

An aerial photograph of a large-scale oil spill cleanup operation on a wide river. A large tugboat with a crane is positioned in the center, surrounded by several smaller barges and support vessels. A long, dark, irregular slick of oil is visible on the water's surface, extending from the top right towards the center. The riverbanks are lined with trees and some industrial structures. The overall scene is dark and somber, emphasizing the environmental impact of the spill.

OIL ON THE SCHUYLKILL

A CASE STUDY

DIVISION OF OIL AND HAZARDOUS MATERIALS
OFFICE OF WATER PROGRAMS
ENVIRONMENTAL PROTECTION AGENCY



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CORRECTIONS

to

"OIL ON THE SCHUYLKILL"

1. Page 34 - Slide R-17
Correct caption to read, ". . . by Berks Associates . . ."
2. Page 39 - Slides A-35 and A-33.
Captions should be reversed.
3. Pages 45-47 - all Slides
Correct captions to read, ". . . at Fort Mifflin Pier."

OIL ON THE SCHUYLKILL

A CASE STUDY

ABSTRACT

On November 13, 1970, 3 million gallons of waste crankcase sludge oil spilled into the Schuylkill River in Pennsylvania. This document depicts the breadth and rapid development of events and actions taken as a result of this major oil spill incident.

This was the first time the revolving fund was utilized and action taken under the imminent threat provisions of the Water Quality Improvement Act of 1970. The report attempts to project, by using a case study format, potential problems that could be encountered by an On-Scene Commander and his team in similar spills. The Schuylkill case may serve as a reference point around which effective response efforts may be planned.

This presentation is based on the Documentation and Critique of the Schuylkill River Spill of November 13, 1970 prepared by Altenburg, Kirk and Company, Inc., Thompson's Point, Portland, Maine 04102 for the Federal Water Quality Administration under Contract 1-PO-000687.

SECTION I. INTRODUCTION:
SCOPE OF THE REPORT

This survey is intended to document all significant facts relating to the Schuylkill River oil spill of November 13, 1970.

The report documents the pre-spill history of the spill originator, the immediate causes and effects of the spill, operational methods and techniques used in the clean-up operation and disposal methods.

Sources of information include:

1. The National Contingency Plan for Oil and Hazardous Materials, June 1970.
2. A complete file of Sitreps (situation reports) originating at the Operations Room of the Regional Response Team at the United States Coast Guard, Gloucester City, New Jersey.
3. Daily logs kept by staff personnel of the RRT.
4. Aerial photographs of the polluted area supplied by the U.S.C.G. Photo Service, Third Coast Guard District, Governors Island, New York, New York.
5. Extensive interviews conducted personally or by telephone with approximately 20 of the key personnel associated with the clean-up effort.
6. News clippings from papers in the cities of Philadelphia, Reading, Pottsville, and Phoenixville for a period of one month beginning November 13.
7. Personal observations of the members of the Documentation Team who were on the site from 17 Nov to 22 Nov.

Most of the statements of fact in this report can be backed up by one or more of the sources quoted above. Where substantiation was not available, statements believed to be true were identified by the phrase "it was reported that.....".

Opinions and judgments of the Documentation personnel are readily identified as such and are based on nearly three years of experience in oil spill control work including two major oil spills.

SECTION II: SUMMARY OF FINDINGS
AND RECOMMENDATIONS

A. Findings

The Schuylkill River Spill was the first occasion for a Regional Response Team to enter the scene in accordance with the National Contingency Plan of June, 1970 and the Water Quality Improvement Act of 1970.

It was also the first time that the F.W.Q.A. supplied an On Scene Commander to a major spill under the Plan.

Conclusions by members of the Documentation Team are listed herewith in approximately the order that the conclusions were developed.

1. There was a very regrettable delay in discovering the spill and in notifying F.W.Q.A. and the Coast Guard.
2. Once notified, both Coast Guard and F.W.Q.A. responded promptly, effectively and in accordance with the Contingency Plan.
3. Cooperation and assistance by the Coast Guard Base at Gloucester City, New Jersey was complete and effective.
4. The Regional Response Team of 4 persons accepted its responsibility and became an effective leader of the response effort without loss of time.
5. Resources of the Delaware River Basin were not well organized or equipped to respond to a major oil spill, although the beginnings of a good cooperative effort were apparent.
6. Additional staffing of the RRT is essential to cope with the work load imposed by the first phases of a major spill.
7. Oil spill contractors available in the area could only supply a minimum of skills and equipment for the clean-up effort.
8. The spill originator had very little capability to assist the clean-up effort beyond closing the broken dikes and redistributing the load in the lagoons on his property.

SECTION II: (continued)

9. Clean-up operations are very difficult in a Metropolitan Area where traffic and buildings interfere with movement of equipment.
10. Aerial survey facilities are essential for planning a clean-up effort spread over a wide area.
11. Effective communications systems linking field operations with the RRT Operation Base are essential.
12. Everyone knows how to report a fire but very few people know how to report an oil spill.
13. The OSC and his staff were conscious of the costs of a clean-up effort and made periodic reviews of the funds committed and results obtained.
14. Use of a Coast Guard Base for Operations Headquarters was very effective and other Coast Guard Bases should be prepared for a similar effort.
15. The Public Relations effort was handled effectively. This resulted in unusually good coverage by the news media.
16. Short range damage to the ecology was minimal, but long range effects have yet to be determined.
17. When the RRT ceased operations on 25 NOV the waters of the Schuylkill and Delaware Rivers were more than 95% clear of the spill.
18. The RRT staff would have been far less effective if it had been operating on its own without the support of Base Gloucester personnel.

B. Recommendations:

1. The RRT staff should be expanded to include
 - a. An operations specialist to back up the OSC on equipment deployment and technology.
 - b. A capable secretary
 - c. A contract specialist to handle business arrangements with contractors and to assist with transportation, housing and communications problems, and to keep daily estimates of costs incurred.

SECTION II: (continued)

2. Specific responsibility for entrys in the "Commanders Log" should be maintained on a 24 hour basis.
3. The RRT should assemble an "emergency kit" so that the most necessary equipment for field operations can be hand-carried by members of the Team when they respond to a call. Maps, writing materials, cameras, tape recorder, portable typewriter and walkie-talkies should be considered.
4. Major attention should be given to organizing the resources of the major oil terminal areas for prompt and effective reaction to oil spills anywhere in the area. This should include
 - a. Education of the entire populace on the need for immediate alarm in case of a spill.
 - b. Specific notification to all State Agencies that there is a National Contingency Plan and a provision for RRT action.
5. The inter-dependence of the containment and clean-up operations (of booms and skimmers) should be emphasized to all operators of oil spill equipment.
6. Each RRT should have a file of USCGS maps covering coastline and river basins in its area so that the staff could study these maps for possible trap-basin sites while enroute to the scene. Careful study of these maps can disclose potential areas for boom-and-skimmer installations, and would save precious time in positioning the available equipment.
7. Study of Documentation reports on all major spills should be a "must" assignment for all personnel assigned to an RRT.

