

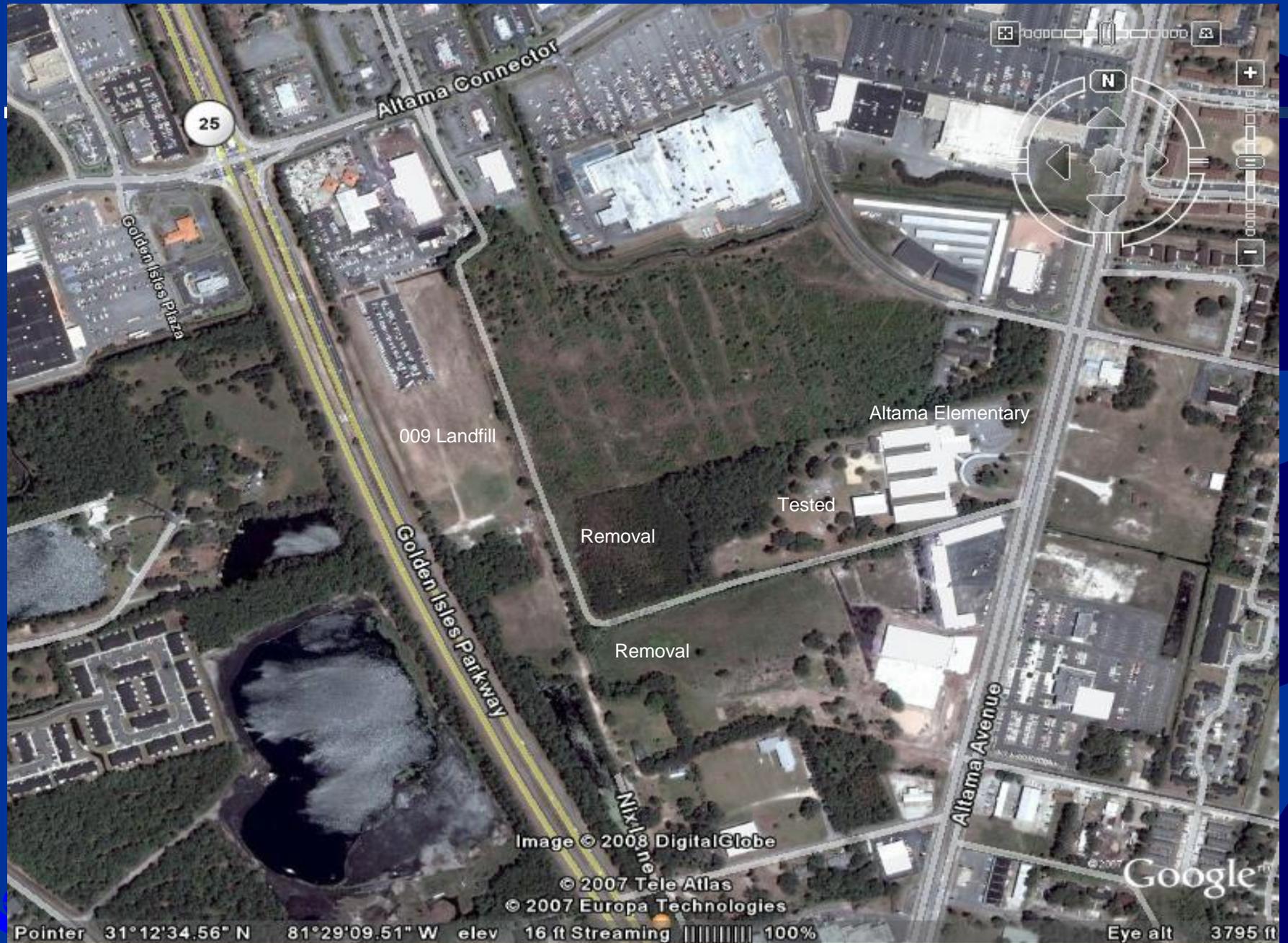
**Hercules 009 Landfill  
Brunswick, GA  
January 29, 2008**

## Hercules 009 Landfill History

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- 1948 to 1980 Hercules manufactured toxaphene
- 1975 to 1980 Hercules Inc. operated 009 Landfill
- 1984 Added to National Priorities List
- 1991 Record of Decision (ROD) OU2 connects residents/businesses to city water
- 1993 ROD OU1 in-situ stabilization

