

SUBJECT: *Proposed Action Plan to investigate the extent of Kepone contamination of Fish Tissue and Sediment in the James River below the fall line due to potential re-suspension of sediments cause by Hurricane Isabel (event September, 2003)*

TO: Bob Burnley, Director

FROM: Larry Lawson, Director Division of Water Program Coordination

DATE: March 4, 2004

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A: Objective:

This project is designed to determine whether the historic disturbance and flooding event which occurred during Hurricane Isabel in September 2003 have caused the contaminant Kepone buried in sediments in the tidal James River to be re-suspended into the water column and thus making it more bioavailable to the aquatic organisms that reside there. The intent of the project is to document the geographical extent and magnitude of contaminated sediment and any resultant increase in Kepone burden of fish in the tidal James River. The potential for increased bioavailability of Kepone to fish will increase the possibility of elevated levels of Kepone in fish tissue and could pose a potential public health threat to consumers. Between 1975 and 1988, there was a ban on commercial and sport fishing in the tidal portion of the James River and its tributaries by the Virginia Department of Health (VDH). The current fish consumption advisory, issued on July 1, 1988, cautions consumer of the hazardous effects of Kepone from the problem area. "A fish-eating advisory exists for those who consume fish from these waters on a daily basis." The focus of this project is to provide the VDH additional data so that they have the necessary information to modify or revise the advisory. The study area includes the James River from the fall line near the I-95 Bridge in Richmond. Surficial sediment samples

collected within the study area may also provide additional information on the potential load of “bioavailable” Kepone in the tidal James River.

B: Justification:

The historic disturbance and catastrophic flooding event visited by the effect of Hurricane Isabel in September 2003 may have caused the re-suspension of the chemical Kepone from buried sediments in the tidal James River. Information gathered during this investigation will provide data needed to determine if Kepone has become more bioavailable to the biota in the problem area, resulting in elevated concentrations of Kepone in fish tissue. This information will be evaluated by the VDH to determine if the current fish consumption advisory should be modified or revised.

The principal state investigator for Kepone at Virginia Institute of Marine Science (VIMS) has requested a follow up study to determine the magnitude and extent of fish and sediment contamination due to the potential re-suspension caused by Hurricane Isabel (e-mail October 6, 2003 from M. Unger - VIMS).

Between 1975 and 1988, there was a ban on commercial and sport fishing in the tidal portion of the James River and its tributaries, but following years of decline in the concentration of Kepone detected in fish tissue, the fishing ban was replaced in 1988 with a fish eating advisory. This advisory does not limit or restrict eating fish but cautions against daily consumption of fish taken from the tidal James and tributaries, an area that stretches from the fall line at Richmond to the Hampton Roads-Norfolk Bridge Tunnel. The observed decline in fish contamination over the years is thought to be the result of the Kepone being sequestered in the deeper sediments in the tidal James and thus becoming less available to contaminate the fish. As a result of the disturbance caused by Hurricane Isabel, the potential for re-suspension of these deeper sediments containing Kepone was greater this year than in the past, or is likely to occur in the future. This study will help determine if the re-suspension of Kepone containing sediments will likely have a significant effect on the levels of Kepone in fish in the affected area.

The waterbodies affected by this health advisory are: VAT-G11, VAT-G10, VAP-G08, VAP-G07, VAP-G04, VAP-G03, VAPG02, VAP-G01, and VAP-J15. A segment of the river, Segment ID: VAP-G01E_JMS01A02, about 1023 square miles, is listed in the 2002 303 (d) Part 3 Waters of Concern due to the presence of Kepone in fish. This suggests a potential threat to human health upon which the Director may determine the need for a source assessment.

Therefore, this project is consistent with the Department's Toxic Contamination Source Assessment Policy (January, 2000) which describes when and how to conduct source assessments for toxic contaminants using the Virginia Environmental Emergency Response Fund (VEERF). The circumstances above represent triggers listed in that document, which indicate the need for toxic contaminants source assessment.

C: Project Structure:

The DEQ's Tidewater Regional Office and Central Office Fish Tissue and Sediment Monitoring Program Staff will collect fish tissue and sediment samples at selected sites within the James River drainage in 2004. The list of potential sites may be adjusted based on accessibility, river condition, weather, etc., (see Table 1 and Figure 1). The Virginia Institute of Marine Sciences (VIMS) will perform biota and sediment sample analyses once VEERF funding has been approved. Funds for additional sampling may be requested in the future, pending the 2004 sample results.