SECTION III. DIARY OF THE
SPILL AND CLEAN-UP OPERATIONS

FRIDAY, 13 NOV 70

- 01:00 Berks Assoc. patrol of dikes, due to several days of heavy rain, stopped "because rain had stopped."
- 03:00 (Est.) Rain resumed, raising level of contents in diked lagoon holding petroleum residue and storm water. Lagoon contents (estimated at 3,000,000 gallons of oil and water mix) overflowed dike, broke through and spilled into Schuylkill River approximately 3 miles west of Pottstown, Pennsylvania.
- 07:00 Berks Assoc. employee on way to work noticed oil in river at Pottstown bridge. Gave alarm. Berks personnel reacted with bulldozer and manpower to close leaks in dikes. (Exhibits 1. and 2.)
- 07:15 Berks Assoc. notified Pennsylvania Department of Health.
- 08:00 Leaks closed in dikes. (According to Berks personnel interviewed 19 Nov)
- 08:00-09:00 During this period Berks personnel notified State officials, who did not notify Coast Guard or F.W.Q.A.
- COMMENT: Notification of the spill should have gone to F.W.Q.A. and/or the Coast Guard at the earliest possible moment after alerting the waterworks group. The time lost was critical. With prompt notification, booms could have been effective well upstream of the Philadelphia area.
- 15:00 About 15:00 there was a radio broadcast heard by Paul Preuss of Clean Waters, Inc. who called Gloucester City, New Jersey (Base Gloucester) Coast Guard at 15:30 and also notified F.W.Q.A. in Washington, D.C.
- 15:30-22:00 During this period, word of the spill spread rapidly, and the following actions were reported by various groups:
- F.W.Q.A. offices were alerted at Washington, D.C., Edison, N.J., and Philadelphia. The Regional

SECTION III. (continued)

Response Team was activated. A call was made to offer help to Pennsylvania Department of Health but none was requested. Call to Commander Dash at Base Gloucester authorized hiring a contractor to combat spill. Personnel of the Regional Response Team departed New York area for Philadelphia by auto, with instructions that F.W.Q.A. would provide the On Scene Commander, and Mr. Howard Lamp'1 of F.W.Q.A., Edison, N.J., was designated.

Executive Officer at Base Gloucester took prompt action to contact Pennsylvania Department of Health and the Regional Response Team in New York (Office of Intelligence and Law, 3rd District U.S.C.G. at Governors Island, New York) in accordance with National Contingency Plan. (Oil and Hazardous Materials.) He also dispatched a patrol to observe progress of the oil (reported to have reached Conshohocken area) and contacted Underwater Technics of Camden, New Jersey, for manpower and equipment to start booming operations to contain the spill.

Base Gloucester designated an "Operations Room" in HQ building and began to equip it for use by the OSC and his staff.

Coast Guard patrol reported oil covered river bank to bank in Fairmount Park area and that inlets to Philadelphia Water Supply had been closed before oil reached them.

At 18:30 Executive Officer of Base Gloucester conferred with Mr. Stith of Underwater Technics at Market Street Bridge, sent patrol to find sites along river where equipment could be placed. District Chief of Philadelphia Fire Department assisted. Most of river bank unsuitable due to highways on West side and railway on East bank. Sites surveyed at Market Street Bridge, Getty Oil Co. grounds, Grove Ferry Bridge, and Gibsons Point.

At 21:30 selected Gibsons Point site for first attempt at placing plastic booms. 41' Coast Guard boat assisted this attempt and found fast current, and excessive amounts of debris in river to be major obstacles to operation. Booms placed across the

SECTION III. (continued)

current at 22:55 broke repeatedly due to fast current and accumulation of debris.

At 22:00, returned to Base Gloucester to brief OSC and his staff upon their arrival.

Underwater Technics, Inc. the contractor hired about 16:00, assembled boom, vacuum truck, rigging and gear and a crew and met Commander Dash at 18:30 near Market Street Bridge and assisted in selection of a first site for working the booms. (Exhibit 3.)

22:00 RRT personnel arrive at Gloucester Base (Gloucester City Coast Guard Base, Gloucester City, N.J.) Howard Lamp'1 and Leo McCarthy of F.W.Q.A., Edison, N.J., and Commander Robert Hanson, U.S.C.G., and Lt. JG. Clow, U.S.C.G., New York District. Oil reported to have reached Delaware River.

F.W.Q.A. assumed OSC responsibility. Howard Lamp'1.

22:30 Base Gloucester activated, phone ordered and helicopter requisitioned for 14 NOV.

22:45 Three vacuum trucks of Underwater Technics at spill clean-up sites and 3 more on the way from Atlantic-Richfield, who offered to process oil recovered from river.

22:55 First boom deployed across current at Gibsons Point parted due to strong current. It was repaired and parted again at 23:38.

COMMENT: The river current of 3K or more was immediate warning that boom containment would be unsuccessful. Initial effort should have been to use diversion technique and steer the oil and debris into back waters or coves for removal operations as was later done successfully at Penrose Avenue Bridge and Fort Miflin.

23:15 Captain of Port (Coast Guard) issued Notice to Mariners closing the Schuylkill River to marine traffic.

24:00 Briefing and planning conference continued until 01:00 14 NOV. Off base accommodations for RRT personnel arranged by Base Gloucester.

SECTION III. (continued)

SATURDAY, 14 NOV 70

- 07:25 Reported that two additional attempts to place boom across river resulted in parting of boom. (Met-Pet boom.)
- 07:45 F.W.Q.A. PR man (William Palmer) arrived at Base Gloucester.
- 08:00 Paul Preuss (Clean Waters, Inc.) on scene with absorbents.
- 09:10 Helo overflight observed 30,000 gal. (est.) of oil in Delaware River. 65 miles of Schuylkill and Delaware rivers polluted, est. 100% covered. 5% very dark oil. Plans to boom Schuylkill at Penrose Ave. Bridge, divert oil and debris into cove at W. bank, remove with crane and vac trucks. Plan to spread straw upstream of Penrose Ave. Mass of debris in Lock 60 discovered by helo observers.
- 11:00 Light pollution reported in Mantua Creek and Woodbury Creek due to tidal action. Clean waters, Inc., assigned to boom those creeks. River current est. 3K. COE Team dispatched to check dike at Berks Assoc.
- 12:00-14:00 Conference of RRT. Search for more boom.
- 14:45 F.W.Q.A. mobile laboratory arrives from Edison, N.J. Biologist dispatched to check damage to fish or wildlife.
- Kenneth Biglane, of the Federal Water Quality Administration Headquarters in Washington, overflew the spill area with a Pennsylvania State Department of Health official to survey the extent of the problem.
- 15:30 Conference with State officials.
- Meeting of National Response Team in Washington to consider fiscal problem of this spill.
- NOTE: 23 additional personnel signed in from F.W.Q.A., U.S.C.G., Corps of Engineers, State Agencies, Contractors, Delaware River Basin Commission, and News Media.
- 17:00 Boom at Penrose Ave. reported functioning with some success as a diversion boom.

SECTION III. (continued)

Philadelphia Municipal water supply inlets in Schuylkill closed before oil entered.

Cost of clean-up initially estimated at \$1,000,000. NRT asked for advice on funding. Amount to be spread among several sources.

Coast Guard personnel from Base Gloucester continued to serve as contact between Operations Room and various field activities.

Report that Atlantic-Richfield will receive and reprocess any oil recovered from the spill.

18:00 Additional contractor on site. Metro Oil at Fort Mifflin, Clean Waters, Inc. upstream and at New Jersey shore.

Estimate (by contractor) that 23,000 gal. of oil had been pumped by vac. truck near Penrose Bridge.

Fairmount Park area boomed to protect park wild fowl refuge. (Canadian Geese.) ASPCA and other societies active to assist that situation.

Oil observed on Delaware River 15 miles below Phila.

News items that Berks Assoc. had a previous record of polluting the Schuylkill River.

Large amount of debris in river is a major obstacle to oil removal.

COMMENT: In its first full day of operations, the RRT made its presence felt and accomplished meaningful progress in

- Sealing off the source of the spill and initiating steps to prevent recurrence.
- Marshalling manpower and equipment to prevent spread of spill into sensitive areas along Schuylkill and starting clean-up.
- Coordination of many agencies.
- Communications and Public Relations.
- At least 24 visitors to Operations Room were interviewed.

SECTION III. (continued)

SUNDAY, 15 NOV 70

09:00 Oil still flowing at source. Only 10% black oil now apparent in Schuylkill. 90% thin film. Corps of Engineers barge placed at Penrose Avenue Bridge to anchor one end of boom. This worked okay.(Exhibit 4.)

Base Gloucester boats surveying shoreline. Moderate contamination noted.

Booming completed at Mantua Creek and Woodbury Creek on New Jersey shore. (Exhibits 5. and 6.)

