

GENERAL STRATEGIES FOR SPILL
CONTAINMENT AND CLEAN-UP
ACTIVITIES OF OIL SENSITIVE
RESOURCES IN CONNECTICUT

1982

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Connecticut Coastal Zone Management Program

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STATE OF CONNECTICUT

GENERAL STRATEGIES FOR SPILL CONTAINMENT AND
CLEAN-UP ACTIVITIES OF OIL SENSITIVE RESOURCES
IN CONNECTICUT
1982

COASTAL ZONE
INFORMATION CENTER

Prepared by the

Connecticut Department of Environmental Protection
Planning and Coordination/Coastal Management Unit

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The development of generic strategies for spill containment and clean-up as well as the analysis of Connecticut's public and private oil spill cooperatives was authored primarily by Bill Hegener, Don Burton and Janet Frost of the Oil and Chemical Spills section of the Hazardous Materials Management Unit.

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Introduction

The Long Island Sound estuary and its associated resource systems forms an integrated coastal ecosystem that is unique and fragile. Estuarine embayments, intertidal flats, tidal wetlands, shellfish concentration areas, and wildlife habitats are sensitive coastal resources that require protection from total loss or gradual degradation due to catastrophic or chronic oil spills associated with petroleum product shipments.

In an effort to prevent, or at least reduce, losses or degradation of sensitive coastal resources from accidental oil spills, the Coastal Management Program has identified and mapped critical coastal resource areas in Long Island Sound that would need priority protection in the event of a major oil spill where only the most environmentally sensitive areas could be protected due to a lack of available equipment and manpower.

The Connecticut Atlas of Oil Sensitive Resource Areas that accompanies this report depicts composite resource areas along the Connecticut coast, as well as the Connecticut River, that contain coastal or valuable biological resources that are vulnerable to oil. The composite resource areas are mapped on mylar overlays used in conjunction with 1980 black and white rectified orthophoto bases at a scale of 1:24000. A preliminary prioritization (subject to field verification) has been developed for each critical coastal area as well as a preliminary assessment of the protectability of each site. The purpose of this dual prioritization system is to give the on-scene-commander information that is readily available during a spill and can be used to develop a spill containment strategy that ensures protection of the most critical and protectable areas as a first priority.

It should also be pointed out that while some areas have a higher indicated priority for protection than others, all areas that have been mapped contain valuable and oil sensitive resources. For practical reasons, some sensitive sites have been excluded from this mapping because they are essentially unprotectable given current limitations associated with oil spill protection technology and clean-up procedures. The legend of the Atlas should be consulted for greater detail concerning its use and limitations.

This companion report to the Atlas contains background information concerning oil transportation in the Sound, a qualitative analysis of the capability of Connecticut's public and private oil spill cooperatives to respond to a major spill incident, and a description of generic strategies that would generally be required for spill containment, control and clean-up activities along the Connecticut coast. The report concludes with recommendations designed to improve the efficiency and operational readiness of Connecticut's oil spill cooperatives.

Oil Transport and Spill Incident Evaluation

In order to understand oil transport and transshipment within Long Island Sound and the Connecticut Coastal Area as it relates to the frequency and magnitude of oil spill occurrences, spill data was obtained from the DEP files on recorded coastal oil spills together with information on oil shipments into the State from U.S. Army Corps of Engineers and the U.S. Coast Guard Captain of the Port Offices in New London and New Haven.

A review of data indicates that while the quantities of petroleum shipped into Connecticut have been declining, petroleum products still constitute the majority of the materials arriving in this state by water. More oil is shipped into New Haven Harbor than any other port in Connecticut, approximately 82 million barrels of oil and gasoline in 1980. A total of 35 million barrels of oil were shipped into Bridgeport and Housatonic River Harbors during 1980 with most of these products going into Bridgeport. Only relatively small quantities of residual (#4 and #6) were shipped into the Housatonic River Area. During the same period, 6 million barrels of oil were shipped into the Norwalk-Stamford Harbor areas. Based on the only figures available (April-June 1981), a much smaller volume of oil, 1.5 million barrels, was shipped into the New London area. Some 5 million barrels went to facilities along the Connecticut River. Large ocean going ships frequently come into the Sound through the Race; however most of the oil shipped into Connecticut arrives by barge and small tank ships. This oil is transported from refineries in New Jersey and New York up the East River and along the Long Island Sound to ports in Connecticut and New York. The large ships go primarily to offshore unloading platform facilities along the Northern shore of Long Island although a number of ships also come into New London and New Haven harbors.

The greatest potential for large or catastrophic spills exists along vessel routes and in areas where large quantities of oil are transferred between vessels or onshore and offshore unloading facilities. Also there is a potential for large spills at facilities which store large quantities of oil, although these shore facilities are usually secured by substantial dikes to contain even very large accidental spills.

An examination of DEP file data giving incidence of marine oil spills for the periods July 1980 through June 1981 and July 1976 through June 1979 shows that the vast majority of spills involved less than 100 gallons of oil. Considering the great quantities of oil shipped into and through Connecticut waters, the data showed a surprisingly low number of spills associated with vessels and marine terminals. Contrary to general opinion, the most frequent types of spills and the total cumulative volume does not relate to waterborne shipment or loading and offloading of vessels at marine bulk facilities. Large marine spills do occur, and because of the extremely large quantities of oil which are shipped into Connecticut ports through Long Island Sound, the potential for a large spill, possibly involving tens of millions of gallons, definitely exists. The largest marine spill during the data period occurred in Wethersfield, where more than 100,000 gallons of oil and gasoline were discharged to the Connecticut River. This occurred as the result of a structural failure of a marine bulkhead and ten subsequent failures of transport piping (docklines) used to offload barges at the adjacent oil storage facility. The spill did not occur during a loading or offloading operation. During this period there were only 3 other oil spills in Wethersfield; all were of minor variety and none was marine related.

For the same 4 year period, New Haven Harbor reported 60 spills into the marine environment, more than any other harbor areas. New Haven was followed by Bridgeport,

Norwalk and Stamford Harbors which had 46, 45 and 35 spills respectively. The entire area from Greenwich to Branford was fairly active as there were between 18 and 25 spills in each of the remaining towns in this area except for East Haven which had only 6. Most of these spills did not involve vessels or marine transfer storage facilities.

The Groton-New London area also had a fairly large number of spills, with 40 waterborne spills in the Town of Groton, 33 in New London and 13 in Stonington. Again it should be pointed out that the data clearly showed that relatively few spill incidents involved oil transport vessels, marine bulk plants, or terminal transfer operations.

The Connecticut Harbors which have the greatest potential for catastrophic environmental oil spill damage are the harbors which have a large number of terminal facilities and have had a large number of oil spill incidents. New Haven Harbor is therefore the area of greatest concern followed by Bridgeport, the New London-Groton and the Stamford-Norwalk areas. The Norwich and Hartford areas are also of concern due to the shipment of petroleum product upriver; groundings are frequent occurrences and many spills are unreported.