Table 1: Potential 2004 James River Kepone sites

DEQ site #	Stream name/location/description
Zone K	James River near fall line from Gillie Creek to Mayo bridge
Zone D	James River near Jordan Point between Rt. 156 bridge and buoy R120
Zone H	Chikahominy River between Rt. 5 and Shipyard Creek
Zone B	James River near Burwell Bay area between buoys R14 and R22
Zone C	James River near the Chickahominy River between buoy 55 and Sandy Point

D: Safety Requirements:

General safety requirements will be followed as stated in the DEQ's Quality Assurance/Quality Control Project Plan for the Fish Tissue and Sediment Monitoring Program (August, 1998).

E: QA/QC for Field Sampling and Laboratory Analyses:

Fish tissue monitoring staff from the Central Office standards and biological programs unit will coordinate with Piedmont Regional Office staff to sample zones K, D and H. The Tidewater Regional Office staff will sample zones B and C. Sampling should be performed between February and June. All field quality control samples will be collected in accordance with the Agency's Quality Assurance/Quality Control Project Plan For The Fish Tissue and Sediment Monitoring Program (August, 1998). Split and replicate samples will be analyzed at a frequency of 5% or 10%. All samples collected under this plan will be analyzed by VIMS.

F: Project Scope:

The projected study schedule follows:

March 2004 – Approval of Proposed Project Plan for VEERF funding by Agency Director.

Spring 2004 – Collect Fish and Sediment samples

March – June 2004 – Deliver samples to VIMS

October 2004 – Receive sample results and report to VDH

October – December 2004 – Evaluate results. Identify contaminated stations sampled in 2004. Consultation with VDH. Post data on the DEQ website. Request VEERF funding and conduct further sampling as deemed necessary and dictated by findings.

G: Responsibility for Specific Study Plan Tasks:

Project Team:

Jean Gregory – WQS&BP manager fish tissue and sediment collection. Facilitates communication and coordination among VDH, and DEQ Central Office and Regional Office Staff.

Mark Alling – PRO monitoring coordinator

Roger Everton – TRO monitoring coordinator

Alex Barron – WQS&BP manager fish tissue and sediment collection, data analysis, and report preparation.

Rick Browder – Sample collection planning and logistics, field collections, data analysis, data management, and report preparation.

Gabriel Darkwah – WQS&BP fish tissue and sediment lab liaison, data analysis, and data management, QA/QC, web site production, and report preparation.

Dr. Mike Unger – VIMS Lab Director, data QA/QC, and primary contact for samples submitted to VIMS.

Bill Hayden – DEQ Public Affairs Director. Central Office point of contact for web-targeted information. Central Office contact for reporters and press releases.

H: Costs of Implementation:

The Virginia Legislature has authorized use of the Virginia Environmental Emergency Response Fund (VEERF) for conducting the assessments described here in accordance with DEQ's Toxics Contamination Source Assessment Policy (VEERF Policy Statement 2-2001, effective 9/11/2000). Costs budgeted include sampling and analysis for samples are indicated below.

Total Cost for sampling February, 2004 – December, 2004: \$ 22,800.00

- **Fish Tissue and Sediment Analysis**

An estimated \$ 20,842.00 will be needed to analyze 170 fish tissue samples at \$ 122.60 including QA/QC samples in order to conduct this study.

and \$ 1,313.00 will be needed to analyze 10 sediment samples at \$ 131.25.

- **Incidentals**

An estimated \$ 645.00 will be needed for equipment and miscellaneous incidental travel costs for the sampling events.

