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NSY PORTSMOUTH
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PRESENTATION FOR PUBLIC HEALTH AND ENVIRONMENTAL RISK EVALUATION OFF
SHORE HUMAN HEALTH RISK ASSESSMENT RESULTS NSY PORTSMOUTH ME
9/21/1994
E MAHONEY ASSOCIATES

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PUBLIC HEALTH AND ENVIRONMENTAL

RISK EVALUATION FOR THE

PORTSMOUTH NAVAL SHIPYARD

**OFF-SHORE HUMAN HEALTH
RISK ASSESSMENT RESULTS**

**September 21, 1994
Public Workshop
Portsmouth Naval Shipyard
Kittery, Maine**

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OBJECTIVES

- **Assess the impact on human health of chemical releases to the river from Portsmouth Naval Shipyard, under current or future Shipyard conditions.**
- **Identify media requiring remediation in order to be protective of human health, using USEPA & MEDEP guidelines for acceptable risks.**
- **Serve as a basis for establishing risk-based media cleanup standards which are health protective.**

MEDIA STUDIED

- 1. River Water**
- 2. Sediment in river (Sand or Mud on Bottom)**
- 3. Lobster**
- 4. Flounder**
- 5. Mussels**

Samples of each of the above were taken throughout the estuary.

EXPOSURE SCENARIOS AND PATHWAYS

Exposure Scenarios

- **Recreational (Residential)**
- **Subsistence (Residential)**

EXPOSURE PATHWAYS

River Water

- **Ingestion while swimming, wading, fishing (recreational)**
- **Dermal (skin) absorption while swimming, wading, fishing (recreational)**

Sediment

- **Ingestion while swimming, wading, fishing (recreational)**
- **Dermal (skin) absorption while swimming, wading, fishing (recreational)**

LOBSTERS, FLOUNDER, MUSSELS

- **RECREATIONAL INGESTION**
 - EPA defines as about 2 meals per week.
 - Assumes 50 weeks per year seafood is ingested at this rate.
 - Assumes 30 years duration.

- **SUBSISTENCE INGESTION**
 - EPA defines as about 5 to 6 meals per week.
 - Assumes 50 weeks per year at this rate.
 - Assumes 30 years duration.

CALCULATION OF HUMAN HEALTH RISKS USING USEPA ASSUMPTIONS FOR EXPOSURES

- **CARCINOGENS**

**Most Conservative USEPA & MEDEP
Risk Goal - One in a Million**

**Probability that One Person in a Million Exposed
to that Level Will Develop Cancer as a Result of
Exposure**

- **NON-CARCINOGENS**

Hazard Index - One (1.0)

USEPA & MEDEP Level which represents No Effect

I. RECREATIONAL INGESTION

A. Average Chemical Concentration

B. Maximum Chemical Concentration

II. SUBSISTENCE INGESTION

A. Average Chemical Concentration

B. Maximum Chemical Concentration

RISKS EXCEEDING GUIDELINES

USEPA 1 in a Million

MEDEP 1 in a Hundred Thousand

Intended to restore hazardous waste sites (RCRA, Superfund) to conditions existing prior to waste.

FDA - Food & Drug Administration Establish allowable levels of chemicals in food.

**Fish
Meat
Poultry
Dairy**

RESULTS

- **RIVER WATER**

Human contact risks below USEPA & MEDEP Guidelines

- **SEDIMENT (RIVER BOTTOM)**

Human contact risks below USEPA & MEDEP Guidelines

- **FISH/SHELLFISH**

USEPA & MEDEP Guidelines were exceeded for some.

RESULTS

RISKS EXCEEDING USEPA RISK GOAL

RECREATIONAL INGESTION - Average Concentrations

- **LOBSTER TAIL FLESH**
 - Arsenic
 - PAHs (Gas, Oil, Fuel)

- **WHOLE LOBSTER (with Tomalley)**
 - Arsenic
 - PAHs (Gas, Oil, Fuel)
 - PCBs (Transformer Oils, Banned Since 1970s)
 - Pesticides (Agricultural, Banned Since 1970s)

- **MUSSELS**
 - Arsenic
 - PAHs (Gas, Oil, Fuel)
 - PCBs (Transformer Oils, Banned Since 1970s)
 - Pesticides (Agricultural, Banned Since 1970s)

- **FLOUNDER**
 - Arsenic
 - PCBs (Transformer Oils, Banned Since 1970s)
 - Pesticides (Agricultural, Banned Since 1970s)

RESULTS

SUBSISTENCE INGESTION - MAXIMUM CONCENTRATIONS

- **MUSSELS**

- **Arsenic**
- **PAHs (Gas, Oil, Fuel)**
- **PCBs (Transformer Oils, Banned Since 1970s)**
- **Pesticides (Agricultural, Banned Since 1970s)**
- **Lead (Children only ages 0-6 yr)**

- **FLOUNDER**

- **Arsenic**
- **PCBs**
- **Pesticides (Agricultural, Banned Since 1970s)**

RESULTS

RISKS EXCEEDING USEPA RISK GOAL

SUBSISTENCE INGESTION - Maximum Concentrations

- **LOBSTER TAIL FLESH**
 - **Arsenic**
 - **Mercury**
 - **PAHs (Gas, Oil, Fuel)**
 - **Pesticides**
 - **PCBs**

- **WHOLE LOBSTER (with Tomalley)**
 - **Arsenic**
 - **Cadmium**
 - **Mercury**
 - **PAHs (Gas, Oil, Fuel)**
 - **Total PCBs**
 - **Pesticides**

**LOBSTER, FLOUNDER MUSSELS
ALL MEET FDA REQUIREMENTS**

MEDIA PROTECTION STANDARDS PROPOSAL

- **ESTABLISH LEVELS FOR CHEMICAL
WHICH ARE SAFE FOR HUMAN HEALTH**
- **DOCUMENT HAS BEEN SUBMITTED TO
USEPA & MEDEP AND IS CURRENTLY
UNDER REVIEW**

Arsenic Toxicity is overestimated.

Toxicity of fish arsenic is much lower than the value used to calculate risks, which is based on the Inorganic Forms of arsenic. Fish arsenic is in a different form (Organic) which has much lower toxicity.

Arsenic levels in fish/shellfish in Piscataqua are at background levels.

CONCLUSIONS

OFF-SHORE HUMAN HEALTH RISK ASSESSMENT

- **SURFACE WATER AND SEDIMENT ARE SAFE**
- **LOBSTERS, FLOUNDERS, MUSSELS EXCEED USEPA/MEDEP GUIDELINES - ALL ARE BELOW FDA LIMITS**
- **MEDIA PROTECTION STANDARDS PROPOSAL IS UNDER REVIEW BY USEPA & MEDEP**