There is no way to predict where the next large spill will originate. However, because of the large number of vessels transporting petroleum through the Sound and the New York area offloading points, the entire Connecticut Coastline is vulnerable and must be considered when resource protection is evaluated.

Evaluation of Private and Public Oil

Spill Cooperatives in Connecticut

During the past ten years seven private oil spill cooperatives have been established in the coastal area of Connecticut in addition to the New Haven

Cooperative. The establishing of the cooperatives has occurred primarily as the result of the 1969 Connecticut Oil Spill Law which requires marine terminals to provide and maintain oil spill containment equipment. In order to avoid the cost of providing equipment on an individual basis, petroleum distributors and users in close geographical proximity have formed cooperatives to purchase, stage and deploy equipment for the protection of its members. There are a number of reasons for the Department's fostering and acceptance of the oil spill cooperative concept:

- 1) The total amount of equipment and manpower resources available for any oil spill incident where a cooperative is established is much greater than if marine terminal facilities were to provide containment capability independently. This is especially true of the manpower which an effective cooperative can provide for the initial response and equipment deployment effort.
- 2) The quantity and quality of equipment, and level of equipment maintenance is in most cases much better through a cooperative arrangement than where individual companies must provide equipment for themselves.
- 3) Oil spill containment training of terminal personnel and integration of these responsibilities with other first line response forces, such as local fire departments, is usually better undertaken as a cooperative venture. This is especially true when one considers that in a spill incident involving an oil spill cooperative, personnel from more than one facility will be involved. The joint contingency/operations plan established for the cooperative will establish an high level of cooperation between facilities and response agencies. This cooperation and sharing of resources could not be expected if companies operating marine terminals were providing spill containment independently of one another.

There have been numerous arguments offered outlining why the cooperative approach is not desirable. The most frequent are listed as follows:

- 1) Liability incurred as a result of injury to personnel from a company assisting the polluting facility and resulting changes in insurance coverage.
- 2) Communications and notification procedures causing delays in equipment mobilization and deployment.
- 3) Delay caused by equipment not being located within the spill site, as it would be if each facility were required to store and maintain its own equipment.

Admitting that these are valid concerns, experience with both types of spill protection concepts strongly indicates that an effectively managed cooperative is the preferential system for initial response that has an adequate level of oil spill protection.

In Connecticut, Oil Spill Cooperatives are located at every harbor receiving petroleum products. See Table #1 for a listing of active cooperatives in Connecticut with containment equipment inventories, locations, and member listings. The three largest private cooperatives were recently evaluated to determine the adequacy of equipment inventory, including level of equipment maintenance and replacement, and their locations to all member facilities. This includes consideration of the modes of transport and deployment. Finally, the evaluation includes training and drill session frequencies and adequacy. The following brief summary is provided for these three Co-op's with improvement recommendations. Comments of the recently established public Mid-Coast/Connecticut River Cooperative are also provided.

TABLE 1

Summary of Containment Equipment
Private and Public Oil Spill Cooperatives
In the CT Coast Area

<u>TOWN</u>	<u>LOCATION</u>	<u>EQUIPMENT</u>
Greenwich (Byram)	Hoffman Fuel Terminal	400' Containment Boom
Stamford	Yacht Haven West	500' Metro 6" Containment Boom
Bridgeport	Bridgeport Fire Dept. Engine Co. #6 Engine Co. #7	700' Slickbar 700' Slickbar
Norwalk	Various Locations Norwalk Oil King Ind., Inc. Penn Petroleum L.H. Gault	1200' Containment Boom 750' Slickbar 10" Boom 240' Uniroyal 14" Boom 750' Slickbar Boom 500' Slickbar 10" Boom
New Haven	Gulf Terminal Wyatt Terminal Member Owned	900' Slickbar 900' Slickbar 5000' Containment Boom
Midcoast/CT River	Westbrook East Lyme Haddam 4 Locations Light House Pt. (Old Saybrook)	2000' 18" Parker System 1000' 12" Parker System 2000' 12" Parker System 1000' 12" Parker System 600' 6" Miniboom 500' 36" Kepner Seaboom (USCG)
New London-Groton Thames River	New London Petroleum Dahl Oil Terminal City Coal Terminal Pfizer General Dynamics CL & P	400' 18" Uniroyal 540' 18" Uniroyal 200' 18" Uniroyal 500' 36" Uniroyal 300' 18" Uniroyal 500' 18" Containment Boom 600' 18" Stickbar

TABLE 1(con't)

TRI-COAST CO-OP

Groton
(Stonington)

700' Containment Systems 12" Riverboom
200' Parker Systems Miniboom

Milford
(Stratford)

700' Containment Systems 12" Riverboom
200' Parker Systems

Greenwich
(Stamford)

700' Containment Systems 12" River Boom
200' Parker Systems Miniboom

U.S.C.G. New Haven

250' 12" Slickbar

U.S.C.G. New London

60' 12" Slickbar
200' 24" Sea Curtain
800' 24" Sea Curtain at Helco, Middletown.

U.S. Navy Submarine Base, Groton

400' Slickbar 12"