# Hercules 009 Landfill and Surrounding Area



# Removal and Testing on Altama Elementary School Property

This area was voluntarily sampled in 1993



This area was tested in 1996, and cleaned up as documented in the Drainage Ditch Action Soil Removal Report

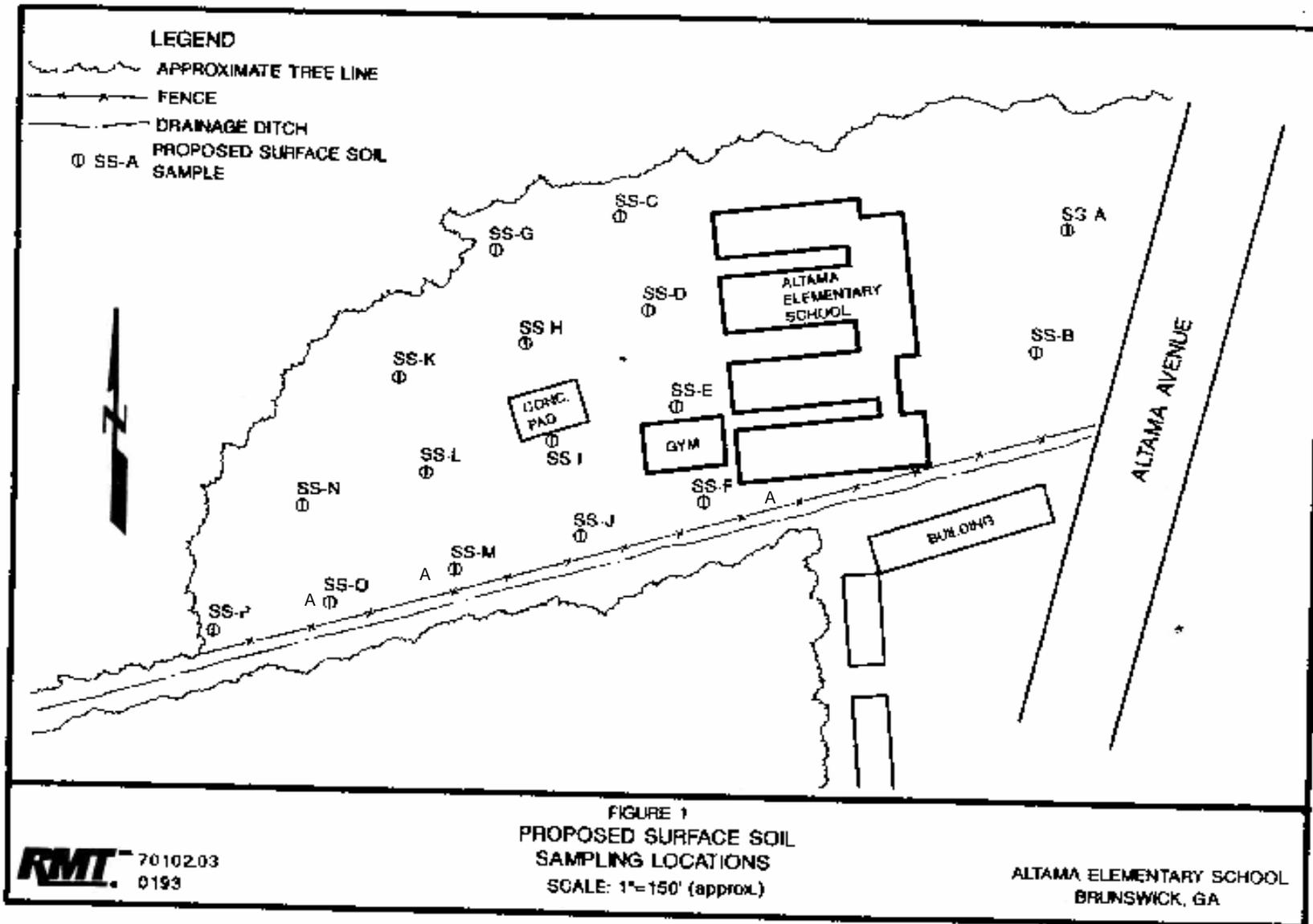


# Sampling and Analysis on Altama Elementary School Grounds

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- Altama Elementary School grounds sampled in 1993
  - Sampling not performed as part of Hercules 009 Landfill cleanup
- 19 surface soil samples were collected 0 to 6 inches
  - All results were non-detect for technical toxaphene
  - Weathered toxaphene not analyzed (no method existed at the time)
- All samples were below the detection limit for technical toxaphene. Detection limit ranged from 0.18 ppm to 0.23ppm
  - The detection limit was, and remains, below all health-based standards

