Department of Environmental Conservation

Division of Hazardous Waste Remediation

North Lawrence Oil Dump Site

Site Number 6-45-013
St. Lawrence County, New York

Record of Decision

March 1993

New York State Department of Environmental Conservation
MARIO M. CUOMO, *Governor* THOMAS C. JORLING, *Commissioner*

RECORD OF DECISION

FOR

NORTH LAWRENCE OIL DUMP SITE

ST. LAWRENCE COUNTY, NEW YORK

ID #645013

PREPARED BY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF HAZARDOUS WASTE REMEDIATION

MARCH 1993

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DECLARATION STATEMENT - RECORD OF DECISION

SITE NAME AND LOCATION:

North Lawrence Oil Dump Site
St. Lawrence County, New York
Site ID #: 6-45-013
Funding Source: 1986 Environmental Quality Bond Act

STATEMENT OF PURPOSE:

This Record of Decision (ROD) sets forth the selected remedial plan for the North Lawrence Oil Dump Site. This remedial action was developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986; and with the New York State Environmental Conservation Law (ECL).

STATEMENT OF BASIS:

This decision is based upon the Administrative Record for the North Lawrence Oil Dump Site and upon public input to the Proposed Remedial Action Plan (PRAP). A copy of the Administrative Record is available at the New York State Department of Environmental Conservation (NYSDEC), 50 Wolf Road, Albany, New York. A Document Repository is located in the Town Clerk's Office, Municipal Building, North Lawrence, New York and at the NYSDEC - Region 6 Headquarters, Watertown, New York respectively. A Responsiveness Summary, that documents the public's expressed concerns, has been included in Appendix A.

ASSESSMENT OF THE SITE:

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

SUMMARY OF SELECTED REMEDIAL ACTION:

The remedy selected for the contaminated lagoons soils and wetland sediments at the North Lawrence Oil Dump Site is Alternative 2: On-Site Solidification/Stabilization. The major components of the remedy are as follows:

a. A pilot test of the solidification/stabilization process will be conducted.

b. The top 2 to 4 ft. of soils in the lagoon contaminated

with oil PCBs, lead and volatile organic chemicals and 6"-12" of sediments from selected areas of the wetland near the lagoon contaminated with PCBs, mercury and lead will be excavated and treated on-site by a solidification/stabilization process.

c. The excavated lagoon area will be refilled with clean soil. A disposal cell would be constructed to maintain at least 2 to 3 feet separation between the high seasonal groundwater and the bottom of the disposal cell.

d. The treated materials will be placed in the disposal cell and the cell, closed with a properly engineered low permeability (10^{-7} cm/sec) cap. (see cross section in Appendix B).

e. A wetland restoration plan will be implemented to restore areas of the wetland damaged during construction.

f. A long term monitoring program including, but not limited to, biota, surface water, and groundwater monitoring will be implemented.

The final remedy will not remove lead contamination above the threshold of tolerance of biological organisms. Therefore, the long-term monitoring program will include a special pre and post construction monitoring program to evaluate the potential impacts of the remaining contamination on the wetland biota as compared to a neighboring uncontaminated wetland.

This alternative will reduce potential threats to the environment by reducing the toxicity, mobility and availability of site contaminants.

Since treated and residual waste will be left on site, the final remedy will also include:

1 - Access Restrictions (i.e, fencing and warning signs),

2 - Educational Programs (see health advisory in Appendix C)

3 - Institutional Controls (to minimize land and groundwater use),

4 - Environmental Monitoring

5 - Five Year Review.

Under items 4 and 5 listed above, environmental monitoring data and the wetland biota monitoring data will be reviewed after five years to help evaluate the effectiveness of the remedy and to decide whether or not additional monitoring or actions are needed, and/or if the site may be delisted.

The selected remedy is satisfactory to the New York State Department of Health.

DECLARATION:

The selected remedy is designed to be protective of human health and the environment, is designed to comply with applicable State Environmental Quality Standards and is cost effective. The remedy satisfies the Department's preference for treatment that reduces the toxicity, mobility or volume of hazardous substances, pollutants or contaminants as the principal goal.

March 25, 1993
Date

Ann DeBarbieri
Deputy Commissioner

SITE BACKGROUND AND DESCRIPTION

The North Lawrence Oil Dump Site (NLODS) is located adjacent to McAuslen Road (on the south side) approximately 1/3 of a mile east of Cemetery Road in the Township of Lawrence, St. Lawrence County, New York. (See Figure 1)

The NLODS is an inactive hazardous waste site which consists primarily of a waste disposal lagoon. The lagoon is approximately 600 feet long and 75 feet wide and is immediately adjacent to a NYSDEC regulated 150-acre wetland and a former non-regulated municipal dump. During the middle to late 1960's, the lagoon was operated as a disposal area and received waste oils and oil sludge.

These materials have also been found in the adjacent wetland sediments. It appears that contamination has migrated over the topographically low, southwestern end of the lagoon as a result of flooding, high water in the wetlands and/or possibly past disposal practices.

SUMMARY OF PAST SITE INVESTIGATIONS

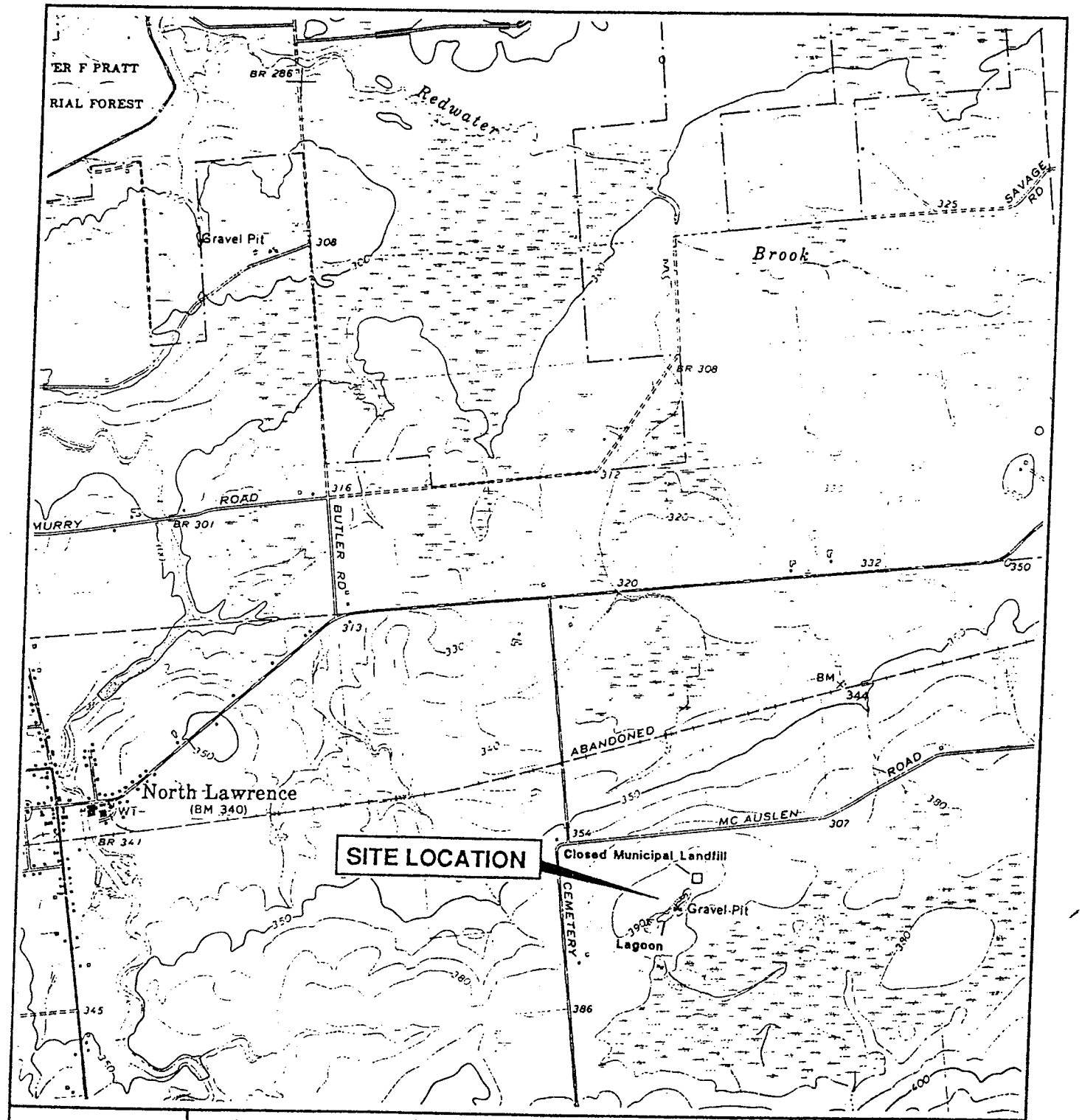
In 1980, NYSDEC staff observed oil stains on vegetation 18 inches above the water in the southeastern end of the lagoon. Samples were collected which showed 100 parts per million (ppm) PCBs in the lagoon sediments. Recra Research, Inc. was retained to perform a Phase I Engineering Investigation for the NYSDEC which was completed in August of 1985.

A contract was signed with the E.C. Jordan Company (Jordan) in October 1988 to complete a phased Remedial Investigation and Feasibility Study (RI/FS). The RI/FS is used to determine the extent of site contamination and to recommend an appropriate remedial action.

The first phase RI field work was conducted in 1989. In addition to total petroleum hydrocarbon analysis, samples were analyzed for other common components of waste oils. These included PCBs, volatiles, semi-volatiles and inorganics.