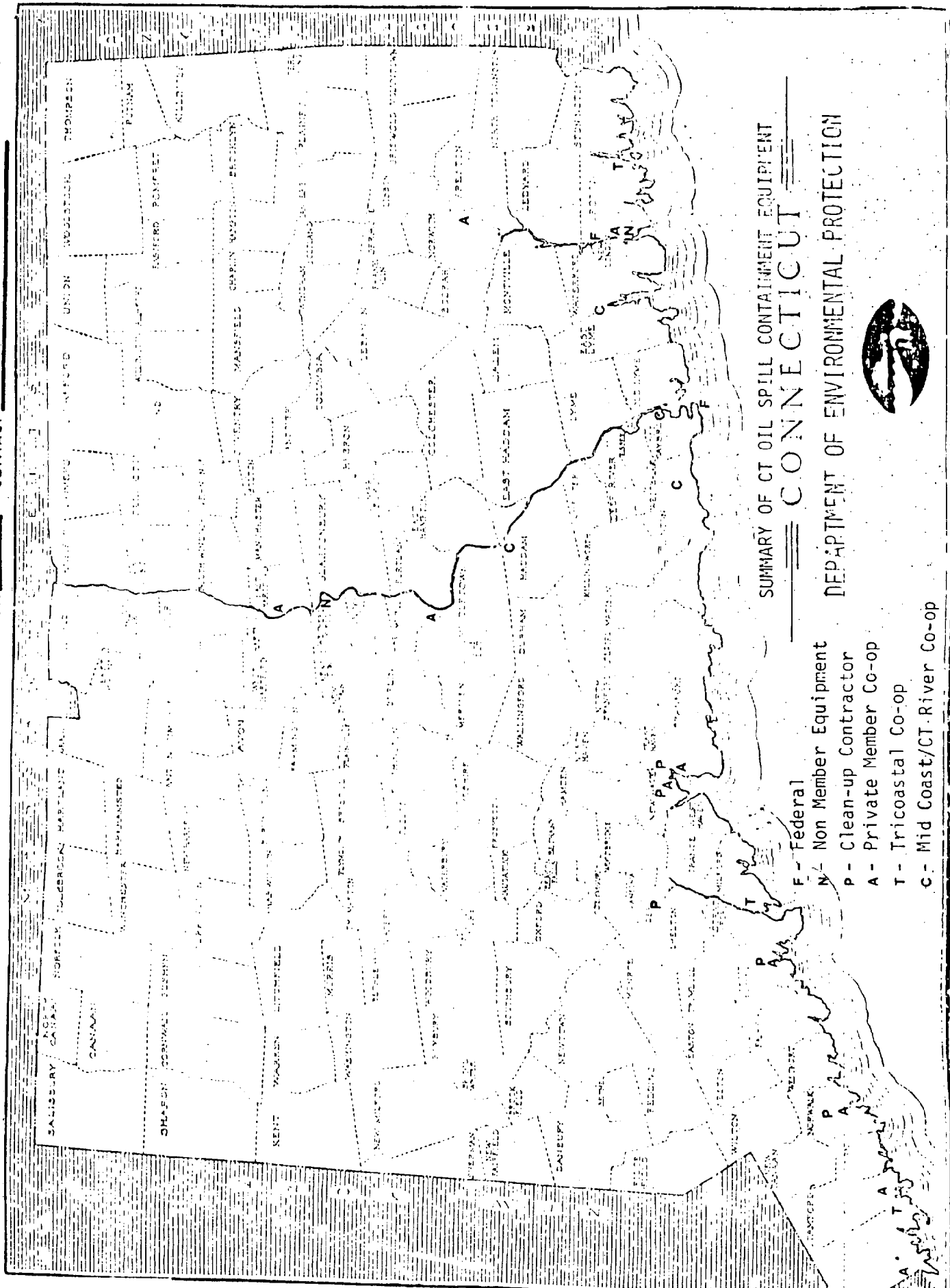
DATE

PREMISE NO.

SOURCE NO.

PARKING SPACES

CONTACT



SUMMARY OF CT OIL SPILL CONTAINMENT EQUIPMENT

CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION



- F - Federal
- N - Non Member Equipment
- P - Clean-up Contractor
- A - Private Member Co-op
- T - Tricoastal Co-op
- C - Mid Coast/CT River Co-op

New Haven Harbor Pollution Abatement Committee

This oil spill Co-op has been in existence since the 1950's making it one of the first such groups in the country. The Co-op membership has gradually expanded to include three professional clean-up contracting firms, and one company which sells clean-up related materials, as well as the members who operate marine terminal facilities in the New Haven and West Haven area. The City of New Haven has been very active in the Co-op since its formation; both the New Haven Fire Department and Civil Preparedness Office have been involved. The relationship of equipment inventory locations, and member facilities can be found in Table 2.

The deployment of equipment is initiated by a notification procedure which involves pyramid telephone calling among member representatives. Each Co-op facility member will provide manpower to man the boats and move the boom from shoreside storage at Wyatt and Gulf to the spill site. The U.S. Coast Guard Group LIS facility is located at Woodward Avenue on the East side of the harbor. During an actual spill event, boom would likely be deployed with the assistance of one or more Coast Guard vessels which can respond to a spill incident any place in the outer harbor in a few minutes. Up until recently, the New Haven Fire Department maintained a fireboat (Sally-Lee) at Longwharf. This vessel was frequently used to move or deploy boom or move oil with fire pumps. Due to budget constraints, the Sally Lee was taken out of service. It is not currently known whether she will be returned to service.

A unique feature of the New Haven Co-op is that three Co-op members (NEPCO, East Coast, and Sealand) are professional oil spill contractors. Two companies (NEPCO and East Coast) maintain facilities with equipment in New Haven. This means that additional containment boom can be brought to the spill site very rapidly. In some cases, the contractors equipment brought over land will be in place in less time than the Co-op can respond over water. One of the contractors (East Coast) can also deploy equipment from its facility into the Quinnipiac River and respond over water as well.

The New Haven Fire Department has had a very high degree of involvement in Co-op activities and has provided a vast amount of assistance to the Co-op during spill incidents, and was instrumental in causing the New Haven Co-op to be formed in the 1950's.

In addition to an extensive training program which provided two training sessions from the Texas A & M Oil Spill School in 1980, its own spill school in the summer of 1981, and two, two-day spill schools coordinated by the Coast Guard Atlantic Strike Team in 1982, the New Haven Co-op has had frequent spill drills. The drills are held approximately twice a year and in each of the last two years at least one seminar has been combined with the spill school training. The spill drills and training sessions allow personnel from member facilities the opportunity for hands-on experience in boom deployment and boat operations. In August 1982, the New Haven Harbor Co-op was involved in a major spill drill conducted over a three day period in New York and Connecticut.

While there have been occasional lapses in the personnel notification procedure in the past, Co-op membership representatives are working to design a procedure which will activate the oil spill response without undue delay or confusion. The Co-op equipment inventory including member owned equipment, appears to be adequate.

The New Haven Co-op is Connecticut's best example of a private Co-op which has an adequate equipment inventory and the necessary spill response training to effectively contain spills. The high level of Co-op activity with monthly meetings and the unique partnership between oil facilities, professional clean-up contractors and governmental agencies makes the New Haven Co-op very effective in carrying out its functions.

New Haven, Bridgeport and Norwalk CooperativesNew Haven Harbor Pollution Abatement GroupBoom

1800' Slickbar containment barrier on two trailers
Storage: 1 at Wyatt Inc, & 1 at Gulf Oil Co.

Member owned Equipment

5000' Boom, assorted brands
Boats - 9 small power boats
Skimmer - 1 air driven skimmer
Pump - 1 4" explosion proof
Other - Various supplies of boom, sorbents & pumps
are available at USCG, Group L.I.S., New Haven

Bridgeport Harbor Pollution Abatement GroupBoom

1400' Slickbar brand containment barrier stored on two trailers
Location: 1 at Bridgeport Fire Department Engine Co. #6
1 at Bridgeport Fire Department Engine Co. #7

Norwalk Harbor Pollution Abatement CommitteeBoom

1200' of 12" skirted containment barrier

Boats

Two with outboard motors

Sorbent Materials

Sweeps and 5 bundles of sorbent booms are located in three areas of Norwalk and Westport. The equipment is maintained and inspected by New England Pollution Control Company

Byram River Co-op is defunct

Bridgeport Harbor Oil Spill Cooperative

The Bridgeport Harbor Oil Spill Cooperative is operated somewhat differently from many of the oil spill cooperatives in Connecticut in that the Co-op containment boom is stored on trailers located at two Bridgeport Fire Department facilities. (See Table 2). This requires that the initial response with the boom trailer and boat will be initiated by the Bridgeport Fire Department personnel who will be assisted by terminal personnel. This is fortunate in two respects. First, the marine terminals in Bridgeport are geographically spread out on three distinct waterways: Johnson Creek, Ash Creek and the Pequonnock River. This means that the points of access will be many and varied. Secondly, the response capability of the Bridgeport Fire Department is much more rapid than one could anticipate from individual Co-op members. This system gives very rapid boom deployment at proper containment locations. With the downtown congestion, independent Co-op members could not hope to duplicate the response. This deployment system accommodates the unique hydrographic aspect of Bridgeport Harbor: that it is formed by narrow channels and creeks as opposed to the large open water setting one finds in most harbors.