Helo flight could not survey Darby Creek areas in approach pattern to Philadelphia International Airport. Control tower would not permit.

12:15 Dr. Maurice Goddard of Pennsylvania State Forest and Waters Administration authorized use of snag boat "Sheriff" through November 16. Operating funds a problem.

16:00 No serious damage to ecology reported as yet. Fouling of Tinicum Island and Cedar Swamp in Claymount Area reported.

16:08 LCDR. Dash reports "Sheriff" on scene and functioning well on debris removal. Excellent cooperation from Corps of Engineers. (Gordon Dilley, Philadelphia District and Mr. Hittener at Fort Mifflin.)

Oil at Ft. Mifflin reported 5" thick ahead of boom. Some booms later became tangled due to debris. Lee Green, spill master for Metro Oil, operating vacuum truck with 2 small skimmers. Oil recovered 800 to 900 gallons. Expected operations to be ineffective after dark.

Pockets of oil reported at Market Street Bridge and Grey's Ferry Avenue Bridge.

14:30 National Response Team - second meeting on fiscal problems.

18:00 At least 16 visitors interviewed at Operations Room, Base G.

SECTION III. (continued)

16:59 First report from COE personnel at Berks Assoc. that a third dike is filled to danger point. State Health Department asked to lower level in that lagoon.

Two tank trucks dispatched to Berks Assoc. by OSC to pump over-loaded lagoon, which contained residue with high acid content.

Planning underway for a disposal area for oil soaked debris.

MONDAY, 16 NOV 70

08:56 Underwater Technics to spread straw upstream from Penrose Bridge.

09:08 Booming completed at Woodbury and Mantua.

11:30 No CG Helo available. Pennsylvania Air National Guard provided a helo at 11:30.

Coast Guard National Strike Force personnel arrived on scene as observers to assist anywhere.

Civil Defense reports 40-60,000 gallon trucks were available for waste if needed.

River 80% covered above Philadelphia.

12:30 National Strike Force observers assigned to liason duty at Berks Assoc. and upper area of Schuylkill River.

Straw being spread at Wissahicken Creek using a straw gun.

Debris being delivered to Warren Sand and Gravel in Falls Township, New Jersey for disposal.

Estimate 30,000 gallons now skimmed. 130 people working.

22:00 Kurt Young of Worthington Corp. arrived with one Mop-Cat and 2 debris baskets.

At least 13 visitors interviewed at Operations Room.

SECTION III. (continued)

TUESDAY, 17 NOV 70

08:30 Some oil still entering river at source. Debris still a major problem with booming and skimming operations.

Lt. Kangeter of Base Gloucester observing Mop-Cat operations. Mop-Cat not self sufficient - needs shore based crane for debris removal support.

Coast Guard tugs dispatched to aid in debris removal at Penrose Bridge.

Bird lovers offer to wash geese and feed birds at Fairmount Park.

Berks Assoc. notified of responsibilities by telegram from Mr. Klashman, F.W.Q.A., Director of N.E. Region.

Filter fence being set up below Douglasville.

4 pumps dispatched to Berks lagoons. Total capacity of 212,000 gph. Lagoon level to be lowered in anticipation of more rainfall.

Limited traffic authorized through boom on Schuylkill. One hour notice required.

Straw spreading discontinued on lower Schuylkill.

Plans for Pennsylvania State Health Department to monitor dikes at Berks Assoc. in event of serious rainstorm.

18:00 At least 19 visitors interviewed.

WEDNESDAY, 18 NOV 70

08:00 Oil still entering river at Douglasville.

Level of oil in lagoons lowered 2' below top. Pumping continues.

D. W. Reynolds of Documentation Team arrives on scene and begins reconnaissance of area.

Light oil observed from Ben Franklin Bridge to 4 miles below Delaware Memorial Bridge. Source unknown.

SECTION III. (continued)

State Department of Health announces a drive to identify and regulate all waste oil storage lagoons in Pennsylvania. Estimates that there may be 1000 of these lagoons. Airplane survey being used to spot these lagoons.

13:00 Construction of filter fence proceeding. Heavy debris pile-up reported against boom at confluence of Schuylkill and Delaware Rivers. Debris reported collecting at an upstream lock site. (Later identified as Lock 60.)

W. M. Altenburg of Documentation Team arrives on scene.

No skimmers in use on Schuylkill River. Two reported in use by Metro Oil in Ft. Mifflin on the Delaware.

Debris disposal site not satisfactory due to great distance from clean-up site. New dump being sought.

18:00 At least 9 visitors interviewed.

THURSDAY, 19 NOV 70

08:00 Some oil still entering Schuylkill at Douglasville. Lagoon level has been lowered. Debris in river still a problem to clean-up operations.

08:30 Documentation Team personnel start inspection of spill and clean-up operations. On site inspections made at Penrose Bridge, Fort Mifflin, Spring Garden Street Bridge, Filter Fence at Pottstown, Spill Site at Douglasville and Lock 60 at Montclair. See Section IV for comments on operations.

09:00 Radio "beepers" leased from communication suppliers for signalling contractors in field. This provided better communication to field personnel when needed.

13:00 Report received that State of Delaware concerned about future ability of Berks Assoc. to handle waste oil collected in Delaware.

15:00 NRT reviews situation at lagoon and requests by Pennsylvania State Officials for Federal funds to remove lagoon contents. Decision by NRT that imminent threat of further spill has been eliminated,

SECTION III. (continued)

and no further removal of material needed at present.

16:00 Offers of extra vehicles from GSA and other Government agencies in Philadelphia area. Report that pockets of oil along shores of Schuylkill have been cleaned out by water hoses so that oil can go downstream to boomed areas.

18:00 At least 16 visitors interviewed.

FRIDAY, 20 NOV 70

08:00 Flow of oil on Schuylkill very light.

09:00 Possible incineration of lagoon contents being explored by OSC with local equipment manufacturer.

Documentation Team conducting personal interviews and telephone interrogation with State officials, Base Gloucester personnel, Philadelphia City officials and contractor personnel.

Report received from Corps of Engineers concurring with estimate from Raymond International, that dikes at Berks Assoc. would probably have failed a second time if level of contents had not been lowered.

Second boom being installed at Spring Garden Street Bridge. Possibility of booming above the dam was discussed.

02:00 Report that Metro Oil clean-up operations not needed beyond this date.

Debris removal continuing at Fort Mifflin and Penrose Avenue Bridge. Debris held in coves by booms.

23:45 Notice to Mariners opened lower Schuylkill to traffic.

SATURDAY, 21 NOV 70

08:00 Mr. Al Bromberg, F.W.Q.A., Edison, N.J., relieves Howard Lamp'1 as OSC for week-end.

Documentation continues interviews with Coast Guard

SECTION III. (continued)

personnel at Base Gloucester.

Booms removed at Mantua and Woodbury Creeks in N.J.

Second boom cancelled at Spring Garden Street Bridge.

Estimate by contractor that debris clean-up can be completed at Penrose Avenue on Monday or Tuesday.

General consensus that river is relatively clean and operations can be phased out in near future.

11:30 Some oil clinging to riverbanks. No decision on how to clean up river banks. (Exhibit 7.)

Helo flight also shows Delaware River much improved. Report that most debris arriving at Spring Garden Street is free of oil.

12:00 Report that debris pick-up at Lock 60 was continuing by Philadelphia Water Department. When completed, oil would be picked up by an oil spill contractor.

SUNDAY, 22 NOV 70

08:00 Documentation Team personnel departed Philadelphia area after checking Penrose Bridge site where 80% of debris had been removed.

Filter fence at Douglasville reported functioning effectively. Absorbent material renewed as necessary.

Only one downstream boom in position - at Spring Garden Street.

Helo overflight reports very little oil evident on river. Pockets at Lock 60 and Penrose Avenue still to be cleaned-up.

Contractors operations reduced over week-end to avoid overtime costs.

MONDAY, 23 NOV 70

08:00 Oil reported stopped at source. Delaware River reported clean. Very little oil evident on Schuylkill, mostly in Phoenixville area.