Due to problems with the First Phase field laboratory and subsequent cost overruns, extensive time was lost in re-budgeting the original contract. In May of 1991, a decision was made to issue a Standby Contract Work Assignment to Jordan to complete the 2nd Phase RI/FS. This allowed work to continue on the project while negotiations took place to properly address the cost overruns and to closeout the original contract.

The Second Phase RI was conducted to confirm the results of the First Phase RI and further delineate the extent of site contamination. The data collected indicated that lead contamination extended much further into the wetland than



SITE LOCATION MAP
NORTH LAWRENCE OIL DUMP SITE
REMEDIAL INVESTIGATION

E.C.JORDAN CO.

6886-03

FIGURE 1

anticipated. Therefore, additional samples were collected in the wetland in June of 1992.

The December 28, 1992 draft final RI/FS and RA reports contains the results and discusses the findings of all phases of the NLODS investigation.

SUMMARY OF REMEDIAL INVESTIGATION FINDINGS

The Remedial Investigation (RI) is intended to determine the nature and extent of contamination and to gather sufficient information to identify, evaluate, and recommend remedial actions appropriate for the site. The following paragraphs summarize the RI findings.

Geology and Hydrogeology

The site geology of the NLODS consists of loose, unconsolidated and unsaturated surface soils which range from 5 to 17 feet below ground surface. Underlying the surface soil is a dense glacial till consisting of varying grain sizes, ranging from clay to gravel intermixed with cobbles and boulders. The thickness of this unit is estimated to range from 35 to 75 feet. The site bedrock ranges from 40 to 85 feet below ground surface and dips to the southeast. Depth to groundwater at the site is shallow (3 to 8 ft). Both shallow and deep groundwater flow in a southerly direction toward the wetland.

Soil Contamination in Lagoon

A total of 41 soil borings were installed in the lagoon and 52 soil samples were collected for analysis to determine the extent of contamination in the subsurface soils. The lagoon soils were found to be contaminated with varying concentrations of total petroleum hydrocarbons (TPHs), PCBs, volatile, semivolatile, and inorganic (metals) contamination to a depth of 12 feet below ground surface (bgs). Significant contamination is located closer to the ground surface (2-4 feet) with contaminant levels decreasing with depth.

Total Petroleum Hydrocarbons (TPHs)

TPHs were detected in the lagoon soils in 84 of 214 samples with an average concentration of 5,945 ppm and a high of 71,000 ppm (which was detected 2 to 4 feet bgs). While TPH contamination was detected at 180 ppm at 14 to 16 feet bgs, the majority of significant TPH contamination was limited to a depth of 10 to 12 feet bgs.

Volatile Organic Compounds (VOCs)

Ten VOCs were detected in the lagoon samples from the First Phase RI and nine VOCs were detected during the Second

Phase RI. The four most frequently detected and most concentrated compounds are summarized in the following table:

Compound	# detects (52 samples)	High Conc.	Average Conc.
Total Xylenes	35	130 ppm	28 ppm
Tetrachloroethylene (PCE)	35	99 ppm	10 ppm
Trichloroethylene (TCE)	27	21 ppm	3 ppm
Toluene	27	42 ppm	5 ppm

ppm = parts per million = mg/kg

As described earlier, higher concentrations were detected closer to the ground surface.

Semivolatile Organic Compounds (SVOCs)

The three most frequently detected SVOCs are Naphthalene, 2-Methylnaphthalene, and Phenanthrene. These compounds are listed in the following table:

Compound	# detects (47 samples)	High Conc.	Average Conc.
Naphthalene	13	110 ppm	13 ppm
2-Methylnaphthalene	17	210 ppm	19 ppm
Phenanthrene	6	11 ppm	3 ppm

ppm = parts per million = mg/kg

The deepest interval at which SVOCs were detected was at 6 to 8 feet bgs. The concentration of SVOCs at this depth was 3.4 ppm of 2-Methylnaphthalene. Higher levels of SVOC contaminants were detected closer to the lagoon surface.

Polychlorinated Biphenyls (PCBs)

The initial discovery of PCBs by NYSDEC staff in 1980 indicated a high of 100 ppm PCB contamination in the lagoon soils. During the phased RI conducted by Jordan, PCBs were detected in 68 of 261 lagoon soil samples with concentrations ranging from 0.7 to 60 ppm. It should be noted that only one sample (60 ppm) was above the 50 ppm PCB TSCA requirement for off-site disposal. This detection was found at the 4 to 6 feet sample interval and is not representative of lagoon PCB contamination. The next two highest samples detected in the lagoon were 46 ppm and 34 ppm, which were both detected within 2 feet of the surface.

Inorganics (metals)

The primary inorganic compound of concern found in the lagoon soils is lead, which was selected as an indicator compound for metals contamination. Significant lead contamination is located at the lagoon surface. Lead was detected in the 0 - 2 foot sample interval at levels of 75,900 ppm, 58,500 ppm and 10,900 ppm. Lead was also detected above background levels (17 to 30 ppm) at depth; a soil sample in the 8-10 foot sample interval showed lead at 380 ppm.

Wetland Sediments and Surface Water Contaminants

The nature of past disposal practices in the wetland area resulted in higher levels of contaminants near the lagoon, with levels decreasing with distance away from the lagoon. Surface water acts as the primary transport mechanism for the lead, distributing contamination throughout the wetland in the direction of natural surface drainage.

Sediments within 300 feet of the lagoon are contaminated with inorganics (particularly lead) PCBs, and VOCs. Mercury contamination was also detected in the lagoon in 12 of 20 samples. The average was 0.98 ppm with a high of 1.9 ppm. All detections were above the NYSDEC guidance value of 0.11 ppm.

The following table summarizes the RI analytical results:

Wetland Sediments Near Lagoon

Compound	# detects/ # samples	High	Average
Total PCBs	9/36	26 ppm	9.4 ppm
Total VOCs	5/14	3 ppm	1.5 ppm
Lead	16/16	10,900 ppm	1960 ppm

ppm = parts per million = mg/kg

The RI analytical results indicate that contamination further than 300 feet from the lagoon berm is limited to lead. Lead contamination in excess of 1000 ppm has been detected within approximately 700 feet of the lagoon. Lead contamination above measured background levels (17 to 30 ppm) has been detected in wetland sediments as far as 1/2 mile from the lagoon.

Lead was detected in 12 of 18 surface water samples with a high of 15,600 parts per billion (ppb). VOC and PCB results show insignificant levels of contamination in the surface water.

Groundwater Contamination

Groundwater contamination is limited to VOC in monitoring well MW-104B, which is located directly down-gradient from the lagoon. During the first phase RI, TCE was detected at 93 ppb, PCE was detected at 42 ppb and Benzene was detected at 12 ppb. During the second phase RI, TCE was detected at 34 ppb and PCE was detected at 14 ppb.

No VOCs were detected in any monitoring wells adjacent to or down gradient of MW-104B, indicating that migration of contaminants through groundwater is limited to the immediate lagoon area.

Air Contamination

No PCBs were detected during the air monitoring program conducted during the 1st Phase RI program.

SUMMARY OF RISK ASSESSMENT FINDINGS

The Baseline Public Health Risk Assessment (BPHRA) and Baseline Ecological Risk Assessment (BERA) document was prepared using the findings of the phased Remedial Investigations conducted at the NLODS. The Risk Assessment (RA) document was developed to evaluate the potential adverse effects of site related contamination to human and environmental receptors. The RA identifies the primary chemicals of concern, possible exposure pathways, toxicity and potential associated risks. This information was used to develop remedial objectives and target cleanup levels for the chemicals of concern. The following paragraphs summarize the RA findings.

Human Health Risks

The Baseline Public Health Risk Assessment (BPHRA) was prepared in accordance with USEPA and NYSDEC guidance documents. The BPHRA was completed to evaluate the carcinogenic (cancer) and non-carcinogenic risks associated with exposure to site related contamination. These risks were evaluated for dermal adsorption and soil ingestion occurring as a result of activities in the wetlands and lagoon, and from using the site access road. The most significant exposure risk would be associated with ingestion of highly contaminated soils in the lagoon, which contains high concentrations of lead.

Findings of the BPHRA indicate that contaminants in the lagoon, wetland and access road do not pose significant carcinogenic or non-carcinogenic risks to the public for long-term (chronic) or short-term (acute) exposures.

Due to the remote location and the very limited public use of the site, no significant public health risk is likely to exist. However, access restrictions (i.e., fencing and warning signs), institutional controls (to minimize land and groundwater use), and long-term monitoring will be implemented to limit potential exposures to site contamination. Public health risk(s) will be periodically reevaluated based on long-term monitoring data and any change in anticipated use of the site.

Environmental Risks

The Baseline Ecological Risk Assessment (BERA) identified inorganics, primarily lead, volatile organics and PCBs as chemicals of concern in the wetland sediments. As described in further detail below, lead and PCBs represent the major extent of contamination in the wetland. Other contaminants of concern (such as mercury) are mostly collocated with the PCBs and will be excavated to within standards, with the exception of lead.

The risks of PCB exposure to ecological receptors was evaluated using a number of criteria and modeling techniques. This included a Food Web Model conducted by Jordan to determine the acute and chronic risks to semi-terrestrial receptors. The evaluation indicated that PCBs above 0.11 to 3.61 ppm PCBs might adversely impact the biota. The findings suggest that small mammals and birds that forage within a limited home range and specialize on invertebrates may be impacted if they were to forage regularly in the NLODS wetlands. Large animals are not likely to be impacted by the NLODS PCB contamination. This is likely due to the larger home range of these animals and, therefore, have a reduced predicted exposure to PCBs in the food web model.