The Bridgeport Harbor Oil Spill Cooperative has had annual oil spill deployment drills. Based on past efforts, the drills should be held more frequently, probably not less than two drills a year. There has been a somewhat passive attitude exhibited in some of the previous drills which no doubt can be attributed to emergency response experience of fire departments which are sometimes casual about oil spill exercises. This will be corrected by conducting full scale and more frequent drills in the future. The Bridgeport Co-op, while more loosely structured, with fewer meetings and fewer drills, does nevertheless, compare favorably with the better Co-ops in Connecticut.

Thames River Cooperative

The Thames River Oil Spill Cooperative is made up of a combination of industrial and commercial business establishments located in the Towns of Groton, New London, Waterford, Montville, and Norwich with equipment stored on both the East and West shores of New London Harbor and the Thames River. (See Table 3) In the event of any sizable spill, the Thames River Co-op could obtain assistance from the U.S. Navy Submarine Base in Groton and the U.S. Coast Guard located at Fort Trumbull, New London. This would greatly increase the manpower and equipment resources. The Navy has the only self-contained oil skimming vessel located in the Connecticut Coastal Zone.

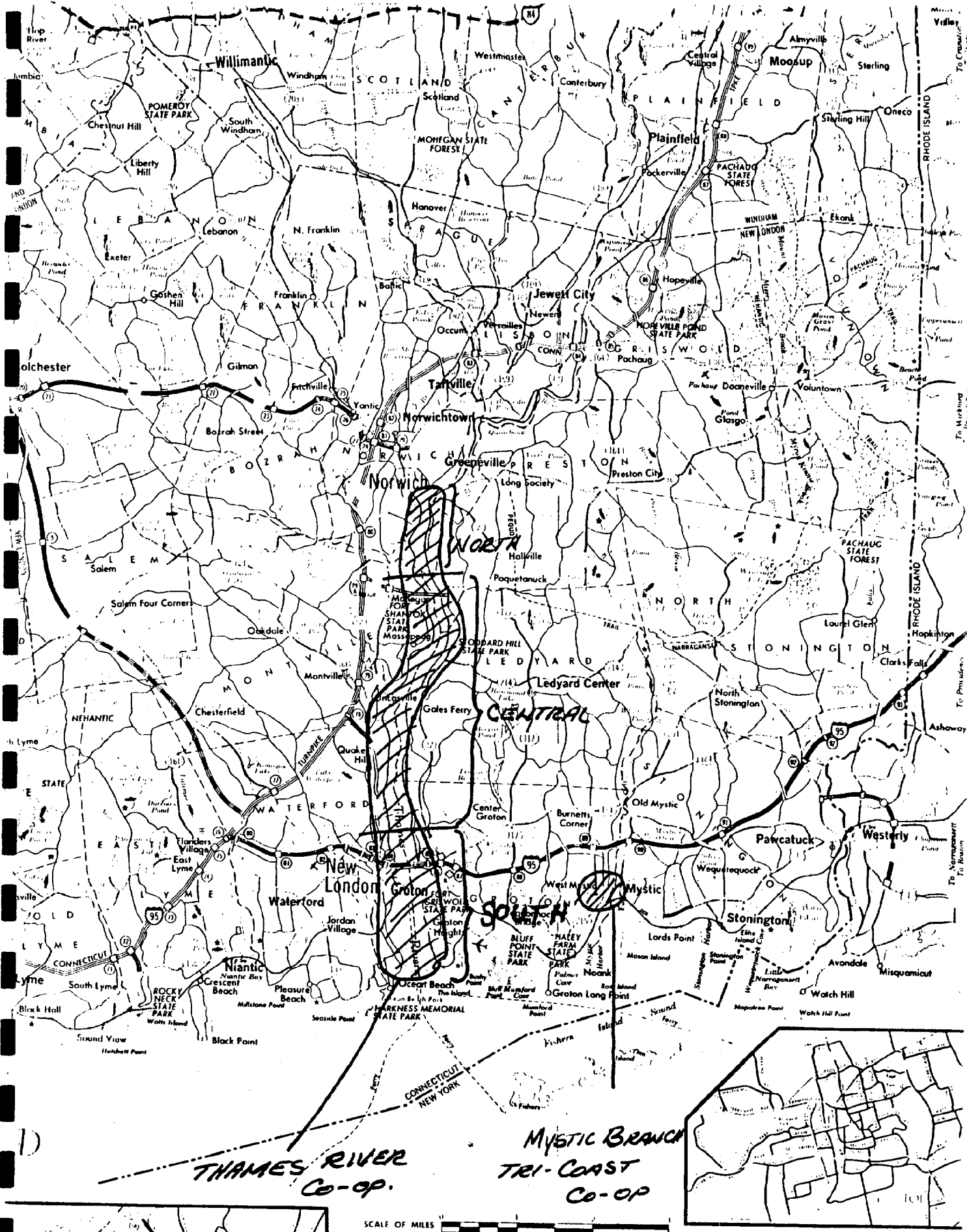
This particular Co-op is loosely organized with infrequent meetings. The drills have been too infrequent with less than annual sessions. This will be improved with at least annual drills beginning in 1982. The equipment is dispersed through the member facilities and without close organizational ties, there is some questions as to how effective the response to a spill incident would be and to what extent Co-op members would commit personnel to assist other member facilities. The Department will be active in upgrading the frequency of oil spill drills and promoting a closer member structure with an effective notification system. Additionally, formal agreements to rapidly access the superior Federal resources (tugboats and skimmers from the Navy) will be actively pursued.

The last drill organized by the Thames River Co-op was held in the spring of 1981 and ran smoothly with all members attending and participating. The drill exercise location, time, and date were not divulged to members to add realism to the exercise. All members arrived with the equipment requested at the spill site and other downriver locations for the deployment of equipment. The exercise was conducted with good efficiency, a minimum of confusion and a greater degree of commitment on behalf of all the membership, not just a few as has been the case in the past.