SECTION III. (continued)

Plans reported to remove Filter Fence on 24 Nov, finish debris clean-up at Penrose Avenue, Lock 60 (Black Rock Dam.)

RRT to de-activate on 25 Nov. Situation to be monitored by Philadelphia office of F.W.Q.A.

18:00 Estimate that 4 contractors and Corps of Engineers have accumulated costs of \$122,603 to date. Does not include direct costs incurred by F.W.Q.A. and U.S.C.G.

828 tons of Oil Soaked Debris reported removed from Schuylkill by Underwater Technics. Cost estimate to incinerate lagoon contents being considered.

TUESDAY, 24 NOV 70

08:45 Mr. Lamp'1 and Mr. Palmer, F.W.Q.A., enroute Federal Court Hearing on emptying of Berks Assoc. Lagoons.

13:25 Pennsylvania Rivers and Forests Department notified to secure operation of snag boat "Sheriff."

WEDNESDAY, 25 NOV 70

08:00 Overflight reports less than 10% oil at any point in Schuylkill, Delaware clean and no oil from source.

Mr. Horowitz, Philadelphia F.W.Q.A., on site as OSC for last stages of clean-up.

Total contractor costs now estimated at \$130,881 as of 24:00, Nov 23.

Last boom removed at Spring Garden Street Bridge.

News report that an agreement was reached to strengthen dikes at Berks Assoc. pending eventual disposition of the contents. Agreement approved by Federal Court Judge.

RRT on-site activities ceased as of 12:00 this date.

SECTION IV: SPECIAL SUBJECTS

A. Oil Spill Preparation in Delaware River Basin

In the very early stages of this clean-up operation it was evident that the many resources of the Delaware River Basin were not well organized to mount an effective effort against a major oil spill.

The beginnings of an organization were apparent. The 10 major oil terminal operators had formed the "Oil Control Coordinating Committee" and had assembled some items of equipment at their various bases. Early in the operation they offered 1250' of curtain type containment boom. The equipment was used, cleaned, and repaired by Base Gloucester before returning it to the committee.

Most of the State agencies involved were aware of the potential dangers of a major oil spill and they cooperated willingly in most instances with the RRT.

The spill was first discovered by Berks Assoc. personnel. However, those personnel and personnel of the water districts on the upper Schuylkill River (Exhibit 8.) and in Philadelphia who took prompt action to close the inlets to their water supply systems failed to notify either the Coast Guard or the F.W.Q.A.

This oversight is hard to explain in view of the publicity that has attended these major spills. It may be that detailed instructions had not reached these agencies through official channels because the ramifications of this particular spill went beyond the areas normally affected by a spill in tidal waters. In any event steps should be taken to insure that peripheral agencies understand their responsibilities under such circumstances. The delay caused by this oversight was approximately 10 hours on 13 NOV (from 7:30 a.m. to 3:30 p.m.) and the time lost permitted the oil to cover such a wide area that all opportunity of confining it near the source was irrevocably lost.

During the clean-up, cooperation was offered by many State agencies and used effectively. The snag boat "Sheriff" was of great value in combatting floating debris. A team from the Philadelphia Water District removed debris caught in the dead water at Lock 60. (Exhibits 8. and 9.) Government Agencies (GSA, Corps of Engineers, Air Force, National Security Commission and others) offered equipment and services.

SECTION IV: (continued)

In summary the cooperation by individuals and departments was of a high order as soon as the problem was understood and the specific needs were recognized.

Admittedly it is not possible to instruct a large metropolitan area in all facets of a major oil spill. However, a public relations program illustrating the aid and assistance which could be useful might be good material for a TV program on the subject.

As far as could be determined, there were no skimmers available in the area except two small skimmers used by Metro Oil in their operation at Fort Mifflin.

In Summary: the Delaware River Basin area (including the Schuylkill river course) should take steps to activate a more effective plan and to marshall additional equipment against the possibilities of a future spill. Most important of all, prevention measures should be started wherever there is a potential for a spill of oil or hazardous materials.

B. Oil Spill Preparedness - Regional Response Team

The National Contingency Plan for Oil and Hazardous Materials dated June, 1970 provides a comprehensive and authoritative background for the response of Government agencies to an oil spill situation.

This plan has been distributed to the concerned agencies of the Federal Government and its implication is beginning to be thoroughly understood.

It was obvious that Coast Guard personnel at Base Gloucester were aware of this plan and prepared to implement it to the extent that their normal duties, special training, and equipment would permit.

Personnel of the RRT seemed to be thoroughly familiar with the plan and their operations on the scene conformed to the text and to the spirit of the document.

It was fortunate that the personnel assigned to the RRT in the New York area could draw upon an extensive background in combatting oil spills. The OSC was Mr. Howard Lamp'l of the F.W.Q.A. at Edison, New Jersey. He has participated in clean-up activities at several major spills and is acquainted

SECTION IV: (continued)

with many of the contractors available to the Northeast Region of the F.W.Q.A. Commander Robert Hanson of the Third District Coast Guard in New York has observed oil spill operations and has broad experience with Coast Guard reaction to emergency situations.

The make-up of the RRT included a public relations man from the F.W.Q.A. and a staff assistant for Commander Hanson.

A staff of four is a bare minimum for the job at hand. Additional personnel were needed in the first two or three days for communication, transportation, housing, and liaison with field personnel. A competent secretary for the staff would have been invaluable. There should also have been someone on the team in addition to the OSC who could provide detailed instruction for contractors and their personnel in adapting equipment to the infinite variety of situations encountered in a major spill.

On this assignment Mr. Lamp'l had the technical knowledge of equipment and its use but he was initially overloaded to a serious degree by the diverse requirements for decisions on a host of other subjects.

It was indeed fortunate that many of the requirements noted above were filled on short notice by visiting personnel summoned from New York or Washington or by those personnel from Base Gloucester who were immediately available to work with the RRT effort.

The need for legal assistance is a case in point. There is always the possibility that legal action may be necessary to spur the spill originator into effective action for immediate spill control or for long range action to prevent recurrence of a spill. On this occasion it was necessary to lay the background for legal action to recover government clean-up costs.

Provision is made in the National Contingency Plan for the OSC to request legal action from the F.W.Q.A. region involved.

In this incident such action was required, it was provided immediately and effectively from the Northeast Region of F.W.Q.A. and with a minimum of demand on the time of the OSC. Consequently, he was not diverted excessively from his primary responsibilities by the legal aspects of the case.

SECTION IV: (continued)

In our experience we have often seen the threat of legal action become a deterrent to the close cooperation which should exist between the OSC and the spill originator. Consequently, in the interests of good relations between the OSC and the spill originator it seems desirable that the OSC be divorced as far as possible from apparent involvement in legal activities and their punitive implications.

In summary: the RRT staff on this operation performed admirably although it was overloaded with detail. As constituted, it contained a bare minimum of the manpower and skills necessary for effective operation and many of those skills could not be employed to their best effect because of the overload of detail in the first 3 or 4 days of the effort.

C. Oil Containment and Clean-up Technique

As previously noted, the ten hour delay in notifying the Coast Guard and the F.W.Q.A. made immediate spill control impossible on the upper reaches of the Schuylkill.

By the time the first contractor arrived on the scene in the lower Schuylkill, (about 18:00 on 14 NOV) problems had developed which rendered all phases of the work difficult and made rapid clean-up almost impossible. Those factors were:

1. The bore of the spill (that is, the black core of sludge which contained the heaviest concentration of pollutants) was far downstream from the spill site.
2. The bore of the spill was extended over 10 to 30 miles of water course - perhaps more.
3. Normal spread of the oil had extended to both banks of the spill for a distance of 40 miles or more.
4. By the time equipment could have reached the upper Schuylkill (after the 10 hour delay) the bore of the spill had passed that area, the source of the spill had been closed off, and only thin films remained to be picked up.