# Altama Elementary Surface Soil Sampling



# Altama Elementary Sampling and Analysis Results

SAMPLE IDENTIFICATION	TOXAPHENE (mg/kg)
SS-A	< 0.19
SS-B	< 0.20
SS-C	< 0.21
DUP01	< 0.22
SS-D	< 0.19
SS-E	< 0.19
SS-F	< 0.19
SS-G	< 0.20
SS-H	< 0.20
SS-I	< 0.20
SS-J	< 0.18
SS-K	< 0.20
SS-L	< 0.21
SS-M	< 0.19
SS-N	< 0.22
SS-O	< 0.21
SS-P	< 0.23
SS-Q	< 0.20
SS-R	< 0.19
SS-S	< 0.19
RBLK01	< 0.005 mg/L

Hercules 009  
Cleanup Goal

0.25 ppm  
(technical toxaphene)

Simon/Manning PRG  
(weathered toxaphene)

1.2 ppm residential  
(sum of 3 primary  
breakdown congeners)

EPA Region 9 PRG  
(technical toxaphene)

0.44 ppm

-All sample results below detection limit  
and cleanup goal

# Drainage Ditch Remediation Project

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- A soil removal was conducted on undeveloped property adjacent to 009 Landfill that is owned by Glynn County Schools
- Soil samples were collected and analyzed for technical toxaphene (at surface, 0 – 1 foot, and subsurface from 1-2 feet)
- Cleanup goal for surface soil was 0.25 parts per million (ppm) and for subsurface soil was 76 ppm
- Sampling and excavation moved in grid fashion away from landfill until a clean line was established
- Technical toxaphene concentrations in excavated soils ranged from 0.18 ppm to 77 ppm. Typical exceedance less than 3 ppm.

# 2005 Office of Inspector General Regional Recommendations

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- The OIG evaluated Hercules 009 investigation and cleanup activities at the request of the Glynn Environmental Coalition
  - Concerns were expressed by the OIG that the toxicity of toxaphene breakdown products should be given additional attention
  
- The OIG recommended that EPA Region 4 take several actions relating to the Hercules 009 Landfill
  - Employ Best Available Science by using GC-NIMS to determine if toxaphene breakdown products are present in the surrounding groundwater – 2006 Groundwater sampling
  
  - Assess the resulting risk, if any, to human health and the environment – Re-evaluation of Site Risks
  
  - Issue the Second Five-year Review Report for the 009 Landfill

## 2006 Groundwater Sampling

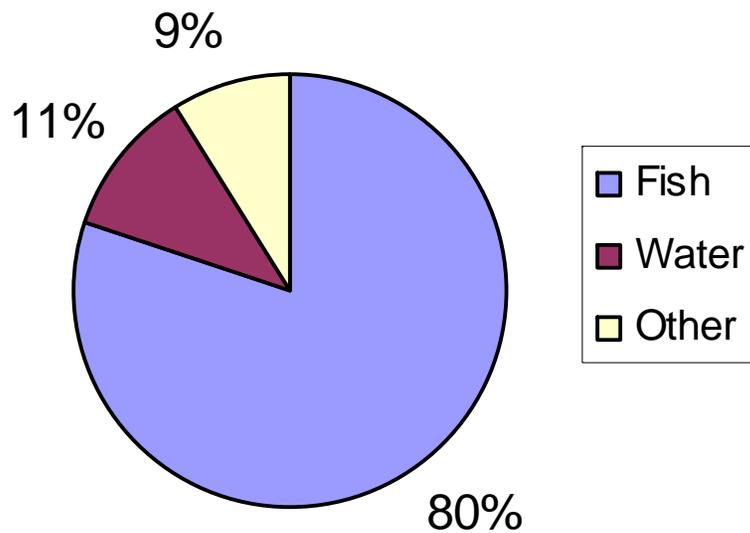
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- Groundwater samples were analyzed using GC-NIMS for toxaphene breakdown products
- Two groundwater wells had detection of breakdown products below Safe Drinking Water Act Maximum Contaminant Levels (MCLs)
- Results from wells farthest down-gradient did not detect toxaphene breakdown products
- Contaminant concentrations were below both the current MCL for drinking water and the Preliminary Remediation Goals (PRGs) developed by Simon/Manning