The risks of lead exposure was also researched in the BERA document. Exposure to elevated lead concentrations presents greater risk to a number of wetland receptors. Lead can block nerve impulse transmission and has been shown to strongly inhibit a number of enzymes. Lead in aquatic systems has been demonstrated to result in a number of physiological effects, including reproductive efforts, gastrointestinal effects, and weight loss. Lead has also been shown to inhibit plant growth, and to bioconcentrate in freshwater biota. Lethal and sublethal effects of lead have been demonstrated in numerous aquatic species.

The BERA indicates that it is impractical to remove all lead contamination above criteria in the wetland because the extent of the excavation of high level lead would cause more harm to the wetland in terms of physical destruction, than is apparently experienced due to chemical exposure. The BERA also indicated the need for a long-term bio-monitoring program to further evaluate the risks associated with the residual lead contamination.

REMEDIAL OBJECTIVES

Based on the results of the RI and RA, the following remedial objectives were identified:

- Prevent or mitigate the release of contaminants of concern to the wetland and surface waters immediately adjacent to the site,
- Reduce risks to human health and the environment associated with inhalation, direct contact, and incidental ingestion of contaminants in the surface soils and sediments of the site; and
- Reduce the volume, toxicity, or mobility of contaminants of concern in the soil, sediments, and groundwater.

The RA and remedial objectives are considered to determine the extent of remediation appropriate for the NLODS. Cleanup goals are established which will meet the remedial objectives and reduce the risks associated with site waste. The cleanup goals allow specific volume and cost calculations in the Feasibility Study, which are necessary to evaluate the remedial alternatives and select the final site remedy.

Lagoon Soils Cleanup Goals

The draft FS used a preliminary cleanup goal to allow general comparisons of alternatives based on an estimated volume of contamination. Specific cleanup goals were established later in the FS process using the NYSDEC Technical Administrative Guidance Memorandum (TAGM) Number 4046 entitled, "Determination of Soil Cleanup Levels." These cleanup levels are established on a site specific basis to prevent leachate generation which might cause contamination of groundwater above standards. The following cleanup goals were established for lagoon soils using TAGM 4046:

Lagoon Soils Cleanup Goal

Compound	Cleanup Goal
PCBs - surface soils	1 ppm
- at depth	10 ppm
VOCs	
TCE	0.7 ppm
PCE	1.4 ppm
Xylene	1.2 ppm
Toluene	1.5 ppm
Lead	500 ppm

ppm = parts per million = mg/kg

These cleanup goals address compounds and contaminants found in waste oil and, along with visual observations, would address removal of TPH contamination.

The majority of contamination above these cleanup goals will be removed by excavating to a depth of 2 to 4 feet below ground surface in the lagoon. Additional excavation may be necessary in the southwestern portion of the lagoon to remove high level PCB contamination (60 ppm at 6 feet bgs).

The volume estimated in the draft FS is comparable to the volume calculated using the above listed cleanup goals. Precise calculations will be completed during the design and implementation of the selected remedy.

Wetland Sediments Cleanup Goal

The RI identified contamination in the wetland sediments above criteria for PCBs, VOCs and inorganics, primarily lead and mercury. PCBs and mercury were selected as indicator compounds because they are collocated with other contaminants (i.e., VOCs, SVOCs, elevated inorganics). Because they are collocated, excavation of PCB and mercury contamination will, in effect, remove VOCs, SVOCs and the areas with the highest levels of lead contamination.

As described in detail in the RA and FS documents, a specific cleanup goal for lead was not calculated. Lead contamination will remain in the wetland sediments at levels in excess of the Division of Fish and Wildlife's Sediment Criteria of 27 ppm and Limit of Tolerance Criteria of 250 ppm. This approach is necessary due to the extent of lead contamination present in the wetland. It has been determined infeasible to remediate to ideal lead levels in the wetland because the excavation of all lead above 250 ppm would cause more harm to the wetland in terms of physical destruction, than is apparently experienced due to chemical exposure. Furthermore, excavation of the additional lead contamination is not considered cost effective.

The ideal cleanup goal for PCBs in the wetland sediments were estimated using Division of Fish and Wildlife criteria as 0.11 ppm. It is recognized that, due to analytical and construction constraints, a cleanup goal of 0.11 ppm may be impractical. Based on the distribution of PCBs in the wetland, a cleanup level of 0.5 to 1.0 ppm appears achievable. The final cleanup level will be determined by pre-design samples and construction constraints. The pre-design samples will be used to determine the extent and concentrations of PCBs in the wetland sediments. Based on the analytical results and the practicality of construction, a cleanup level will be established as close to ideal goal as feasible and cost effective. It must be recognized that some potential risk may exist at levels exceeding the ideal goal.

The following cleanup levels were established for PCBs and mercury in the hot spot area:

Wetland Sediments Cleanup Levels

Compound	Cleanup Level
* PCBs	0.5 - 1.0 ppm
Mercury	0.11 ppm

ppm = parts per million = mg/kg

* Note: The ideal cleanup goal for PCB would be 0.11 ppm. See discussion preceding table.

All known volatile and semivolatile contamination in the wetland will be removed using these cleanup goals. In addition, some highly elevated levels of lead will be excavated, thereby further reducing the continuing source of inorganic contamination to the wetland.

The total volume of wetland sediments and lagoon soils to be excavated for remediation is approximately 7,000 to 8,000 cubic yards. Figure 2 shows the general extent of the lagoon and wetland that will be excavated.

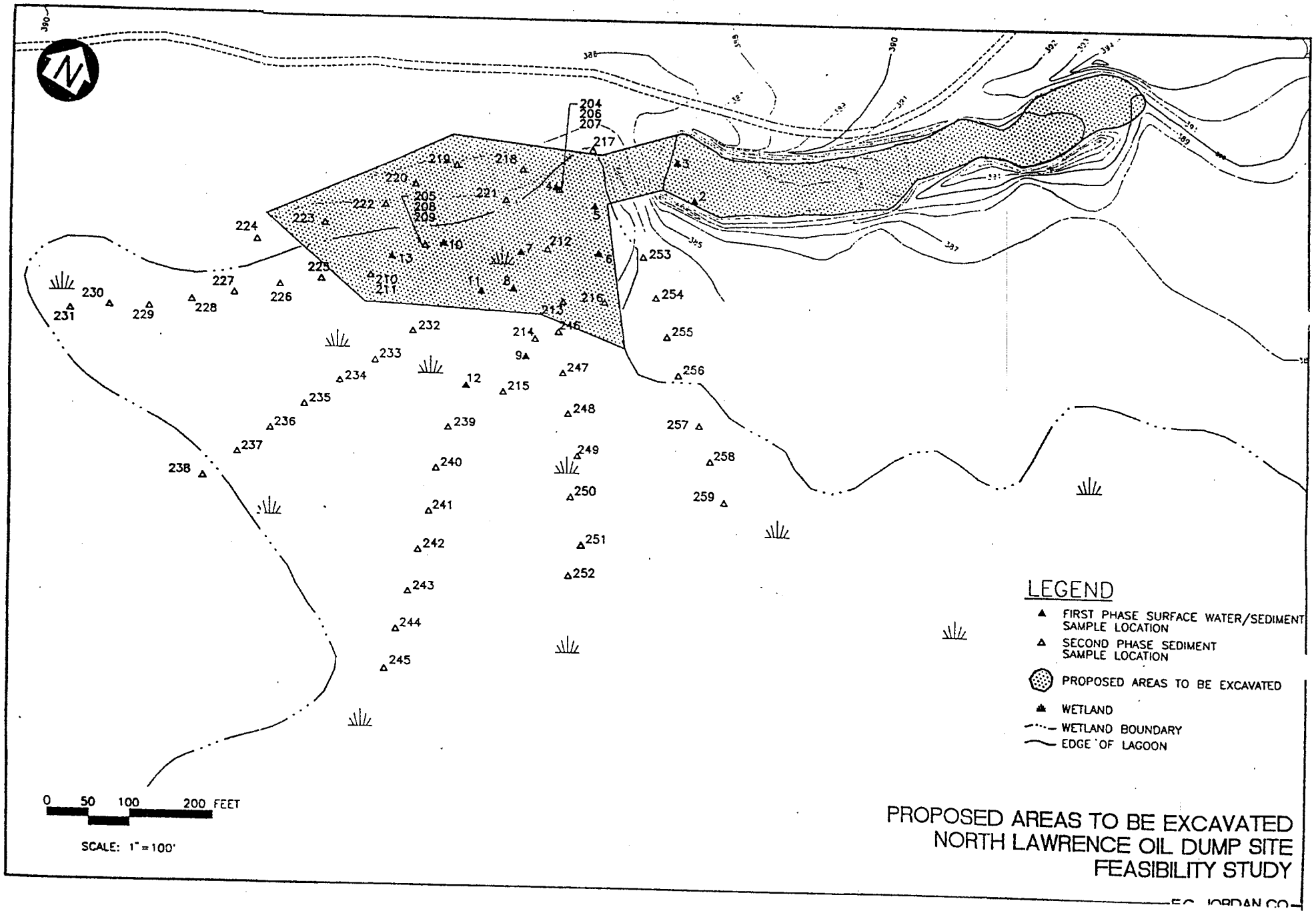

LEGEND
FIRST PHASE SURFACE WATER/SEDIMENT SAMPLE LOCATION
SECOND PHASE SEDIMENT SAMPLE LOCATION
PROPOSED AREAS TO BE EXCAVATED
WETLAND
WETLAND BOUNDARY
EDGE OF LAGOON
0 50 100 200 FEET
SCALE: 1" = 100'
PROPOSED AREAS TO BE EXCAVATED
NORTH LAWRENCE OIL DUMP SITE
FEASIBILITY STUDY

FIGURE 2

Summary of Remedial Alternatives

Remedial alternatives were developed and evaluated throughout the RI/FS process using the objectives described above. The following section is provided to summarize the alternatives evaluated for contaminant remediation at the site.