SECTION IV: (continued)

Other factors called for the utmost care in the use of equipment. Several of these factors were not immediately recognized. In fact, some were only apparent after several days of the operation.

These were:

1. The Schuylkill river, swollen by heavy rains, was running at a rate of 3 knots or more at most portions of its course.
2. The natural catch basins and back-waters where relatively low current flow could be expected had not been surveyed and charted for spill purposes.
3. The large volume of debris dislodged by the floods was a major hindrance to normal operations of equipment. (Debris shown in the boom in Exhibit 10 was later pushed into the cove in the foreground for removal by crane.)
4. The spilled oil (in concentrated form) may have had a Specific Gravity very close to 1. Company personnel reported it to be .95 or more. If so, its rate of rise would be very slow and the effectiveness of booms and skimmers would be adversely affected, but this was not on the record until 18 NOV when it was reported to the Documentation Team.
5. From Douglasville (the spill source) to the Delaware, access to the river banks was either difficult or impossible for heavy equipment, trucks and personnel. Extensive search was needed to find even a few spots in the Philadelphia area where shore-based operations could be effective.

Had the above factors been known and understood, better sites could have been chosen for clean-up operations and equipment could have been deployed to greater effect.

For example:

1. Lock 60 at Mont Clare was an almost ideal trap basin. Without any effort on anyone's part, substantial quantities of oil and debris collected

SECTION IV: (continued)

in the approaches to the abandoned lock. (See Exhibit 9.)

If a diversion boom could have been installed to reach from the East end of the Black Rock Dam to a point 1500' upstream on the West Bank river before the spill reached that point, it is probable that upwards of 80% of the oil could have been trapped in Lock 60. (Exhibit 11.) Actually, two barriers would be required. A debris barrier should be upstream of the diversion boom to prevent damage by logs and branches.

Obviously, the time delay factor nullified that opportunity, but it should be kept in mind as a possible permanent defense against other spills.

2. Efforts to "contain" the spill in booms strung across the lower Schuylkill were fruitless. Excessive current, plus debris, broke booms repeatedly. The change to the diversion boom pattern used successfully at Penrose Bridge should have been made as soon as the rapid current was noticed. (See Exhibit 4.)

The first attempt to "contain" the spill by use of a boom was not effective, damaged equipment, used up manpower and spent money to no avail. This is because the true function of a boom in a moving oil spill situation is not yet thoroughly understood.

The boom should be used primarily to assist the clean-up operation by urging the oil into areas where skimmers or vacuum pumps can be used effectively.

Containment cannot be divorced from clean-up. A boom strung across a flowing stream or tidal creek (as at Woodbury Creek in Exhibit 6.) will collect a pool of oil as shown in the photo. As increasing amounts of oil are collected in the pool, skimming can be effective if proper equipment is available. If such equipment is not used, the pool of oil soon expands beyond the capacity of the boom to contain it, seepage occurs under the boom and the oil continues downstream. The booms shown did perform a

SECTION IV: (continued)

useful function in preventing some quantities of oil in the Delaware (in the foreground of the picture) from proceeding upstream of Woodbury Creek under the influence of tidal action in the Delaware.

Considerable training of personnel is needed to spread the doctrine that clean-up is the objective of the operation, not just containment. The placing of the very first boom should have been done at a spot where clean-up operations were feasible.

3. If the spilled oil did, in fact, have a very high specific gravity, it would be very slow to rise to the surface and separate from the water after being submerged by turbulence in the rapid current.

Consequently, the booms placed in rapid current under the Spring Garden Street Bridge had little opportunity to collect oil pools (though some debris was collected at that point) and there is no record of any skimming operation at those booms.

Just above the Spring Garden Street Bridge is the Fairmount Dam, (Exhibit 3.) and upstream of the dam the river is wide, deep and has very slow surface current for a distance of several hundred yards.

This pool above the dam would have been an ideal place for oil to rise to the surface of the water. A diversion boom placed in that area would have had ideal conditions for collecting a large pool of oil suitable for effective skimming.

Access to the water was readily available on the East bank of the river at that point.

4. The Filter Fence placed at the Douglasville Bridge just below the spill site worked effectively to absorb the thin film of oil flowing along the West Bank of the Schuylkill at that point.

Construction of the Filter Fence started on 17 NOV and it was not reported complete until 21 NOV or 22 NOV. Rigging the fence in the fast flowing river was slow and costly in view of the minimum amount of surface oil flowing at the time.

SECTION IV: (continued)

5. The operations at Penrose Bridge (Exhibit 4.) and at Ft. Mifflin were well sited and effective. In each case, diversion booms were placed to lead the oil and oil soaked debris out of the river current and into a quiet backwater where clean-up operations could be effective. At Penrose Bridge, clamshell buckets removed 828 tons of oil soaked debris and loaded it into trucks. At Fort Mifflin, 2 small skimmers removed over 23,000 gallons of oil from the pool and a crane removed debris.
6. Disposal of oil-soaked debris was finally concentrated at a dump site near Gloucester City, N.J. The site was approved by the New Jersey Health Department for the purpose. Recovered oil was delivered to the Atlantic-Richfield refinery in Pennsylvania. Disposal of residue still in the Lagoons at Berks Associates is planned but the method is undecided as yet.

In Summary: the contractors who operated the booms and clean-up equipment responded promptly to the emergency, they worked long hours under difficult conditions so that clean-up of the oil available to them on the Schuylkill was nearly 100%.

Their efforts were severely handicapped by the 10 hours delay at the start of the emergency. Each contractor had his own ideas on procedure and the use of equipment could have been improved if there had been more consultation with the OSC or someone else on his staff who understood advanced techniques of booming, skimming and disposal.

Nevertheless, the clean-up was effected and for a total estimated cost far less than has been incurred in many smaller spills.

D. Facilities and Assistance Supplied by Base Gloucester

(Gloucester City, New Jersey) Coast Guard Base is 4 nautical miles from the confluence of the Schuylkill and Delaware Rivers and on the New Jersey shore.

The commanding officer of Base Gloucester is Captain Of The Port of Philadelphia. The authority of the Captain Of The Port Office plus the local knowledge of the area, the expertise of the base personnel and the facilities

SECTION IV: (continued)

available were invaluable to this operation.

When the RRT was activated on the afternoon of 14 NOV Base Gloucester took fast action to provide an Operations Room equipped with desks, phones, map and blackboard facilities.

By the time RRT personnel arrived arrangements had been made for Base Gloucester's patrol boats for river transportation on the Delaware and to the head of navigation on the Schuylkill. Base personnel had been dispatched on reconnaissance missions to locate the approaching oil and initial contacts had been made with contractors who could assist in the oil spill clean-up operations.

Reservations were available for housing and transportation of the RRT personnel and the beginnings of a communication network had been arranged for keeping in touch with the Federal and State agencies, the public and others involved in the spill operations. The effect of this preparatory effort made it possible for RRT personnel to devote immediate attention to the requirements of the spill situation and only a minimum amount of their time was diverted to non-productive activities. Subsequent to the arrival of the RRT personnel, Base Gloucester continued to supply personnel, equipment, and facilities to assist the clean-up effort.

Helicopter flights over the area were performed by Coast Guard aircraft based in New York. This had one drawback in that the aircraft assigned to this mission were not authorized to land at Base Gloucester's heliport for technical reasons. This necessitated a 40 minute trip to or from the Philadelphia International Airport for personnel making the overflights.

It would have been far more effective to have chartered a commercial helicopter and permitted it to operate from the heliport at Base Gloucester. Such an arrangement could have provided immediate transportation for one or two knowledgeable observers on each flight and would have had the additional advantage that a smaller helicopter could have landed at many spots close to clean-up operations. The cost of such charter could well have been less than the direct operating cost of the flights dispatched from New York.

SECTION IV: (continued)

One minor deficiency in the Operations Room was the absence of a detailed map of the Schuylkill River above the head of navigation. U.S.C.G.S. maps were requisitioned for this purpose and were delivered about 21 NOV. Over-the-counter purchase could have provided this valuable information at a much earlier point in the operations.