TABLE 3

Thames River Cooperative

- | | | |
|--|--|--|
| 6) <u>Central Vermont RR</u> | 4) <u>United Fuel</u> | 3) <u>C L & P</u> |
| 19 Bags of Sorbent C.
2000' Wire Fence
100 Posts
Generators
3/4 ton Pickup
Handtools | Absorbent Materials
Sand
Hand tools
Tank truck | 600' 18" Slickbar
13' Boat 25/hp motor
3/hp Sea Broom With 100'
Hose
19' Boat 70/hp motor
Handtools |
| 5) <u>New London
Petroleum</u> | 2) <u>Dahl Oil</u> | 7) <u>City Coal</u> |
| 400' Uniroyal 18" Boom
Handtools
1 Tank Truck
Absorbent Materials
Sand | 540' Uniroyal
(18" Boom)
1 Van
Handtools
Absorbent Material | 200' Uniroyal
(18" Boom)
Handtools
2 Self priming pumps
12' Boat without motor
Absorbent material |
| 9) <u>Pfizer</u> | 1) <u>Lehigh Oil</u> | |
| 500' Uniroyal 36' Boom
300' Uniroyal 18" Boom
12' Boat 12/hp motor
18' Boat 105/hp motor | 1 Tank truck
Absorbent Material & Hay
Portable Pump
Filter fence material | Handtools
1 Response Van
with equipment |
| 8) <u>General Dynamics</u> | | |
| 500' 18" Boom
1 Vac All
1 Backhoe
3 Payloaders
2 Skimmer Floats with
six sections of hose | 2 Suction Pumps
1 Portable Light System
2 Portable 500 gal. Tanks
18' Boat 40/hp Motor
1 Liquid Vacuum Tank (3300 gal. capacity) | |
| <u>Also</u> | | |
| 10) U.S.C.G. Group L.I.S., New London has assorted spill clean-up equipment available: Boats, boom, etc. | | |
| 11) U.S.N. Sub Base, Groton has booms, skimmers, boats, etc. available for oil spill containment. | | |

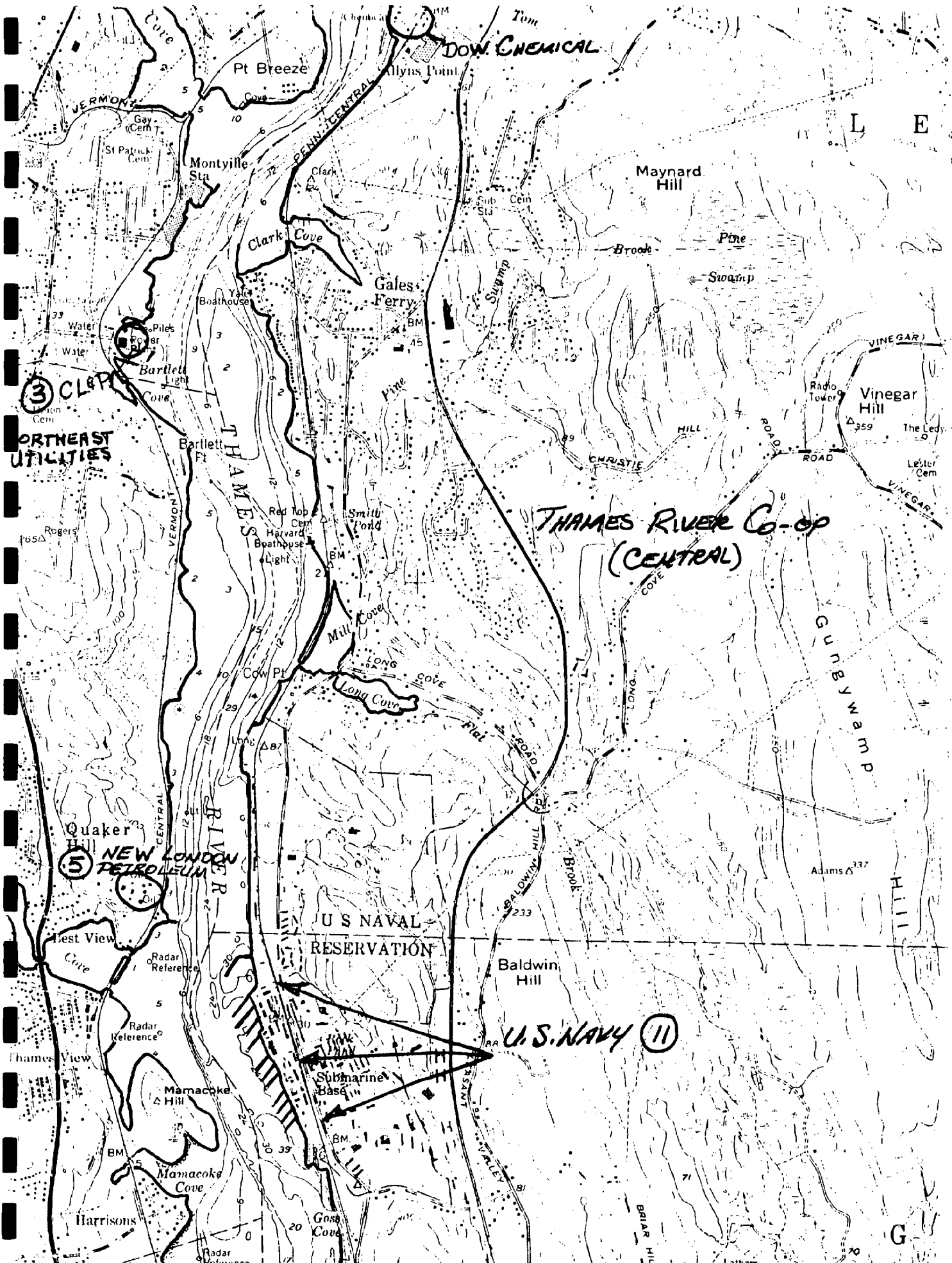


THAMES RIVER
Co-op.