Alternative 1: Minimal Action

The Minimal Action Alternative was developed as a baseline with which to compare other remedial alternatives and is included in the detailed evaluation in accordance with program requirements. This alternative represents the minimal action that would be taken to provide protection of public health and the environment without disturbing contaminated soils and sediments.

While no remedial technology would be implemented under Alternative 1, efforts would be made to reduce the potential for impact through the following key site closure components: 1) access restrictions, 2) education programs, 3) institutional controls, 4) environmental monitoring, and 5) five year review.

The Minimal Action Alternative has a Capital Cost of $141,000 and a Total Present Worth Cost of $1,186,000.

Alternative 2: On-Site Solidification/Stabilization

Alternative 2 would combine excavation and on-site solidification/stabilization (S/S) of lagoon sludge, underlying soils, and wetland sediments. The treated soils would be landfilled on site in a disposal cell constructed 2 to 3 feet above the high groundwater table. A properly engineered low permeability cap would be placed over the cell. This alternative would reduce potential threats to the environment by reducing mobility and availability of site contaminants. The damaged wetland would be restored and the five site closure components described in the Minimal Action Alternative would be implemented.

Alternative 2 has a Capital Cost of $3,830,000 and a Total Present Worth Cost of $5,091,000.

Alternative 3: On-Site Incineration and Solidification

Alternative 3 would combine excavation and on-site incineration of lagoon sludge, underlying soils, and wetland sediments followed by S/S of incinerated materials. The treated soils would be landfilled on site in a disposal cell constructed 2 to 3 feet above the high groundwater table. A

properly engineered low permeability cap would be placed over the cell. This alternative would reduce potential threats to the environment by reducing mobility and availability of site contaminants. The damaged wetland would be restored and the five site closure components described in the Minimal Action Alternative would be implemented.

Alternative 3 has a Capital Cost of $12,666,000 and a Total Present Worth Cost of $13,896,000.

Alternative 4: On-Site Solvent Extraction and Solidification

Alternative 4 would combine excavation and on-site treatment of lagoon sludge, underlying soils, and wetland sediments by solvent extraction technologies followed by S/S. The separated PCB-contaminated oily waste stream would be disposed at a TSCA facility. The treated soils would be landfilled on site in a disposal cell constructed 2 to 3 feet above the high groundwater table. A properly engineered low permeability cap would be placed over the cell. This alternative would reduce potential threats to the environment by reducing mobility and availability of site contaminants. The damaged wetland would be restored and the five site closure components described in the Minimal Action Alternative would be implemented.

Alternative 4 has a Capital Cost of $11,241,000 and a Total Present Worth Cost of $12,502,000.

Alternative 5: On-Site Low Temperature Thermal Desorption and Solidification

Alternative 5 would combine excavation and on-site treatment of lagoon sludge, underlying soils, and wetland sediments, by low temperature thermal desorption technologies followed by S/S and placement of treated materials under a properly designed cap. The separated PCB-contaminated oily waste stream would be disposed at a TSCA facility. The treated soils would be landfilled on site in a disposal cell constructed 2 to 3 feet above the high groundwater table. A properly engineered low permeability cap would be placed over the cell. This alternative would reduce potential threats to the environment by reducing mobility and availability of site contaminants. The damaged wetland would be restored and the five site closure components described in the Minimal Action Alternative would be implemented.

This alternative has a Capital Cost of $9,812,000 and a Total Present Worth Cost of $11,073,000.

Alternative 6: Off-Site Disposal at RCRA-Permitted Landfill and/or Incineration

Alternative 6 would include excavation of contaminated lagoon sludge, underlying soils, and wetland sediments, and treatment and/or disposal in an off-site RCRA-permitted Subtitle C landfill or incinerator. This alternative would reduce potential threats to the environment by removing contaminated sludge, soil, and sediments above target cleanup levels. Clean backfill material would be placed into the excavated lagoon area. The damaged wetland would be restored and the five site closure components described in the Minimal Action Alternative would also be implemented.

This alternative has a Capital Cost of $13,362,000 and a Total Present Worth Cost of $14,124,000.

Remedial Alternatives Evaluation Criteria

The following criteria were used, in conjunction with the remedial objectives, in evaluating the potential remedial alternatives for the North Lawrence Oil Dump Site:

1. **Overall Protection of Human Health and the Environment**

This criterion will provide a final check to assess whether each alternative provides adequate protection of human health and the environment. The overall assessment of protection draws on the assessments conducted under other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness and compliance with applicable standards.

2. **Compliance with Standards, Criteria and Guidance Values (SCGs)**

This evaluation criterion will be used to determine whether each alternative will meet all of its identified federal and state requirements. The detailed analysis will summarize which requirements are applicable, relevant, and appropriate to an alternative and describe how the alternative meets these requirements.

3. **Long-Term Effectiveness and Permanence**

The evaluation of alternatives under this criterion will address the results of the remedial action in terms of the risk remaining at the facility after response objectives have been met. The primary focus of this evaluation will be the extent and effectiveness of the controls that may be required to manage the risk posed by treatment residuals and/or untreated wastes. Such an evaluation is particularly important to all alternatives.

4. **Reduction of Toxicity, Mobility, or Volume through Treatment**

This evaluation criterion will address the regulatory preference for selecting remedial actions that employ treatment technologies permanently and significantly reducing the toxicity, mobility, or volume of the contaminants. This preference is satisfied when treatment is used to reduce the principal risks at a site through destruction of contaminants, for a reduction of total mass or contaminants, to attain irreversible reduction in mobility, or to achieve reduction of the total volume of contaminated media.

5. **Short-Term Effectiveness**

This evaluation criterion will address the effects of the alternatives during the construction and implementation phase until remedial response objectives are met. Under this criterion, alternatives will be evaluated with respect to their effects on human health and the environment during implementation of the remedial action.

6. **Implementability**

The implementability criterion will address the technical and administrative feasibility of implementing an alternative and availability of various services and materials required during its implementation.

7. **Cost**

Detailed cost analysis of the selected remedial alternatives will include the following:

- Estimation of capital, operations and maintenance (O&M), and institutional costs; and
- Present worth analysis.

Costs developed during the FS are expected to provide an accuracy of +50% to -30%.

RATIONALE FOR SELECTION

The following summarize the results of the detailed evaluation of remedial alternatives:

- Alternative 1, Minimal Action, would not protect the environment and would not meet chemical or location specific SCGs.
- Alternative 6, Off-Site Disposal, is the lowest on the NYSDEC hierarchy of technology and is also not considered cost effective

The remaining technologies involve on-site application of technologies that would reduce toxicity, mobility or volume of contamination and be protective of human health and the environment.

- Alternative 4, Solvent Extraction, and Alterative 5, Low Temperature Thermal Desorption, are similar separation/treatment technologies. However, Alternative 4 has fewer available vendors and would be more costly to implement.

- Alternative 3, Incineration, would require substantial time prior to implementation and would have the greatest short term impact to the local community.

- Alternative 2, Solidification/Stabilization, is considered the most appropriate remedial action for treatment of site waste. Furthermore, it is the most cost effective remedy as it shows similar performance to the next highest preferred remedy (Alternative 5) at a significant cost savings ($5,982,000 less).

SUMMARY OF THE GOVERNMENT DECISION

Based on a comparison of the six remedial alternatives to the remedial objectives and criteria described above, the recommended remedial alternative for the North Lawrence Oil Dump Site is Alternative 2, On-Site Solidification/Stabilization. This alternative provides the most feasible remedial action for addressing NLODS contamination.

Solidification/Stabilization (S/S) is considered a fixation technology that is a permanent remedy for treatment of inorganic contamination. Although S/S will not destroy or remove PCBs and other organics, it will reduce the bioavailability of these constituents and is considered a permanent remedy for waste with low levels of organic contamination. Excavation of any materials containing PCB's in excess of 50 ppm are regulated by TSCA. Contamination above 50 ppm PCBs was found in only one area in the lagoon, TB-106, at a depth of 6 feet below ground surface.

The bench-scale treatability study conducted for this site concluded that the NLODS waste can be effectively solidified to produce a material having improved structural integrity, with low leachability and permeability. In order to verify the results of the bench scale S/S test, a pilot scale test will be performed using highly contaminated soils. This "trial run" will determine the effectiveness of the S/S technology on heavily contaminated materials in larger volumes. It will also provide more quantitative performance, design and cost data for allow refinement of the final remedy components.

Materials will be placed in an on-site disposal cell following treatment by S/S technology. The detailed design of the landfill cell will be dependent on the findings of the pilot study. The following components represent the major design considerations appropriate for disposal at the NLODS.

a) Excavation and Treatment

The top 2-4 ft. of contaminated soils in the lagoon and 6-12" of sediments in selected areas of the wetland near the lagoon contaminated with PCBs, lead and/or mercury will be excavated. These contaminated materials will be solidified/stabilized on-site.

b) Placement of Treated Materials

Materials from the lagoon and wetland will be placed in the lagoon area following treatment. In order to maintain the integrity of the treated material, it is necessary to place materials above the groundwater table. Because the lagoon excavation will extend below the groundwater table, the excavation will require regrading with clean backfill material in order to place treated materials above the water table.