In summary the contribution by Base Gloucester personnel was so significant that other Coast Guard bases should be prepared for similar duty, when and if the need arises.

E. Public Relations

Public Relations problems have often become a major problem to the On Scene Commander (or his counterpart) on other spills. In this situation, the OSC and his PR staff personnel made effective contact with local news media on 14 NOV and maintained good relations. Daily press releases were accurate and concise. Telephone requests for information were answered promptly and completely.

The results were evident in the excellent newspaper coverage which was comprehensive and accurate. It avoided any hysterical pronouncements or premature conclusions.

Presence of a competent PR man on the RRT staff is most desirable and proved its worth on this occasion. PR problems did not become an undue burden on the On Scene Commander.

F. Relations With the Spill Originator

Berks Associates, Douglasville, Pennsylvania, is a producer of lubricating oils reclaimed from waste crank-case oils gathered from filling stations in the Pennsylvania, Delaware, New Jersey area.

As such, it performs a useful service and is an example of the potential for effective recycling of industrial wastes.

Unfortunately, the site chosen for long term storage of the 5% or 10% (by volume) of unusable residue was a hazardous site within 60' of the bank of the Schuylkill River. (Exhibits 1. and 2.) The dikes which contained the residue were not leak proof, there was no effective method for draining rain water from the lagoons, and an overflow finally took place with disastrous results.

SECTION IV: (continued)

The company's monitoring of the dikes was not continuous, even during the extended rain which preceded the spill.

The potential danger was realized by the Pennsylvania State Board of Health which required a "safety" lagoon dike to be installed a few weeks before the spill, but the "safety" dike failed to hold in the emergency.

The company's immediate reaction to repairing the dike was fast and as effective as could be expected. The company had very few resources, fiscal, personnel or equipment-wise to contribute to the clean-up effort.

Unfortunately, the owner did not put on a good show of cooperative effort. The record shows that company representatives invited to take part in post-spill conferences on two or more occasions failed to attend, although the owner of Berks Assoc. did contact the OSC by 'phone.

Furthermore, Berks Associates had been cited for 26 violations of pollution laws since 1951, and the State Department of Sanitary Engineering reported that corrective action had been unsatisfactory in most cases.

Legal action against the company was started (or preparation for it was started) by both the State and the Federal Government at an early date. F.W.Q.A. legal work started Sunday, 15 NOV.

The company's immediate response was to file for bankruptcy and the final adjudication of the company's payment of clean-up costs is months away.

G. Effects on Ecology

The petroleum residue spilled into the Schuylkill River was known to contain high concentrations of polluting chemicals. Consequently all agencies were concerned about the possible damage to the ecology of the region. The ecological forces of the Pennsylvania Department of Health initiated a program of sampling the river conditions and the mobile laboratory of the F.W.Q.A. from Edison, New Jersey took samples of the river water plus a careful sampling of the materials remaining in the breached lagoons at Berks Associates.

SECTION IV: (continued)

Apparently the rapid current in the river moved the dangerous materials from the Schuylkill into the Delaware and eventually out to sea before major damage could be done to the river bottom and banks of the Schuylkill.

Some pollution was obvious at Tinicum Island in the Delaware and in marshes along the New Jersey shore of the Delaware below Philadelphia.

By the time the RRT ceased operation the consensus of opinion was that no severe short-range damage was apparent.

Samples of the spilled material analyzed at the laboratory in Edison, New Jersey indicated a high content of phenols and a lead content of 2 to 5 milligrams per liter. Such concentrations would normally make the river water unfit for irrigation or other farm uses.

However, there were indications that the spilled materials were highly miscible in water and the concentrations measured may eventually have little effect. Long-range effect on the ecology obviously requires time for its accurate evaluation and is thus beyond the scope of this report.

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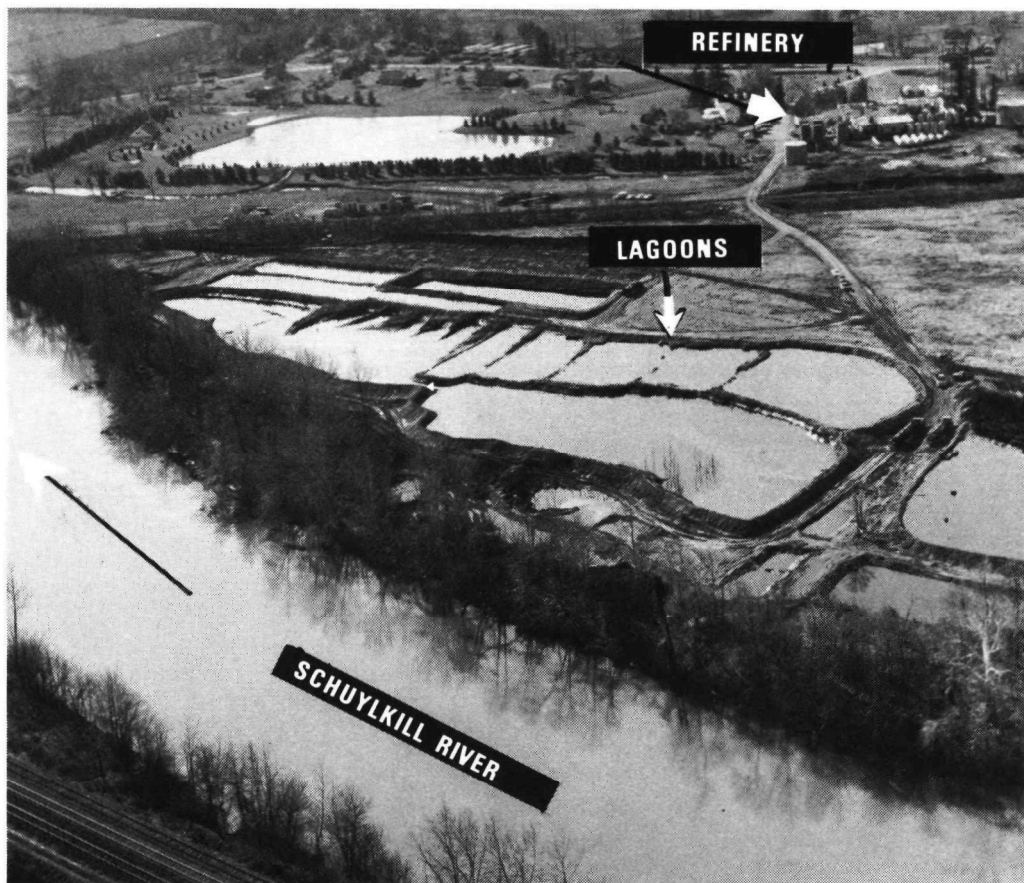


EXHIBIT 1.--
Refinery plant
and lagoon of
Berks Associates
on Schuylkill
River, Douglas-
ville, Pa.