Mystic Branch
TRI-COAST
Co-op

SCALE OF MILES

HARTFORD AND VICINITY



DOW CHEMICAL

3 CLARK
NORTHEAST UTILITIES

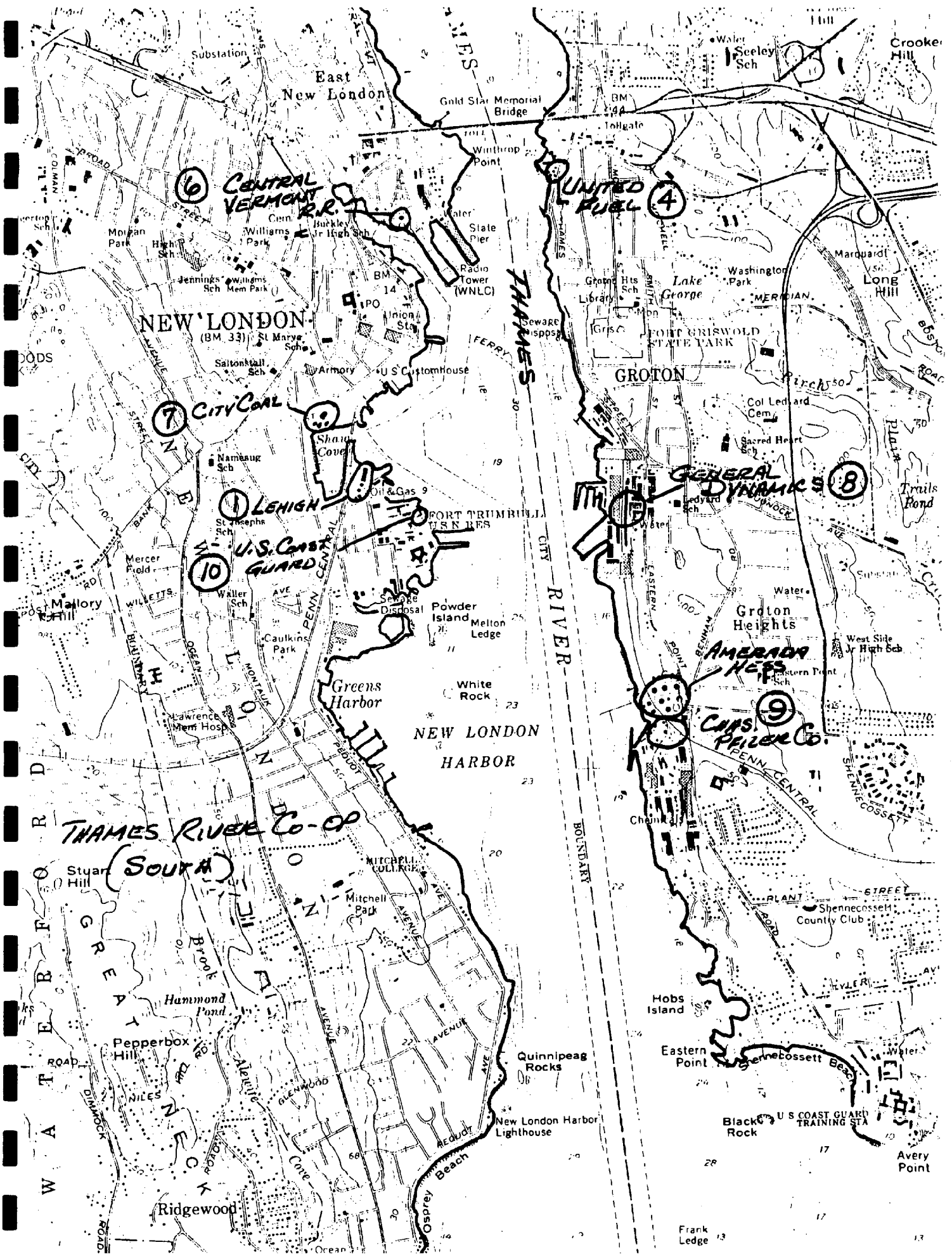
THAMES RIVER Co-op
(CENTRAL)

5 NEW LONDON
PETROLEUM

U.S. NAVAL
RESERVATION

U.S. NAVY 11

G



⑥ **CENTRAL VERMONT R.R.**

④ **UNITED FUEL**

NEW LONDON
(BM 33)

GROTON

⑦ **CITY COAL**

① **LEHIGH**

⑩ **U.S. COAST GUARD**

⑧ **GENERAL DYNAMICS**

AMERADA NEPS

⑨ **CAS. PAUER CO.**

THAMES RIVER CO-OP

(SOUTH)

GREY

NECK

Ridgewood

NEW LONDON HARBOR

THAMES RIVER

BOUNDARY

W
A
T
E
R
B
O
R
D
E
R

Mid-Coast/Connecticut River Oil Spill Cooperative

In 1980, a State owned oil spill cooperative was established for the Lower Connecticut River/Mid-Coast area. This cooperative, established with funding provided by the Coastal Energy Impact Program, was designed to provide oil spill protection to a geographic area which experiences a high volume of waterborne petroleum transport but has no private marine terminals or spill protection from private spill cooperatives.

The following summary outlines the current status of the Mid Coast/Connecticut River Oil Spill Cooperative. There are four basic equipment storage areas in the Old Saybrook area at a commercial marina. Efforts to locate a State facility which could provide convenient waterfront access with reasonable security have been unsuccessful. The workboat will remain in the water until ice begins to form, usually around the first or second week of December. Arrangements have been made with the U.S. Coast Guard to have the boat hauled and stored at the New Haven Station.

The remaining large equipment items are the two box-body trucks. These trucks will be located at East Lyme and Westbrook to tow the 20' boats and carry 500' of 12" containment boom. This will provide a complete unit of boom and boat at these locations.

The purchase of these vehicles has been accomplished.

With the acquisition of equipment completed, the emphasis of personnel involved in the Co-op has shifted to equipment deployment. The initial preference for rapid response and deployment of the Co-op equipment was to have local fire departments of the towns from within the Co-op area undertake this task. While this seemed to be the most logical way to achieve the goal of rapid equipment deployment, the initial response from local fire departments indicates that they do not want to participate in the deployment of the Co-op equipment. In June 1981, a training seminar was given by DEP personnel for two participating towns. Nineteen people attended the session representing Chester, Madison and North Madison fire departments. A second training session was given in August 1981, involving several more fire departments. Beyond this, it is difficult to

determine how many other fire departments will eventually participate in the Co-op.

To make up the additional manpower resources needed to provide timely deployment of equipment, the following adjustments are being made:

- a) A tentative commitment has been secured from the U.S. Coast Guard COTP (Captain of the Port) New London to provide at least four personnel from the COTP office for initial response containment boom deployment. These persons, already trained in spill activities and use of water craft, will be available following equipment orientation sessions and the formalizing of a memorandum-of-understanding between the Coast Guard and DEP. Additionally, contacts have been made with the chief executive officers of each area town to request assistance for boom deployment spill incidents involving these individual towns.
- b) At the present time, boom deployment will be accomplished by DEP Oil & Chemical Spill Unit personnel with the assistance of DEP Conservation and Preservation Division and CT DOT (Department of Transportation - boom delivery). Under our present operational procedure for the Co-op area, a professional clean-up contractor will immediately be summoned to respond to any significant spill report. The contractor will arrive on-scene in time to assist with the deployment of spill containment equipment. Those costs will be borne by Connecticut's Oil Spill Contingency Fund until reimbursement can be obtained from the pollutor.

In summary, the establishment of the Mid Coast/Connecticut River Oil Spill Cooperative is now complete. The Co-op is operative with the ability to provide containment of spills. The response capabilities will gradually be improved as additional commitments for participation are secured and those personnel have attended the training and orientation classes.

Mid-Coast/Connecticut River Oil Spill Cooperative

(State Funded and Operated)

Containment Barrier:

4000'	12" Skirt/Parker Systems
2000'	18" Skirt/Parker Systems
500'	36" Kepner Sea Curtain (U.S.C.G.)
600'	American Boom & Barrier; Mini boom, Assorted Anchors, and Buoys.