Section 360-2.13(d) of the NYSDEC Division of Solid Waste 6 NYCRR regulations requires a minimum separation of 5 feet between the base of the disposal cell and the seasonal high groundwater table. The shallow groundwater table at the NLODS will likely make it practical to maintain only a 2 to 3 feet separation distance. The need for a liner system will also be evaluated in the remedial design to provide additional protection of the cell and further limit groundwater contact with the treated waste. The cost of a liner system was not developed as part of Alternative 2 in the FS document. An additional cost of $250,000 has been estimated for a liner system. This would not significantly affect the cost effectiveness of the remedy. Detailed liner costs would be established during the remedial design.

c) Cap Construction

A properly engineered low permeability cap will be constructed over the treated material to minimize infiltration and weathering effects and maintain the integrity of the solidified material. The specific parameters of the low permeability cap will be established in the remedial design. A typical cross section of a low permeability cap is illustrated in Appendix B.

d) Long-term Monitoring Program

The final remedy will also include a long-term monitoring program. As discussed previously in the Summary of Feasibility Study Findings, the cleanup goals established for wetland sediments will not remove all lead contamination

above criteria. The final remedy will address lead contamination by removing the elevated levels adjacent to the lagoon (i.e. "hot spot"). The monitoring program will be implemented in the wetland to evaluate the potential short- and long-term impacts on biota from the lead levels remaining in the wetland. A site-specific biomonitoring work plan has not yet been established for the site. The monitoring plan should include, but not be limited to, the following major components:

- Establish baseline ecological conditions on-site and at background reference locations, prior to remediation, and track ongoing trend conditions;
- Evaluate extent of bioaccumulation/biomagnification and potential impact of contamination on ecological population or community;
- Evaluate if exposure to lead is resulting in increased incidence of disease or other physiological disorders;
- Evaluate toxicity and bioavailability of contaminants in wetland sediments.

These components are described in detail in the FS and RA documents. In addition, as part of the State's educational program for this site a health advisory for the consumption of fish and wildlife is outlined in Appendix C.

CONCLUSIONS:

- The NYSDEC considers Alternative 2, On-Site Solidification/Stabilization to be the best balanced remedy for this site. This alternative will satisfy the goal of protecting human health and the environment, to be in compliance with State Standards Guidelines and Criteria, and is cost-effective.

Public Participation

The NYSDEC relies on public input to ensure that the remedies selected for this site meet the needs and concerns of the community and that the remedies are an effective solution to the problem.

As part of the RI/FS, a Citizen Participation Plan was prepared with the following principal objectives:

1. To provide area residents with an understanding of the New York State Superfund process.

2. To provide accurate, understandable information concerning the RI/FS program to interested citizens through project updates and public meetings.

3. To provide the community with information needed to express their views and to discuss issues of concern with NYSDEC during the RI/FS process. Documents and data were made available for public review. Citizens and town officials were asked to express their views and discuss issues of concern with NYSDEC.

4. To establish a good relationship with the local media so that accurate information about RI/Fs activities would be reported.

5. To provide the public an opportunity to make inputs into the project and the selection of remedy for the site.

The following public participation activities were carried out:

1. Document repositories were established at the North Lawrence town Clerk's Office and the NYSDEC - Region 6 Headquarters, Watertown. Pertinent reports and documents related to the RI/FS have been placed there during the project.

2. A public meeting was held on February 10, 1993 at the North Lawrence Fire Hall to discuss the findings and conclusions of the RI/FS, to present the proposed remedial alternatives for the site and to solicit public comment on NYSDEC's chosen remedial alternative. Questions and answers recorded during this meeting and responses received during the 30 day public comment period (February 1, 1993 to March 2, 1993) were used to develop the Responsiveness Summary, presented in Appendix A of this document.

Appendix A

Responsiveness Summary

North Lawrence Oil Dump Site
(# 6-45-013)
Town of Lawrence, St. Lawrence County, New York

RESPONSIVENESS SUMMARY

This Responsiveness Summary was prepared to answer the public's comments about the New York State Department of Environmental Conservation's (NYSDEC's) Proposed Remedial Action Plan (PRAP) to deal with the contaminated soils and wetland sediments at the North Lawrence Oil Dump Site.

NYSDEC invited the public to comment about the proposal through a mailing to the site's contact list and at a public meeting held on February 10, 1993. This Responsiveness Summary addresses the most significant comments received at the public meeting and during the public comment period which ran from February 1, 1993 thru March 2, 1993. A stenographic record of the public meeting was also produced for future reference.

COMMENT: Why is the State concerned about this site? Waste oils containing PCBs used to be spread on roads.

RESPONSE: Concern about spreading waste oil on roads is warranted. Regulations now prohibit such activities because of the environmental problems which can be caused. The State is concerned about the North Lawrence Oil Dump site since it is a known inactive hazardous waste site which poses potential risks to the environment because of the presence of PCBs, lead, mercury, and other contaminants in the waste oil disposed at the site.

COMMENT: The general history of the site is slightly wrong. Specifically, there were three lagoons into which oil was disposed. Did the State find and investigate the other lagoons?

RESPONSE: The State found only one lagoon in the area which contained significant amounts of wastes and which appeared to be impacting the environment. A monitoring well was installed in the general area between the old landfill and main lagoon where the other lagoons reportedly existed. This well had low levels of organic chemical contamination which was thought to emanate from the landfill. However, further inspection of the area will be made during the design phase to determine if other areas exist which warrant remediation.

COMMENT: Won't the excavation of sediments in the wetland stir up the contaminants? Contaminants could then be transported further downstream to farms.

RESPONSE: The actual excavation in the wetland is limited to the area by the lagoon which contains PCBs, lead and mercury. The design and construction work plan will require erosion and sediment controls to minimize or prevent the transport of contaminants. In addition, monitoring of the construction process would occur. Actions would be taken if the construction methods were causing excessive sediment transport. Leaving the contaminated sediments in place poses potential threats to wildlife and other ecological receptors.

COMMENT: What exactly is the remedy the State plans to construct? What will the solidified material look like?

RESPONSE: The State's remedy will consist of the following:

a. The top 2 to 4 feet of contaminated soils in the lagoon and approximately 6" to 12" of sediments in the wetland near the lagoon contaminated with PCBs, lead and mercury will be excavated. These contaminated soils and sediments will be mixed with a cement type mixture to solidify the materials and minimize how much contamination can leach from the material. The solidified material would generally look similar to concrete blocks or could be a granular material. This would be dependent on the actual solidification process used.

b. The excavated area in the lagoon will be refilled with clean soil to a minimum of two feet above the high seasonal groundwater table. This area will then be graded and formed into a cell for placement of the treated/solidified wastes. Evaluation would be made during the design to determine if the cell must be lined with a synthetic plastic-type liner.

c. The cell will then be closed with a low permeability cap consisting of a 6"-12" gravel/soil layer, overlain by 18" of low permeability clay. A 4 foot thick soil layer will be placed over the clay to prevent frost penetration into the clay. Evaluation will be made during design to determine if a synthetic plastic-type liner should be substituted for the clay layer.

d. An environmental monitoring program will be conducted which will include, but not be limited to, biota sampling, groundwater and surface water sampling.

e. Wetlands will be restored in accordance with a wetland restoration plan.

COMMENT: Why not just build a fence if no significant health risk exists?

RESPONSE: Contaminants such as PCBs, lead and mercury are migrating into the wetland from the lagoon. These contaminants are above concentrations in wetland sediments which pose potential risks to the wildlife and the environment. The goal of the remedy is to remove the continuing source of the contamination (contaminated lagoon soils) and excessive levels of PCBs and mercury from the wetland.

COMMENT: How much will the remedy cost?

RESPONSE: The preliminary estimate of the cost is:
Capital Cost (construction) - $ 3,830,000
Present Worth - $ 5,091,000
(construction, annual
operation and monitoring)

The accuracy of this cost estimate is +50% to -30%. A more refined cost estimate will be made during design.

COMMENT: Where will mixing or treatment of the soils occur?

RESPONSE: Treatment will occur on-site.

COMMENT: Will local contractors do any of this work?

RESPONSE: The prime contractor will be chosen through a competitive bidding process. The prime contractor may subcontract some work, but is not required to do so. Occupational Safety and Health Laws require persons that work at a hazardous waste site have a 40 hour training course and medical exams.

COMMENT: Can contaminants from this area affect the Brasher Flats Preserve and farmland during flooding?

RESPONSE: This is not likely. Monitoring data defined the limits of contamination in the wetland. Flooding would dilute the contamination which could travel from the wetland to the low lying areas. In addition, surface water would be monitored as part of the remedy.

COMMENT: Were any special tests conducted that show the solidification process will work?

RESPONSE: Yes. A treatability study was conducted on the heavily contaminated (oily) material. The material was

solidified, and leaching tests and strength tests were conducted to determine if the process would work. The treatability study showed the process will likely work. However, the next step will involve a pilot study in the field to demonstrate the process is fully effective and to determine the best mixture ratios prior to full scale application. Any problems noted during the pilot test will be factored into the final remedy.

COMMENT: Local cancer rates seem high. Was a cancer survey done?

RESPONSE: A cancer survey was not performed. The Risk Assessment for this site did not indicate that the site posed a significant public health risk. The Bureau of Epidemiology would evaluate if a cancer survey was warranted. Residents concerned about the local incidence of cancer may contact the Department of Health which maintains a cancer registry by calling Sue VanPatten at 1-800-458-1152, Ext. 402.

COMMENT: How big will the on-site disposal cell/landfill be? Will it extend into the wetland or wooded area?

RESPONSE: The exact size of the landfill will be dependent on the amount of solidified material and the process used. Approximately 7000 to 8000 cubic yards of material will be solidified. The volume could be increased by 30 to 100% by the solidification process. Therefore, the disposal cell will have a volume of between 9100 - 16,000 cubic yards. The disposal cell will extend into the wooded area and roadway area, but not significantly into the wetland.

COMMENT: How deep will the wetland sediments be excavated? Will this damage the wetland?