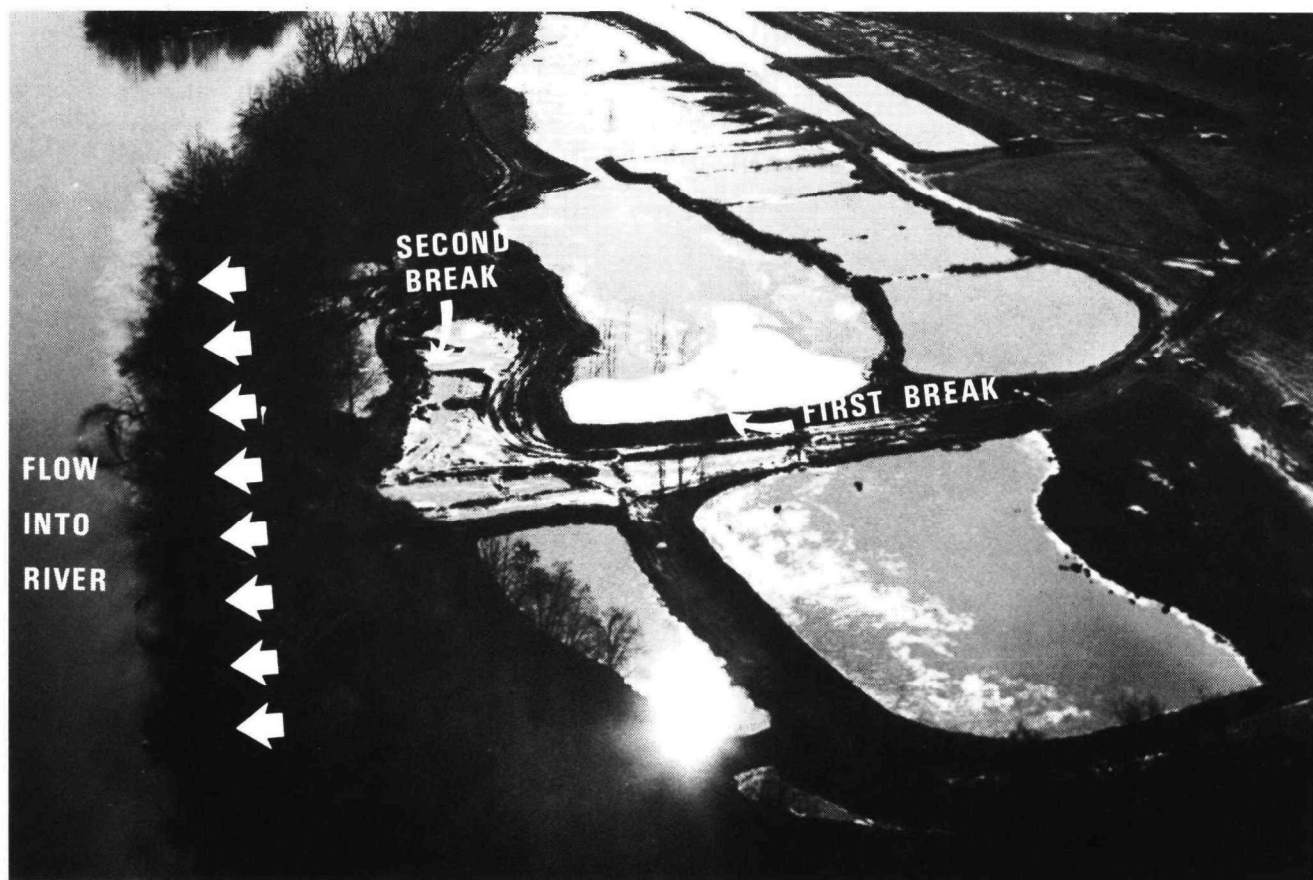


EXHIBIT 2. -- Breaks in dikes, and area of riverbank pollution.

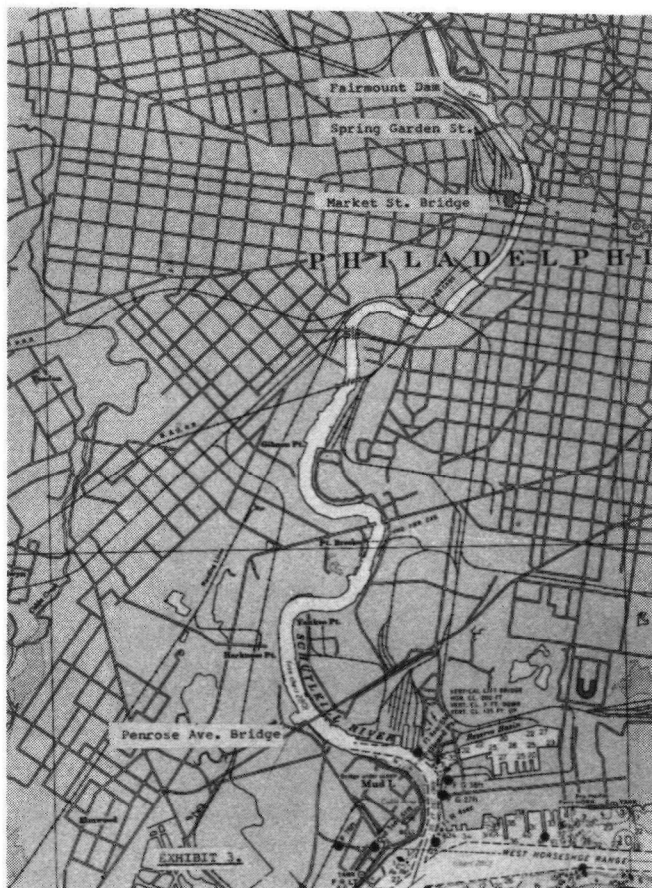


EXHIBIT 3.-- The lower Schuylkill River from Fairmount Dam to confluence with Delaware River.



EXHIBIT 4.-- Corps of Engineers barge and boom placement at Penrose Avenue Bridge.



EXHIBIT 5.-- Boom at Mantua Creek, N.J.



EXHIBIT 6.-- Booms at Woodbury Creek, N. J.



EXHIBIT 7.-- Riverbank pollution leaching into Schuylkill River.

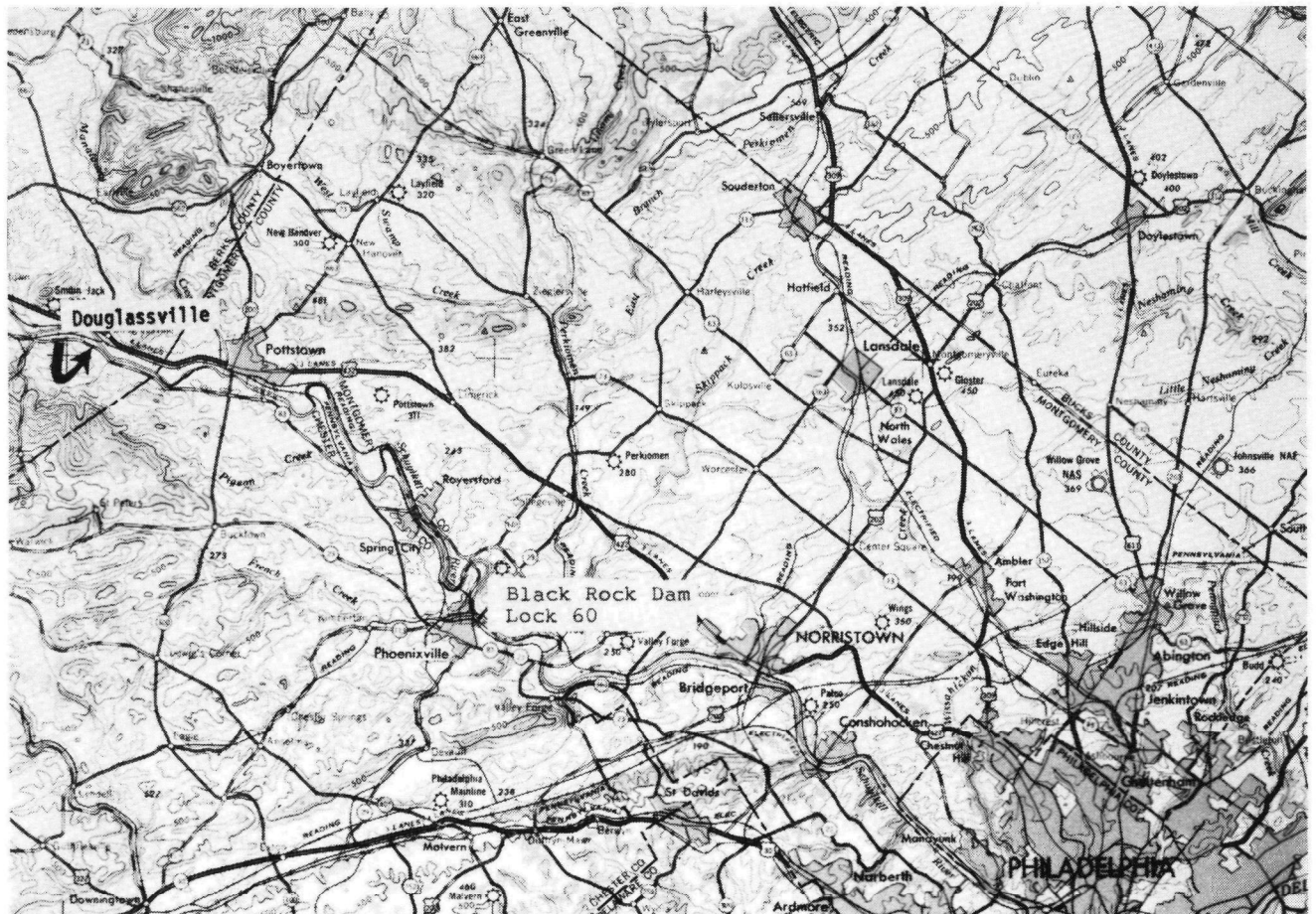


EXHIBIT 8. -- The upper Schuylkill River from West Philadelphia to Douglasville.