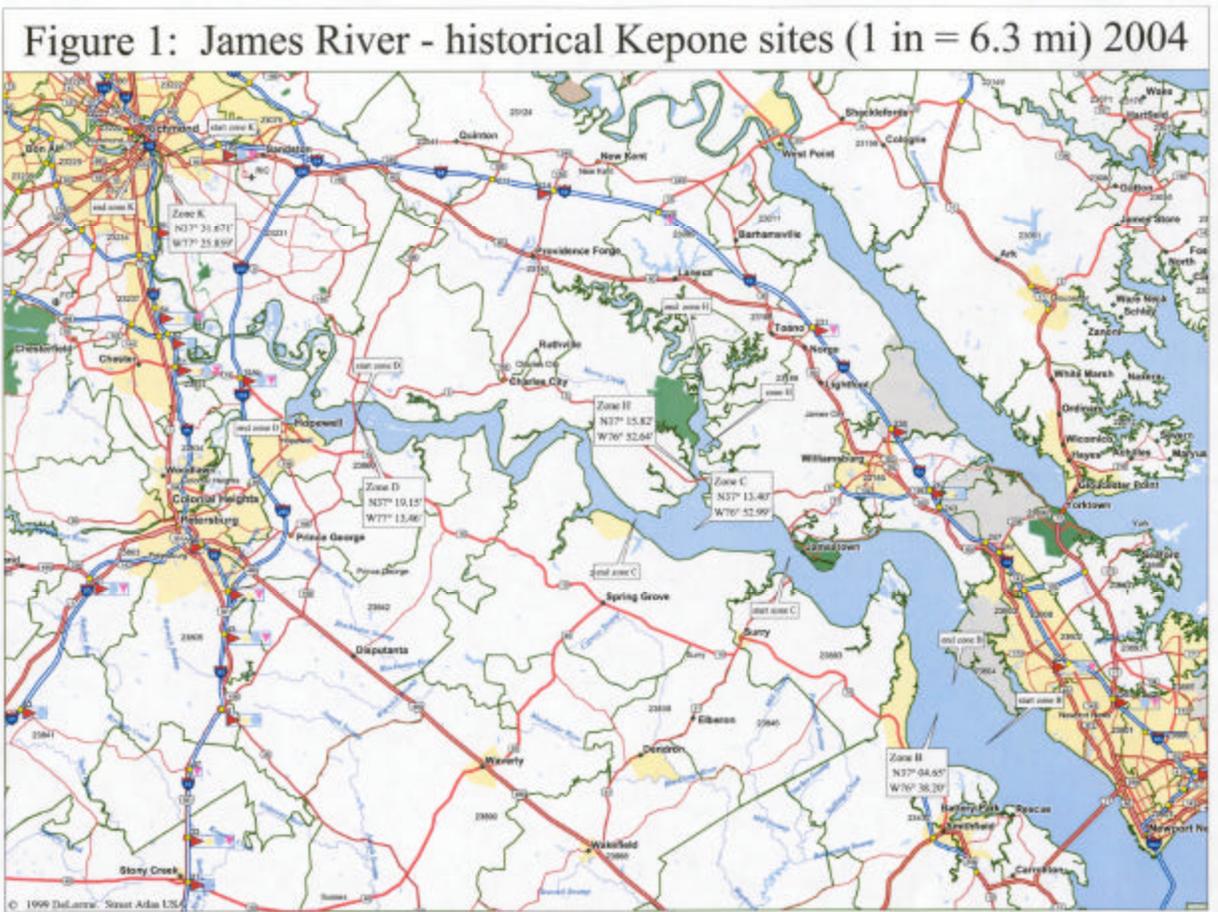
Any change in the scope of work to include special contractual services or expanded sampling will require additional resources.

I: Products:

1. Maps with the following information
 - Monitoring locations and contaminant concentrations for fish tissue and sediments
2. Reports
 - Data to VDH
 - DEQ website and data to DEQ assessment staff
 - Plans and recommendations for further investigation

DEQ Director Approval: _____ Date: _____

Figure 1: Potential 2004 James River Kepone monitoring sites



2004 Monitoring Plan for Kepone

The Kepone monitoring efforts for 2004 should be conducted in the same manner as they were conducted in 2002 with additional monitoring near the fall line. For the year 2004, striped bass are to be collected in zone B and striped bass and white perch are to be collected at each of zones C, D, H and K. The locations of the zones B, C, D, H and K are described below.

Zone B: James River in Burwell bay area between buoys R14 to R22

Zone C: James River at mouth of the Chickahominy River between buoy 55 and Sandy Point

Zone D: James River in Hopewell area from Rt. 156 bridge to buoy R120

Zone H: Chickahominy River from Rt.5 to Shipyard Creek

Zone K: James River near I-95 from Gillie Creek to Mayo bridge

2002 303(d) PART 3 WATERS OF CONCERN FACT SHEET

RIVER BASIN: JAMES RIVER BASIN

CITY/COUNTY: Chesterfield, Charles City, Henrico, James City, Cities of Richmond, Hopewell

STREAM NAME: James River and tributaries

HYDROLOGIC UNIT: 02080206

SEGMENT ID.: VAP-G01E_JMS01A02 **TMDL MAP ID:** VAP-G01E-02

SEGMENT SIZE: 1023.44 - Miles, Sq. Mi.