# Toxaphene Exposure Routes

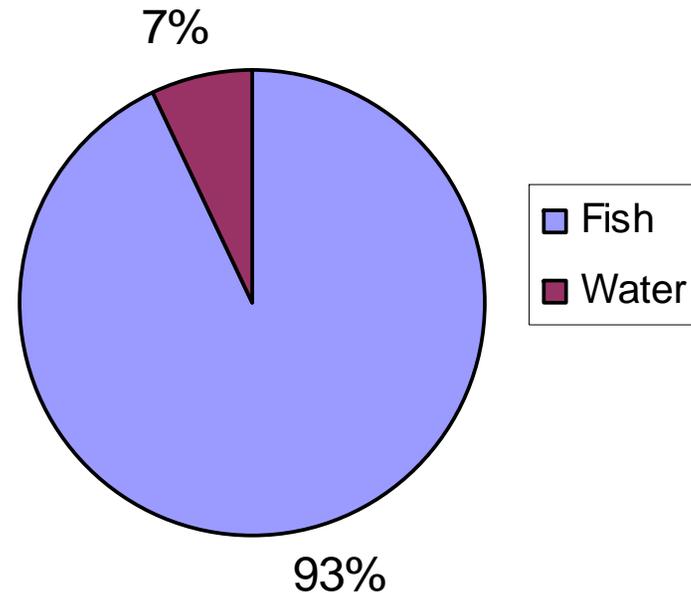
- The OIG focused their review on groundwater because a literature review determined that people are most likely to be exposed to toxaphene from the consumption of contaminated fish or water

### Toxaphene Exposure



Source: Fiolet and van Veen 2001

### Toxaphene Exposure



Source: Buranatrevadh 2004

# Re-evaluation of Site Risks

- EPA Region 4 conducted a re-analysis of European toxicity data and determined that weathered toxaphene breakdown products are less toxic than technical toxaphene.
- EPA OIG supported the risk assessment approach developed by Dr. Ted Simon, EPA, and Dr. Randall Manning, GAEPD, as the best available science regarding risk of exposure to weathered toxaphene
- Weathered toxaphene breakdown products differ by environmental media
  - Water: Three persistent congeners in water are of primary concern for biota (fish, humans)
  - Soil: Prevalent congeners (Hx-Sed, Hp-Sed) are of lesser concern because studies indicate they are eliminated from the body quickly
- Region 4 has developed screening criteria for congeners that are of primary concern for biota
- No screening criteria for congeners prevalent in soil (Hx-Sed, Hp-Sed) has been developed yet
- Research is being conducted at the national level regarding analytical methods for weathered toxaphene breakdown products and defining risk assessment benchmarks

# Region 4 Response to OIG Review

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## ➤ 2006 Groundwater Sampling Results

- Weathered toxaphene breakdown products identified in on-site groundwater at levels below MCL's and risk-based standards
- No off-site migration or exposure to technical toxaphene or weathered toxaphene in groundwater is taking place.

## ➤ Re-evaluation of Site Risks

- Weathered toxaphene breakdown products pose less risk than technical toxaphene in soil medium based on best available science
- Primary exposure route of concern is water to biota
- Analytical methods, risk assessment, and cleanup goals for weathered toxaphene are the subject of ongoing research

## ➤ Review and Issuance of Five-Year Review Report

- Remedy determined to be protective and exposure pathways under control
- Second Five-Year Review Issued on June 13, 2006

# Altama Elementary School Conclusion and Recommendations

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- Previous testing of school-yard soil showed no site-related impact at the school (technical toxaphene below detection limit)
- Analytical method for weathered toxaphene is undergoing validation by EPA
- Best available science indicates weathered toxaphene breakdown products in soil do not pose a human health risk
- OIG concurred with Region 4 findings in their final memorandum dated October 31, 2006
- Based on the best available science, re-testing of the Altama Elementary School school-yard soils is not warranted at this time
- EPA concludes that soil at the Altama Elementary School poses no risk from toxaphene at the Hercules 009 landfill.
- EPA will continue to evaluate the science of weathered toxaphene and review the risk posed by the Hercules 009 site