Boats

26' Pacific Plastic diesel powered flat deck workboat
 2 Boston Whaler "Outrage" model work boats with 85/hp Johnson Outboards
 Assorted Lines, Anchors, and Buoys

Vehicles

1 Ford F-600 truck with 10' walkin box
 1 Dodge D-300 truck with 10' walkin box
 1 Plymouth 4 X 4 Trail Duster
 3 26' Wells Cargo equipment box trailers

Miscellaneous

Sorbent Materials	25 bags
Sorbent Boom	10 bundles
Sorbent Pads	10 bundles

SUMMARY OF EXISTING EQUIPMENT AND PERSONNEL FOR DEPLOYMENT

A review of the enclosed TABLES, particularly TABLE 1, containing summary inventories of privately and publically owned containment equipment located within or proximate to Connecticut's coastal area indicates that the State has an adequate geographic distribution of containment equipment. In all cases, the private co-operatives and professional clean-up contractors (TABLE 5) have adequate personnel available for deployment of equipment.

For the two public co-operatives, manpower arrangements are presently not adequate. The Connecticut River/Mid-Coast Co-op still lacks complete support from the volunteer fire departments which the Co-operative area serves. Present deployment procedures rely on Department of Environmental Protection personnel, with tentative arrangements for additional support from United States Coast Guard personnel from New London and New Haven. The Tri-Coast Co-op will ultimately depend on fire department and, to a lesser extent, other municipal personnel for deployment functions. Training has been initiated and is being completed under a Coastal Energy Impact Program grant.

Summary of Private Contractors EquipmentNew England Pollution ControlNew Haven

2000' 18" Containment Systems

500' 18" Slickbar Mark V

Norwalk

500' 18" Slickbar Mark V

200' 8" MP Boom

100' 8" Mini Boom

At New Jersey

3500' 18" Containment System

Hitchcock Gas Engine Co.Bridgeport

400' 20" Uniroyal

East Coast Environmental ServicesNew Haven

1200' 16" Slickbar

400' 18" Slickbar

200' 12" Slickbar

200' 24" American

Sealand Environmental Services, Inc.Derby

2500' 18" Slickbar

900' 18" Bennett

General Strategies for Spill Containment, Control, and Cleanup Activities

It is extremely difficult to do more than generalize any non site-specific access evaluation. There are many factors other than location which are also important such as magnitude of spill, type of oil or petroleum product involved, wind and tide condition, and type and amount of equipment required.

For this evaluation, we have logically concentrated on the various spill site types which can be encountered in coastal water spills with the access problems associated with each group.

1. Restricted Harbor Areas:

These areas are located on channels at coves which are protected from the tide and wind. Many of the harbors which can be categorized as restricted or confined are narrow throughout or at least at several points. These narrow points usually provide relatively easy landside access for emergency response equipment and containment boom. Spills into such an area can frequently be contained by the deployment of boom from the shore without the use of a boat. Lines can be used to draw the containment boom across a channel or the mouth of a cove, often with little difficulty. Good examples of this would be the terminals in Bridgeport Harbor located on Johnson Creek and Cedar Creek or City Coast in New London located in Shaws Cove. Spills near these facilities could be contained with relative ease.

2. Bulkhead and Vessel at Terminal

Spills occurring at a marine bulkhead from within the facility or from a vessel such as a barge at the marine facility can frequently be contained by deploying boom directly along a bulkhead or around the vessel from one point on a bulkhead to another.

3. Open Water Harbor Area

Open water harbor areas will normally require the use of a boat for boom deployment. The most rapid deployment response will occur when there are private workboats, fireboats and/or Coast Guard boats in the water at all times. This condition exists in some of our harbors (New Haven, New London) but is not universal. The access point for the boom deployment boats is sometimes adjacent to the boom location point but more likely the boat must be launched at either a marine or other private/public launch ramp near the spill site. In a harbor situation this usually does not present a problem as the launching facilities are usable under most tidal conditions. Containment boom can be deployed at the boat launch site or in many cases from the member facility closest to the spill site. In some locations such as New Haven, the boom deployment vessel would transport boom to the spill site. This procedure could be modified by the use of contractors boom brought into the member facility and deployed by the Co-op boat.

4. Open Water Access Points

When it is determined useful to deploy boom in open water, the access points would normally be out of a harbor, marina or public access that is proximate to the spill area. Obtaining an adequate access to an open water spill would probably not present a problem other than having to transport boom over water for some considerable distance. Access for clean-up could be much more difficult since private property and difficult topography without roadways can be encountered.

5. Coastal River Access Points

Here again we would be required to use existing public/private access ramps or marinas to launch deployment boats and/or equipment. The Coastal River siting could well provide the most difficult circumstances. The deployment

of a boat and containment boom may be at different locations distant from the spill site. The clean-up activities may also take place miles from suitable landside access. Even if permission can be obtained from a property owner, terrain and lack of suitable roadways will frequently prevent bringing landborne equipment to the spill site. The choice must be made between working from the river using small workboats and vacuum equipment mounted on work barges or allowing the tide and wind to move oil to a containment location where access can be accomplished with relative ease (i.e. vacuum trucks and tankers can be brought within pumping distance of the contained oil).

Each spill event presents a unique set of circumstances which will establish the access conditions for boom deployment and spill clean-up. Usually within a harbor area, access presents no real problem to response for containment or for location of heavy removal equipment such as vacuum truck and large tank trailer rigs. In the open waters along coastal shorelines, access can present a problem both for the deployment of containment boom from boats and from actual spill clean up at the water's edge. It would sometimes be extremely difficult to get access to the coastal shoreline even if permission were obtained from private owners since the terrain would not permit heavy vehicles to come near the waterfront. Fortunately, beach front clean-ups are rare and this problem is not frequently encountered.

The most difficult situation which arises from time-to-time is the clean-up in a coastal river setting. Here boom deployment must be accomplished using boats and boom launched from facilities many miles from the spill site or area of oil concentration. Access for clean-up activities is frequently precluded by marsh, and in other cases, rugged terrain sloping steeply to the river. Here it is usually preferable to allow oil to move downstream with the aid of deflection booms to a location which allows landside access for

essential clean-up equipment such as vacuum trucks. Even when this can be satisfactorily accomplished, it is not infrequent that hand work from small boats along the river must be carried out to take care of small accumulations (pockets) of oil and to remove accumulated oily debris. This is of course, more often seen in black or residual oil spills which tend to adhere to the river shoreline and everything with which they come in contact.

There has been some consideration of arranging access to private property on a pre-incident basis. This has been discounted as impractical and unnecessary. During an incident where it is necessary to accomplish access to the spill site over private property, it has been the Department's experience that private parties will almost always allow equipment to enter even to the extent that roads have been constructed, trees removed, and lawns damaged with the owner's permission. These accesses were made with the verbal agreement of the State on-scene-coordinator that the damage would be corrected to the owner's satisfaction. These arrangements were always honored by the DEP and no grievances are outstanding to our knowledge. The major difficulty with pre-incident agreements, beside the great effort that would be required to accomplish the task of negotiating and executing agreements with a large number of property owners, would be the problem of property transfers invalidating the agreements. A secondary effort would be required to keep all agreements up-to-date and in force. In summary, the pre-incident agreement is probably too difficult to accomplish and our previous experience indicates that it is unnecessary.