RESPONSE: The wetland sediments will likely be excavated to a depth of 6" to 12". The area to be excavated is near the lagoon. Damage to the wetland will occur, and will be restored to the extent practical in accordance with a Wetland Restoration Plan.

COMMENT: Why is the consultant doing the work from Maine? How much was the study?

RESPONSE: The total cost of the study was approximately $ 1,200,000. E.C. Jordan was chosen by evaluating proposals from several prequalified consultants. Subsequent to the initial phase of the work, the initial contract was terminated. E.C. Jordan completed the work under a work assignment issued to them under a Standby Contract. E.C. Jordan was one of the consultants issued a standby contract after competing against other prequalified consultants in a proposal process. Standby

Contracts were negotiated with consultants submitting the best proposals.

COMMENT: What rules apply to the proposed remedy? What if these rules change? Will these solidified materials and any contaminated soils under them have to be dug up if the rules change?

RESPONSE: The remedy was chosen consistent with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The remedy will be designed primarily to comply with the Toxic Substance Control Act (TSCA) and current State Regulations governing the handling and disposal of hazardous and solid wastes. The State cannot predict how future regulations will impact the remedy. The future need to excavate soils under the solidified materials would be minimized by using current criterion to estimate soil cleanup goals and by using visual observations during construction to guide the extent of excavation.

COMMENT: Do the landowners have to pay for the cleanup?

RESPONSE: Prior to spending State Superfund monies, the owner(s) and other parties that might be responsible would be contacted to determine if they can or will cleanup the site. If the responsible parties cannot or will not do the cleanup, it will be done with State Superfund. The State can recover money from the responsible parties if the parties have sufficient financial resources.

COMMENT: Who paid for the study? Who will pay for the $5,000,000 remedy?

RESPONSE: The State taxpayers paid for the study through the State Superfund (Environmental Quality Bond Act). The remedy will also likely be funded by the State taxpayer through the State Superfund.

COMMENT: Will clay be used in the cap? Is anyone looking at the potential problems that could result from the local mining of clay, especially in Brasher Flats, since this remedy, the county landfill, and the remedies at Alcoa, Reynolds and GM will require large amounts of clay. Local residents are concerned about stripping the clay and its impacts on farmland and hydrogeology.

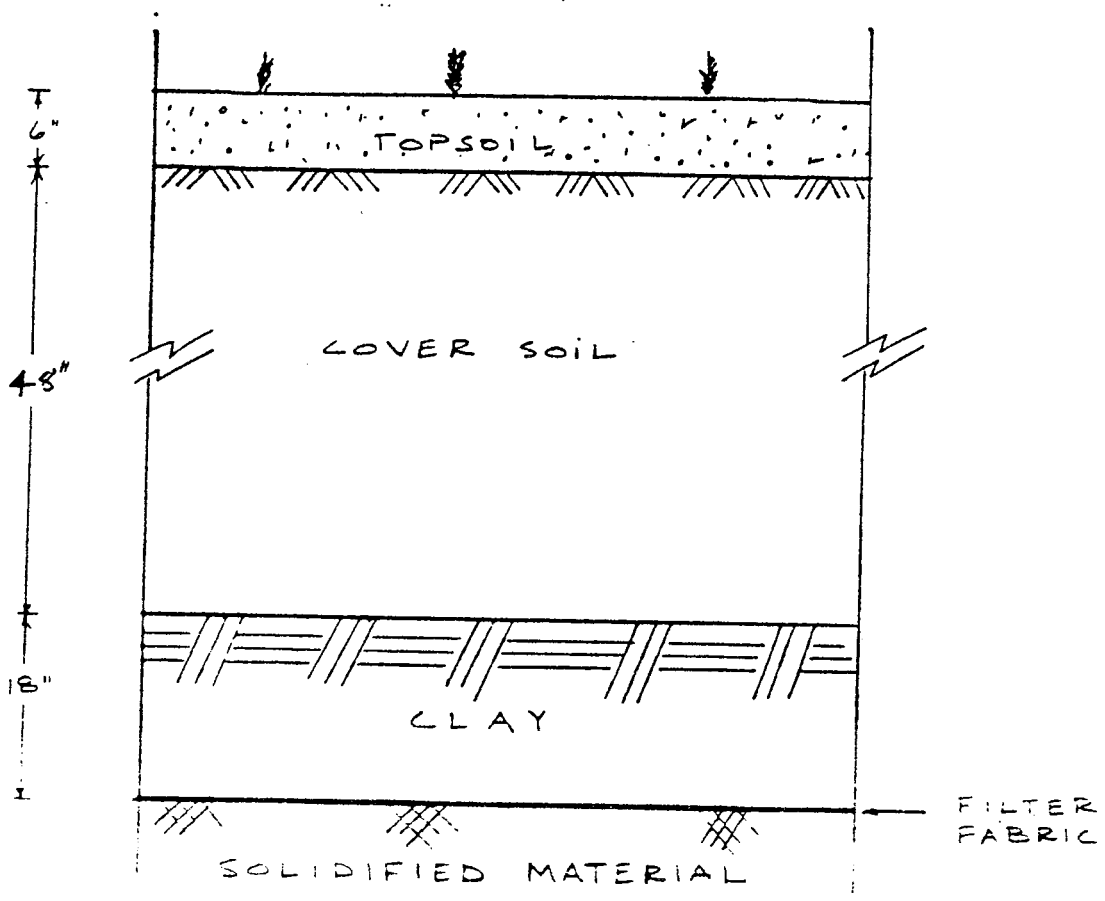
RESPONSE: Mining of clay requires a permit from the NYSDEC. These permits require controls and restoration of land to minimize impact. The concerns expressed by local residents were discussed with staff in the NYSDEC Region 6 office assigned to the mined land permit group. Local residents may call Mr. Zayoski at (315) 785-2293 to discuss mining concerns.

COMMENT: Will the solidification/stabilization process be adversely impacted by soils coated with heavy amounts of oil. Should these soils be sent off-site? Should the disposal cell be lined?

RESPONSE: Oil could interfere with treatment. While the treatability studies indicated the heavily contaminated soils could be solidified, the pilot test will reconfirm this and will evaluate if the process would be made significantly more efficient if the most heavily contaminated soils were removed and disposed off-site. The design will evaluate the need for a lined disposal cell.

Appendix B

PROPOSED CAP SECTION



Appendix C

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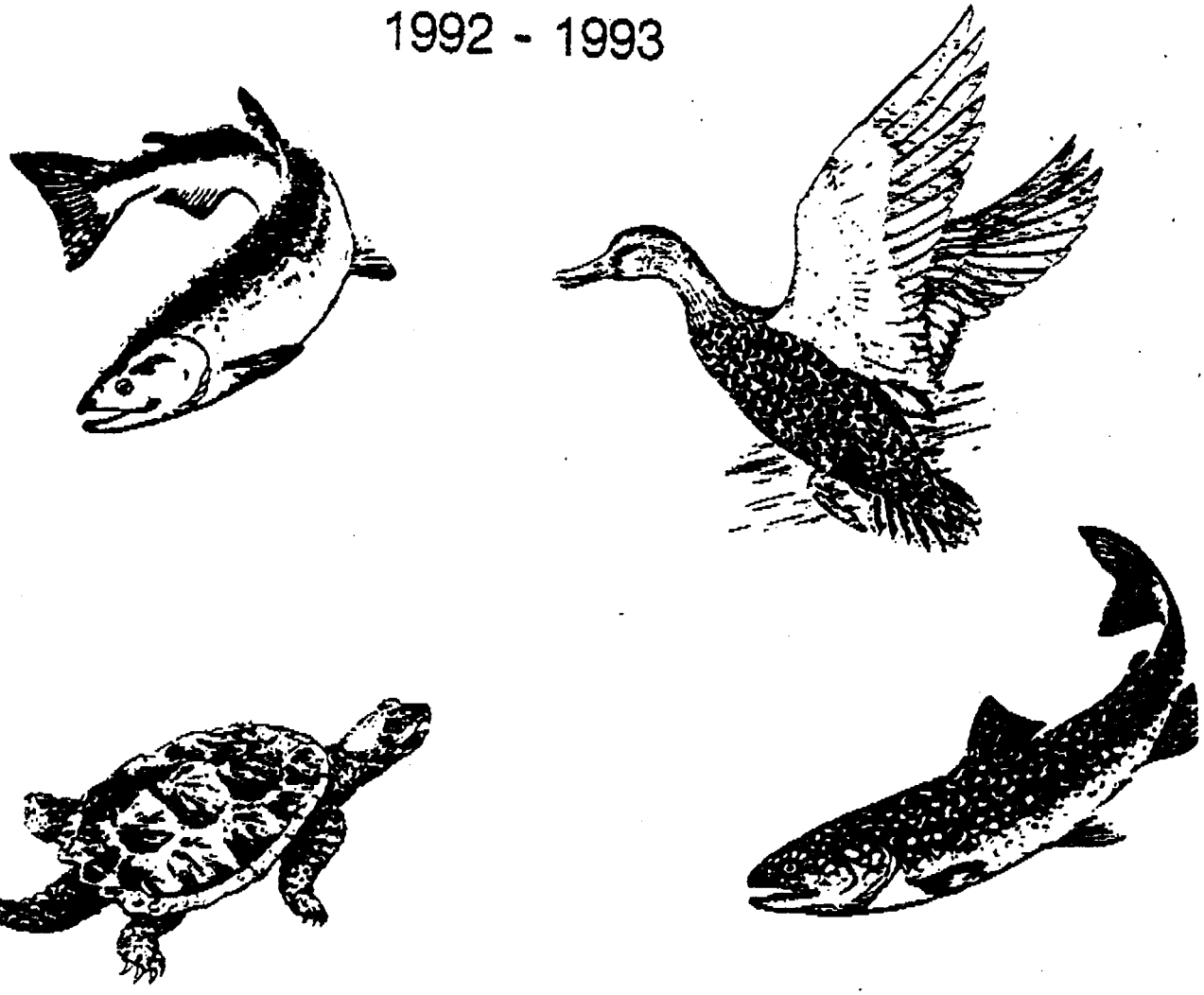
Health Advisory

CHEMICALS IN SPORTFISH AND GAME

1992 - 1993



Prepared by

New York State Health Department

1992-1993 HEALTH ADVISORIES: CHEMICALS IN SPORTFISH OR GAME

SUMMARY

The New York State Department of Health (DOH) issues an advisory on eating sportfish and wildlife taken in New York State because some of these foods contain potentially harmful levels of chemical contaminants. The health advisory is divided into three sections: (1) general advice on sportfish taken from waters in New York State; (2) advice on sportfish from specific water bodies; and (3) advice on wildlife. The advisory is developed and updated yearly and is directed to persons who may be likely to eat large quantities of sportfish or wildlife which might be contaminated.