INITIAL LISTING: 2002 **TMDL Schedule:** -

UPSTREAM LIMIT:

DESCRIPTION:	Fall line
RIVER MILE:	110.30
LATITUDE:	37.52810

LONGITUDE: -77.43500

DOWNSTREAM LIMIT:

DESCRIPTION:	Hampton-Norfolk Bridge Tunnel
RIVER MILE:	0.00
LATITUDE:	36.98600

LONGITUDE: -76.30470

Estuarine James River and tributaries downstream to the Hampton-Norfolk Bridge Tunnel.

CLEAN WATER ACT GOAL AND USE SUPPORT:

Fish Consumption Use - Threatened

IMPAIRMENT CAUSE:	IMPAIRMENT SOURCE
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VDH Fish Consumption Advisory

Kepone

Fish Tissue - Kepone

Unknown

SUMMARY:

The James River and its tributaries from the fall line to the Hampton-Norfolk Bridge were assessed as threatened of the Fish Consumption Use because of a fish consumption advisory. The Virginia Department of Health issued the advisory because of a concern regarding Kepone.

Kepone exceedances in fish tissue were noted at several stations.

Historical Kepone release.

Chapter 2.5 PUBLIC HEALTH/AQUATIC LIFE CONCERNS

Increasingly, the DEQ is addressing the role toxicants play in reducing water quality in state waters and supports programs to monitor, evaluate, and reduce toxicity to aquatic life and human health. Many of the programs in place at DEQ that address toxicity in state waters are described and discussed throughout this report.

The toxic pollutants that were monitored during the reporting period include toxic organics, metals and pesticides. Information on the state's monitoring programs and the results of this monitoring for toxics in water column, fish tissue, and sediment is provided in Chapters 3.1 and 3.3 of this report. A discussion of the methodology used to determine elevated levels of toxicants is provided in Chapter 3.2.

Fishing Advisories and Restrictions

The VDH Division of Health Hazard Controls has ten health advisories, limiting fish consumption, and one restriction, prohibiting consumption, currently in effect. A fishing restriction allows sport fishing within the affected area, but the taking of fish for human consumption is prohibited. A health advisory warns of potentially dangerous levels of contamination found in fish tissues in an affected area and in most cases, limits consumption but does not prohibit it. Under health advisories, the population at risk and a safe maximum consumption rate may be specified. These areas are described below.

Kepone in the Lower James River

From 1966 through 1975 Allied Chemical Company and its subsidiary Life Science Products, Inc. produced a persistent chlorinated hydrocarbon insecticide called Kepone. During production, an estimated 90,720 kg of Kepone was released to the environment through atmospheric emissions, wastewater discharges, and bulk-disposal of off-specification batches. The James River and its tributaries from Richmond to Newport News were contaminated with Kepone. In 1975, the entire James River from the fall line at Richmond to the Hampton Roads/Norfolk Bridge Tunnel, including all tributaries, was closed to the taking of any shellfish and/or finfish because of Kepone. From 1975 through 1988 various Kepone bans were in place. In 1988, all James River fishing restrictions due to Kepone were allowed to expire as Kepone levels in fish remained below the U.S. Food and Drug Administration (FDA) action level of 0.30 ppm. This area is currently under a contaminant advisory, covering the mainstem James River and all tributaries from the fall line at Richmond to the Hampton Roads-Norfolk Bridge Tunnel. This advisory does not limit or restrict the consumption of fish from this part of the river.

DEQ has continually monitored Kepone levels in the James River since its identification in 1975. The major areas of concern were Kepone levels in the water column, finfish, and sediment of the James River and its tributaries, and in the ground water in Hopewell. After continuous non-detectable results, water column monitoring was discontinued in 1981. Kepone levels in finfish, ground water, and sediment have decreased since the onset of the problem. Continued sediment sampling will provide the state with an up-to-date portrayal of Kepone levels throughout the contaminated reach of the river. The waterbodies affected by this health advisory are: VAT-G11, VAT-G10, VAP-G08, VAP-G07, VAP-G04, VAP-G03, VAPG02, VAP-G01, and VAP-J15.

2.5 – 1

VDH - Kepone fish consumption advisory

James River and its tributaries from the fall line at Richmond to the Hampton-Norfolk Bridge Tunnel. Kepone may be hazardous to your health. A fish-eating advisory exists for those who consume fish from these waters on a daily basis. (7/1/88) **Note: A PCB advisory is also in effect for this section of the James River. See below.**

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