Identification of Storage Areas for Oily Waste & Debris Generated by Oil
Spill Clean-up Activities

During the past ten years, the disposal of oily waste materials from a spill cleanup has become an increasingly difficult problem. This is true of even the smaller 1,000 gallon spill as well as the large "Argo Merchant" size spills which can generate thousands of cubic yards of debris from clean-up operations.

Due to the disposal problems associated with oil spills, a conscious effort has been made by State On-Scene-Coordinators to minimize or reduce the amount of waste generated during spill clean-ups. This has become necessary due to the difficulty in finding suitable land disposal sites and the reduced number of incinerators which are still operating in Connecticut.

Table 6 summarizes the methods currently used to segregate oil spill clean-up by products. Several important steps have been taken to reduce and keep those materials to manageable levels.

1. Every effort is made to contain and remove sizable spills using vacuum equipment and then by techniques that accomplish as much of the clean-up as possible with direct oil, or oil and water, removal. This allows the relatively uncontaminated oil or oil-water mixture to be reclaimed and eliminates the need for costly, extensive disposal of large amounts of spill debris.
2. The use of absorbent materials such as sorbent pads, sorbent and fiberpearl has been restricted primarily to small spills or to polishing or final clean-up on larger spills. When large numbers of pads are used, the contractors use pads from which the oil can be removed and the pads reused. This is desirable to reduce the amounts of sorbents requiring disposal and can also be cost effective by substantially reducing amounts of sorbent pads required for the clean-up.

TABLE 6

SCHEMATIC OF DISPOSAL OF OIL SPILL DEBRIS AND
RECOVERED OIL AND OIL-WATER MIXTURES

<u>TYPE OF DEBRIS</u>	<u>PROCESSING REQUIREMENTS</u>	<u>DISPOSAL OPTIONS</u>
<u>COMBUSTIBLE MATERIALS</u>		
1. Sorbent Pads	Press out oil	Reuse
2. Sorbents, Particulates	None	Incinerate
3. Logs	Cut to Firewood length	Given to public for stove & firewood
<u>NON-COMBUSTIBLE MATERIALS</u>		
1. Sand	Mix with sand if free draining	Landfill, asphalt construction or incineration
2. Stone, Gravel	No free draining oil	Landfill, asphalt, batch plant, road- bed construction
3. Earth	Mix with sand	Landfill, daily cover
4. Speedi-Dri, Oil-Dri, Calcium Bentonite	No Processing	Landfill or incin- erate
<u>LIQUID OILS, OIL-WATER MIXTURES</u>		
1. Oils	No processing	Incineration
	Reclamation (water & dirt removal)	Fuel Oil
2. Oily Water	Pretreatment for oil removal	Water to municipal sewer

3. The careful cleaning of beaches using handtools and light weight power equipment can greatly reduce the volume of debris as well as preserve the beaches from destruction by heavy equipment. In large coastal spills it was formerly standard procedure to remove large amounts of beach sand to the point where the clean-up operation was more ecologically damaging than the impact of the spill itself. This attitude has been changed and now sand removal is limited and done carefully to avoid damage, significantly reducing the volume of contaminated sand that requires disposal.
4. The careful separation of burnable debris such as sorbents, brush, and wood can be accomplished and reduces the volumes of material requiring land disposal. Sorbents and brush are then scheduled for incinerators while the wood is cut and used for fuel.

Because the clean-ups are done with much greater care with regard to oil debris generation, it is not frequently necessary to go to storage areas for temporary or long term disposal. However, in the event of a very large fuel oil spill in Connecticut Coastal Waters, interim debris storage would probably have to be implemented to facilitate this difficult task. The Department has developed a listing of a number of possible private and municipal coastal landfill disposal areas which could be used for storage until ultimate disposal options could be worked out and arrangements consummated. This list was developed with the assistance of the DEP Solid Waste Unit in 1976 and was revised as necessary. The list does not imply any commitment in the part of the municipality or owner of the facility to accept this waste. The actual negotiation for acceptance and requirements for site preparation and engineering would take place at the time of the spill. The staging and ultimate disposal of an extremely large volume of material from a spill can present a very serious problem. Fortunately, in the event of a large spill, the Department's Hazardous Waste Section and

Solid Waste Management Unit would combine their expertise and energies to bring this disposal problem to an environmentally acceptable conclusion.

SUMMARY AND RECOMMENDATIONS

Connecticut is fortunate in having a good mix of centrally located, seemingly well equipped and trained private oil spill cooperatives. There are also a number of capable professional clean-up firms with substantial spill equipment inventories and excellent response capabilities. This capability has recently been supplemented by the inclusion of two CEIP funded coastal area cooperatives which provide much greater flexibility and comprehensive coverage of the entire coastline. This situation probably is unique in the New England area, however, the mere presence of equipment does not insure that the response will be adequate to this end.

The following recommendations, if implemented, will substantially improve the functional level of a number of Co-op's which are not very rigorous in training and hold practice drills only at irregular intervals:

- 1) A cooperative effort should be established with the United States Coast Guard to ensure standardization of requirements for all cooperatives to minimum levels. The standards would include the following:
 - a. Annual inspections of all spill related containment equipment for general condition and readiness. Any equipment not found to be in serviceable repair would be required to be repaired or replaced.
 - b. Annual full scale drills, with additional supplemental training as required. Also, communication drills (i.e. notification of responding personnel to be held at least semi-annually).
 - c. Requirement that each Co-op provide an annual listing of Co-op officers, member contacts, including 24-hour phone numbers of those Co-op officers and persons responsible for equipment maintenance and storage.
- 2) The Department of Environmental Protection with the aid of the United States Coast Guard should pursue an agreement with the U.S. Navy concerning authorization for the use of Navy personnel and equipment (skimmers, tugs, containment boom)

in the event of a major spill in the Lower Thames River or adjacent waters. An agreement could be made with the Navel base public works officer who has recently been given authority to enter into cooperative agreements by a directive which shifted the responsibility from Navy Buships, Philadelphia to the individual Naval facilities. Details of when equipment would be available, and how procurement could be effected, should be incorporated into a pre-incident agreement.

- 3) An agreement should be worked out with the United States Coast Guard, Captain-of-the-Port in New Haven and New London concerning Coast Guard assistance to the Department of Environmental Protection for employment of Department equipment in the Coastal Zone (Mid-Coast/CT River and Tri-Coast Co-ops). This agreement should contain provisions for equipment orientation of Coast Guard personnel, as necessary, and possible reimbursement to the Coast Guard of certain expenses, such as fuel costs which cannot be recovered through the Section 311 pollution fund of the Clean Water Act.(P.L. 92-500, 1972 as amended)
- 4) Development, with guidance from the U.S. Environmental Protection Agency and United States Coast Guard, of a listing of possible oil spill debris staging sites (temporary storage sites). This should be done with assistance from Department of Environmental Protection, Water Compliance Unit, Hazardous Waste Unit, and the Solid Waste Unit and should include guidelines for site development and monitoring as well as required permit procedures.

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