BACKGROUND

Fishing and hunting provide many benefits including food and recreation. Many people enjoy cooking and eating their own catch. However, some fish and wildlife contain elevated levels of potentially harmful chemicals. These chemicals or contaminants enter the environment through such means as past industrial discharges, leaking landfills and the widespread use of pesticides. Fish and wildlife take in contaminants directly from the environment and from the food they eat. Some chemicals remain in them and then are ingested by people. DDT, PCBs, mirex, chlordane and mercury have been found in some species of fish taken in New York State at levels that exceed federal food standards. Long-term exposure to high levels of these chemicals has been linked to health effects such as cancer (in laboratory animals) or nervous system disorders (in humans).

The federal government establishes standards (tolerance levels or action levels) for chemical residues in or on raw agricultural products, including fish. A tolerance level is the maximum amount of a residue expected when a pesticide is used according to the label directions, provided that the level is not an unacceptable health risk. The federal government estimates of health risks assume that people eat about one one-half pound of fish each month. Action levels are established for chemicals that do not have approved agriculture uses but may unavoidably contaminate food due to their environmental persistence. Fish and wildlife cannot be legally sold if they contain a contaminant at a level greater than its tolerance or action level.

In New York State, the Department of Environmental Conservation (DEC) routinely monitors contaminant levels in fish and wildlife. The contaminant levels are measured in a skin-on fillet which has not been trimmed; the federal government uses this sample in determining whether or not the fish exceeds the tolerance level. When fish from a specific water body are found to contain high contaminant levels, DOH issues a sportfish consumption advisory for that species of fish. Under some circumstances, the state prohibits the sale or offering for sale of fish containing high contaminant levels. Advisories are also developed for contaminated wildlife. These actions are taken to minimize public exposure to contaminated food products.

GENERAL ADVISORY

The general health advisory for sportfish is that an individual eat no more than one meal (one-half pound) per week of fish from the state's freshwaters, the Hudson River estuary, or the New York City harbor area (the New York waters of the Hudson River to the Verrazano Narrows Bridge, the East River to the Throgs Neck Bridge, the Arthur Kill, Kill Van Kull, and Harlem River). This general advisory is designed to protect against consumption of large amounts of fish which may come from contaminated waterways that are as yet untested or which may contain unidentified contaminants. The general advisory does not apply to fish taken from marine waters. Ocean fish, although less tested, are generally less contaminated than freshwater fish, and fish that live further out from shore are likely to be even less contaminated than those that live or migrate close to the shore.

SPECIFIC FRESHWATER ADVISORIES

The second part of the health advisory contains information and recommendations for specific bodies of water. Fish monitoring has identified over thirty water bodies that have fish with a contaminant level that exceeds an action level or a tolerance level. Department of Health recommendations are based on the contaminant levels and suggest either limiting or avoiding eating a specific kind of fish from a particular body of water. In some cases, enough information is available to issue advisories based on the length of the fish. Older (larger) fish are often more contaminated than younger (smaller) fish.

The health advisory contains specific advice for infants, children under the age of fifteen and women of childbearing age. The Health Department recommends that they not eat fish from the specific water bodies listed in the advisory. The reason for this specific advice is that chemicals can have a potentially greater impact on developing organs in young children or in the fetus. Waters which have specific advisories have at least one species of fish with an elevated contaminant level, which means that a contamination source is in or near the water.

MARINE WATERS

The Department of Health has issued specific advisories for marine waters. These apply to striped bass, bluefish, and American eels and are the only marine fish advisories currently in effect. Striped bass, bluefish, and eels have specific habits or characteristics which make them more likely to have contaminants than other marine species.

An advisory has been issued for striped bass because of PCB contamination. Although saltwater fish are generally less contaminated than freshwater fish, fish like striped bass which spend time in Hudson River waters, can be contaminated at levels above food standards. The advisory for striped bass is divided into three geographical areas. For striped bass taken from the Hudson River from the Federal Dam at Troy south to the Tappanzee Bridge, the Health Department recommends against any consumption. For striped bass from the Hudson River from the Tappanzee Bridge south to and including the lower N.Y. Harbor and Long Island Sound west of Wading River, the advisory is to eat no more than one meal per month. The general advisory applies to striped bass from eastern Long Island Sound, the Peconic/Gardiners Bays and Long Island South Shore waters. Women of childbearing age, infants and children under fifteen should not eat striped bass from the Hudson River or lower New York Harbor, and western Long Island Sound.

The Department has extended the general advisory to bluefish and American eels. They are contaminated with PCBs, although to a lesser extent than striped bass from the Hudson River, New York Harbor, and western Long Island Sound. The recommendation for bluefish and American eels caught in New York State's waters is to eat no more than one meal (one-half pound) per week, with an additional recommendation to not eat American eels from the Hudson, Harlem, and East Rivers and New York City harbor area.

OTHER ADVISORIES

The Department has also issued special advisories for crabs in the Hudson River, snapping turtles, and waterfowl which have been found to be contaminated with PCBs. Cooking methods that minimize the amount of contaminants which would be eaten are recommended. The complete advisory is provided at the end of this brochure.

The health implications of eating deformed or cancerous fish are unknown. Any obviously diseased fish (marked by tumors, lesions or other abnormal condition of the fish skin, meat or internal organs) should be discarded.

SHELLFISH

All foods of animal origin, such as meat, poultry, seafoods and dairy products should be thoroughly cooked before consumption. The Health Department specifically recommends that the public not eat raw or partially cooked clams or oysters. This advice is not because of chemical contamination. Raw or partially cooked shellfish illegally harvested from waters contaminated with sewage have been linked to gastrointestinal illness and hepatitis A, caused by bacteria or viruses.

SHOULD I BE CONCERNED ABOUT MEDICAL-TYPE WASTE AND GARBAGE AFFECTING FISH?

The wash-up of medical-type waste and garbage on New York and Long Island beaches has not affected the sanitary condition of marine fish, lobster and crabs. Furthermore, fish do not carry or transmit the AIDS virus. Consumers need not limit consumption of these foods because of these problems. Good sanitary practices should be followed when preparing fish from any waters. Fish should be kept iced or refrigerated until cleaned and filleted and then refrigerated until cooked. Hands, utensils, and work surfaces should be washed before and after handling any raw food, including fish. Seafood should be cooked to an internal temperature of 140° F.

WHAT CAN I DO TO REDUCE MY EXPOSURE TO CHEMICAL CONTAMINANTS FROM FISH?

Fish is an important source of protein and is low in saturated fat. Naturally occurring fish oils have been reported to lower plasma cholesterol and triglycerides, thereby decreasing the risk of coronary heart disease. Increasing fish consumption is useful in reducing dietary fat and controlling weight. By eating a diet which includes food from a variety of protein sources, an individual is more likely to have a diet which is adequate in all nutrients.

Although eating fish has some health benefits, fish with high contaminant levels should be avoided. When deciding whether or not to eat fish which may be contaminated, the benefits of eating those fish can be weighed against the risks. For young women, eating contaminated fish is a health concern not only for herself but also to any unborn or nursing child, since the chemicals may reach the fetus and can be passed on in breastmilk. For an older person with heart disease the risks, especially of long term health effects, may not be as great a concern when compared to the benefits of reducing the risks of heart disease.

Everyone can benefit from eating the fish they catch and can minimize their contaminant intake by following these general recommendations:

1. Choose uncontaminated species from water bodies which are not listed in the Health Department's advisory.

2. Use a method of filleting the fish which will reduce the skin, fatty material and dark meat. These parts of the fish contain many of the contaminants. A pamphlet on this method is available from the DEC.

3. Choose smaller fish, consistent with DEC regulations, within a species since they may have lower contaminant levels. Older (larger) fish within a species may be more contaminated because they have had more time to accumulate contaminants in their bodies.

4. For shellfish, such as crab and lobster, do not eat the soft green substance found in the body section (tomalley, liver). This part of the shellfish has been found to contain high levels of chemical contaminants, including PCBs and heavy metals.

5. Based on limited studies, cooking methods such as broiling, poaching, boiling, and baking, which allow contaminants from the fatty portions of fish to drain out, are preferable. Pan frying is not recommended. The cooking liquids of fish from contaminated waters should be avoided since these liquids may retain contaminants.

The following recommendations are based on evaluating contaminant levels in fish and wildlife. To minimize potential adverse health impacts, the New York State Department of Health recommends:

- Eat no more than one meal (one half pound) per week of fish from the state's freshwaters, the Hudson River estuary, or the New York City harbor area (the New York waters of the Hudson River to the Verrazano Narrows Bridge, the East River to the Throgs Neck Bridge, the Arthur Kill, Kill Van Kull, and Harlem River), except as recommended below.
- Women of childbearing age, infants and children under the age of 15 should not eat fish with elevated contaminant levels. The fish species listed from the waters below have contaminant levels that exceed federal food standards and most fish taken from these waters contain elevated contaminant levels.
- Observe the following restrictions on eating fish from these waters and their tributaries to the first barrier impassable by fish:

Water	Species	Recommendation
*Barge Canal (Tonawanda Creek, Lockport to Niagara River; Erie & Niagara Co.)	Carp	Eat no more than one meal per month.
Belmont Lake (Suffolk Co.)	Carp	Eat None.
Buffalo River and Harbor (Erie Co.)	Carp	Eat none.
Canadice Lake (Ontario Co.)	Lake or Brown trout over 21"	Eat none.
Canandaigua Lake (Ontario-Yates Co.)	Lake trout over 24"	Eat no more than one meal per month.
*Carry Falls Reservoir (St. Lawrence Co.)	Walleye	Eat no more than one meal per month.
Cayuga Creek (Niagara Co.)	All species	Eat none.
East River (NYC)	American eel	Eat none.
Fourth Lake (Herkimer-Hamilton Co.)	Lake trout	Eat none.
Freeport Reservoir (Nassau Co.)	All species	Eat no more than one meal per month.
Gill Creek (Niagara Co.) Mouth to Hyde Park Lake Dam	All species	Eat none.

Grasse River (St. Lawrence Co.) Mouth to dam in Massena; Also see St. Lawrence River	Smallmouth bass, Brown bullhead, Walleye	Eat no more than one meal per month.
Hall's Pond (Nassau Co.)	Carp, Goldfish	Eat none.
Harlem River (NYC)	American eel	Eat none.
Hoosic River (Rensselaer Co.)	Brown and Rainbow trout	Eat no more than one meal per month.
*Hudson River		
- Hudson Falls to Troy Dam	All species	No fishing.
- Troy Dam south to and including the lower N.Y. Harbor	American eel, White perch, Carp, Goldfish, White catfish,	Eat none.
	Walleye, Rainbow smelt, Largemouth bass, Smallmouth bass, Atlantic needlefish, Bluefish, Northern pike, Tiger muskellunge	Eat no more than one meal per month.
- Troy Dam south to Tappan Zee Bridge	Striped bass	Eat none.
- Tappan Zee Bridge south to & including Lower N.Y. Harbor	Striped bass	Eat no more than one meal per month.
	Blue crab	Eat no more than 6 crabs per week.
	- hepatopancreas (mustard, liver or tomalley)	Eat none.
	- cooking liquid	Discard.
Indian Lake (Lewis Co.)	All species	Eat no more than one meal per month.
Irondequoit Bay	Carp	Eat none.
Keuka Lake (Yates-Steuben Co.)	Lake trout over 25"	Eat no more than one meal per month.
Kinderhook Lake (Columbia Co.)	American eel	Eat no more than one meal per month.
*Koppers Pond (Chemung Co.)	Carp	Eat no more than one meal per month.

Lake Champlain		
-whole lake	Lake trout greater than 25", Walleye greater than 19"	Eat no more than one meal per month.
-Bay within Cumberland Head to Valcour Island	American eel, Brown bullhead	Eat no more than one meal per month.
Lake Ontario and Niagara River below the falls	**American eel, Channel catfish, Carp, Lake trout, Chinook salmon, Coho salmon over 21", Rainbow trout over 25", Brown trout over 20".**	**Eat none.**
	White sucker, smaller Coho salmon, Rainbow & Brown trout.	Eat no more than one meal per month.
- West of Point Breeze	White perch	Eat none.
- East of Point Breeze	White perch	Eat no more than one meal per month.
Loft's Pond (Nassau Co.)	Carp, Goldfish	Eat no more than one meal per month.
Long Pond (Lewis Co.)	Splake over 12"	Eat none.
Upper Massapequa Reservoir (Nassau Co.)	White perch	Eat no more than one meal per month.
*Meacham Lake (Franklin Co.)	Yellow perch over 12"	Eat none
	Smaller Yellow perch	Eat no more than one meal per month.
Mohawk River Below Lock 7	White perch	Eat none.
	Smallmouth bass	Eat no more than one meal per month.
Nassau Lake (Rensselaer Co.)	All species	Eat none.
Niagara River Above the falls	Carp	Eat no more than one meal per month.
Niagara River Below the falls; also see Lake Ontario	White perch	Eat none
	Smallmouth bass	Eat no more than one meal per month.
Onondaga Lake (Onondaga Co.)	All species	Eat none.
Oswego River (Oswego Co.) Power dam in Oswego to upper dam at Fulton	Channel catfish	Eat no more than one meal per month.
St. James Pond (Suffolk Co.)	All species	Eat no more than one meal per month.

St. Lawrence River		
- Entire River	American eel, Channel catfish, Lake trout, Carp, Chinook salmon, Coho salmon over 21", Rainbow trout over 25", Brown trout over 20"	Eat none.
	White perch, smaller Coho salmon, Rainbow and Brown trout	Eat no more than one meal per month.
- Bay at St. Lawrence-Franklin County line	All species	Eat none.
Salmon River (Oswego Co.) Mouth to Salmon Reservoir; also see Lake Ontario	Smallmouth bass	Eat none.
Saw Mill River (Westchester Co.)	American eel	Eat no more than one meal per month.
*Schroon Lake (Warren & Essex Co.)	Lake trout over 27"	Eat no more than one meal per month.
Sheldrake River (Westchester Co.)	American eel	Eat none.
*Skaneateles Creek from Dam at Skaneateles to Seneca River (Onondaga Co.)	Brown trout over 10"	Eat no more than one meal per month.
Smith Pond Rockville Center (Nassau Co.)	Carp, Goldfish	Eat no more than one meal per month.
Smith Pond Roosevelt Park (Nassau Co.)	Carp, Goldfish	Eat no more than one meal per month.
Spring Pond (Suffolk Co.)	All species	Eat none.
Stillwater Reservoir (Herkimer Co.)	Splake	Eat no more than one meal per month.
Threemile Creek (Oneida Co.)	White sucker	Eat no more than one meal per month.
Valatie Kill - between Co. Rt. 18 and Nassau Lake	All species	Eat none.

Additional Advice

Additional information on the health advisory may be obtained by calling 1-800-458-1158.

The health implications of eating deformed or cancerous fish are unknown. Any grossly diseased fish should probably be discarded. Levels of PCB, mirex and possibly other contaminants of concern can be reduced by removing the skin and fatty portions along the back, sides and belly of smallmouth bass, brown

trout, lake trout, coho salmon, striped bass, and bluefish. (This technique does not reduce mercury levels, however.) A guide to this method can be obtained from any DEC office.

Marine Waters - The general advisory (eat no more than one meal per week) applies to bluefish and American eels but not to other fish species taken from marine waters. American eels from the Hudson, Harlem, and East Rivers and New York Harbor should not be eaten.

*Marine Striped Bass - Eat no more than one meal (1/2 pound) per month of striped bass taken from New York Harbor or Long Island Sound west of Wading River. Eat no more than one meal (1/2 pound) per week of striped bass taken from Eastern Long Island Sound, the Peconic/Gardiners Bays, and Long Island South Shore waters (legal minimum length of marine striped bass is 36"),

Marine Crabs and Lobsters - It is recommended that the hepatopancreas (liver, mustard, or tomalley) of crabs and lobsters not be eaten because this organ has high contaminant levels.

Snapping turtles - Snapping turtles retain contaminants in their fat, liver, eggs and to a lesser extent in the muscle. If you choose to consume snapping turtles, carefully trimming away all fat and discarding the fat, liver, and eggs prior to cooking the meat or preparing soup or other dishes will reduce exposure. Women of childbearing age, and children under the age of 15 should avoid ingesting snapping turtles or any soup or stew made with snapping turtle meat.

Waterfowl - It is recommended that you eat no mergansers since they are the most heavily contaminated waterfowl species. Other waterfowl should be skinned and all fat removed before cooking; stuffing should be discarded after cooking; limit eating to two meals per month. Monitoring data indicate that wood ducks and Canada geese are less contaminated than other waterfowl species with dabbler ducks and then diving ducks having increasingly higher contaminant levels.

*Changes from the 1991-92 Health Advisory

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ADDITIONAL INFORMATION

NEW YORK STATE DEPARTMENT OF HEALTH

For more information on health effects from exposure to chemical contaminants, contact:

Environmental Health Information
1-800-458-1158 (toll-free number)

Leave your name, number and brief message. Your call will be returned as soon as possible.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

For more information on fishing, contact:

Regional Offices

Region 1 SUNY Campus, Bldg. 40 Stony Brook, NY 11794 (516) 751-7900

Region 2 47-40 21st St. Long Island City, NY 11101 (718) 482-4900

Region 3 21 South Putt Corners Rd. New Paltz, NY 12561 (914) 255-54538

Region 4 2176 Guilderland Ave. Schenectady, NY 12306 (518) 382-0680

Region 5 Route 86 Ray Brook, NY 12977 (518) 891-1370

Region 6 State Office Bldg. Watertown, NY 13601 (315) 785-2236

Region 7 615 Erie Blvd. West Syracuse, NY 13204 (315) 426-4700

Region 8 Routes 5 and 20 Avon, NY 14414 (716) 226-2466

Region 9 600 Delaware Ave. Buffalo, NY 14202 (716) 847-4600

For information on contaminant levels, contact:

Bureau of Environmental Protection
50 Wolf Road
Albany, NY 12233
(518) 457-6178

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