EXHIBIT 9. -- Debris in Lock 60 (Black Rock Dam).



EXHIBIT 10. -- Oil and debris cleanup at Penrose Avenue Bridge.

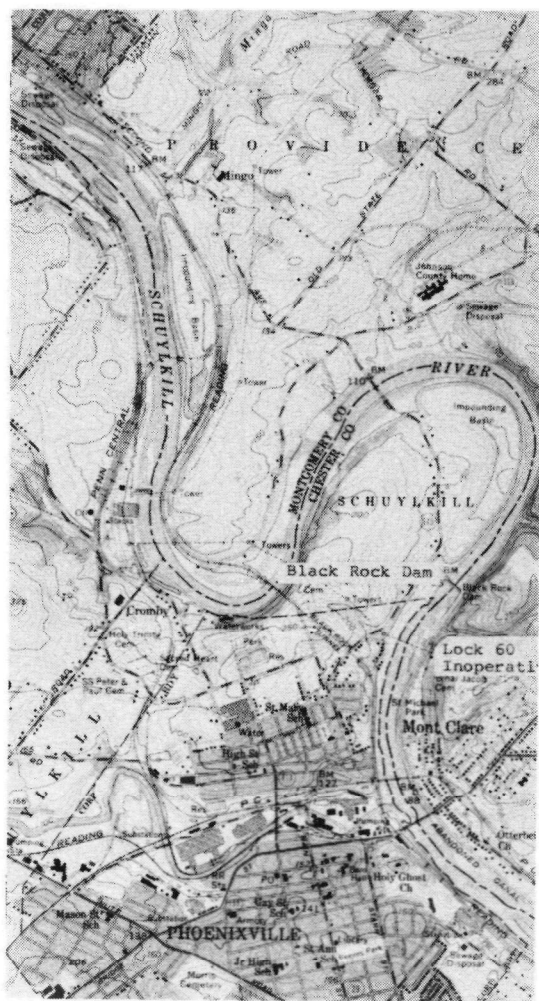


EXHIBIT 11. -- Black Rock Dam and Lock 60 at Mont Clare (Phoenixville, Pa.).

SLIDE DISPLAY

Berks Associates at Douglassville	33
Bridge at Douglassville	37
Lock 60 - Black Rock Dam	38
Boom at Spring Garden Street Bridge	40
Diversion Boom at Penrose Avenue	
Bridge	41
Cleanup operations at Penrose	
Avenue Bridge	42
Cleanup operations at Fort Mylin	
Pier	45



SLIDE R-16. -- Berks Associates plant on Schuylkill River at Douglassville, Pennsylvania. Refinery in foreground, lagoons in background.



SLIDE R-17. -- Oil storage lagoons at refinery plant operated by Douglas Associates on Schuylkill River. Schuylkill River on left.



SLIDE R-18. -- Oil storage lagoons. In foreground is the Schuylkill River and area of oil spill over riverbank and into the river.



SLIDE A-27. -- Dike at oil storage lagoon containing used oil with sulphuric acid residues.



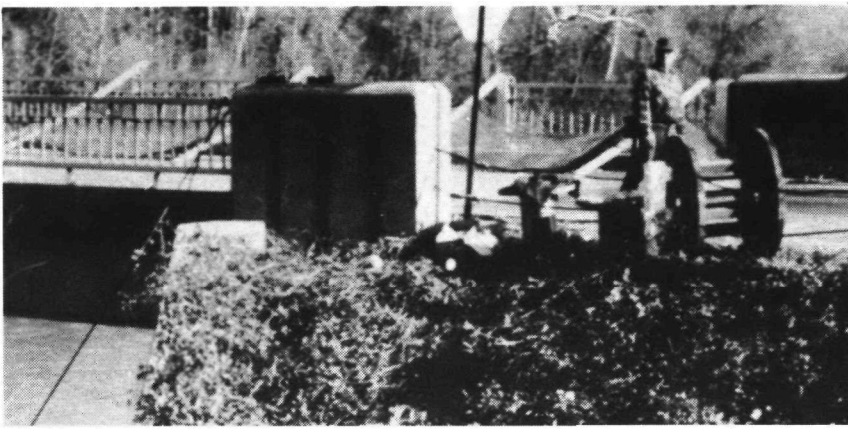
SLIDE A-28. -- Location of first overflow showing fresh earth in repaired area. Lagoon contained oil with lead residues.



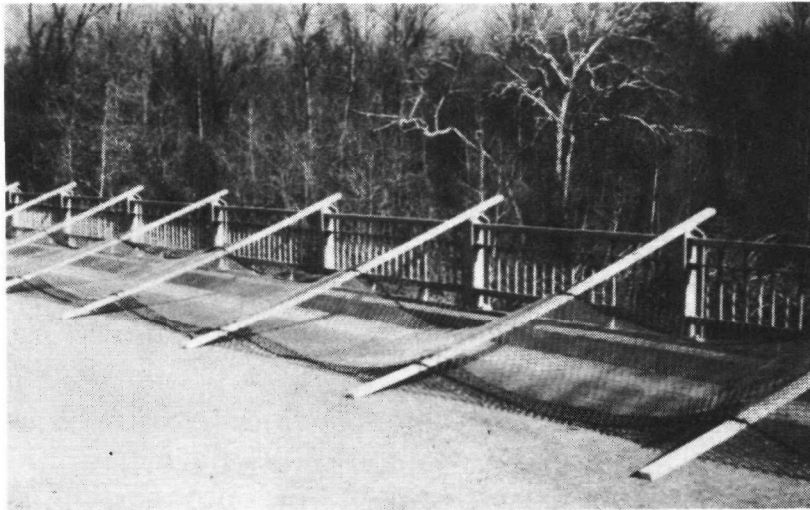
SLIDE A-29. -- Bottom of "safety" lagoon. Dike in background.



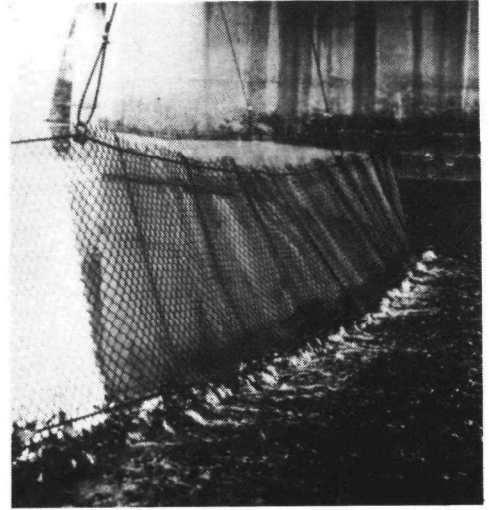
SLIDE A-31. -- Location of second overflow from "safety" dike. Man is standing on fresh earth repair site.



SLIDE A-25. -- Bridge at Douglassville from which filter fence was suspended.



SLIDE A-22. -- Downstream half of filter fence being assembled.



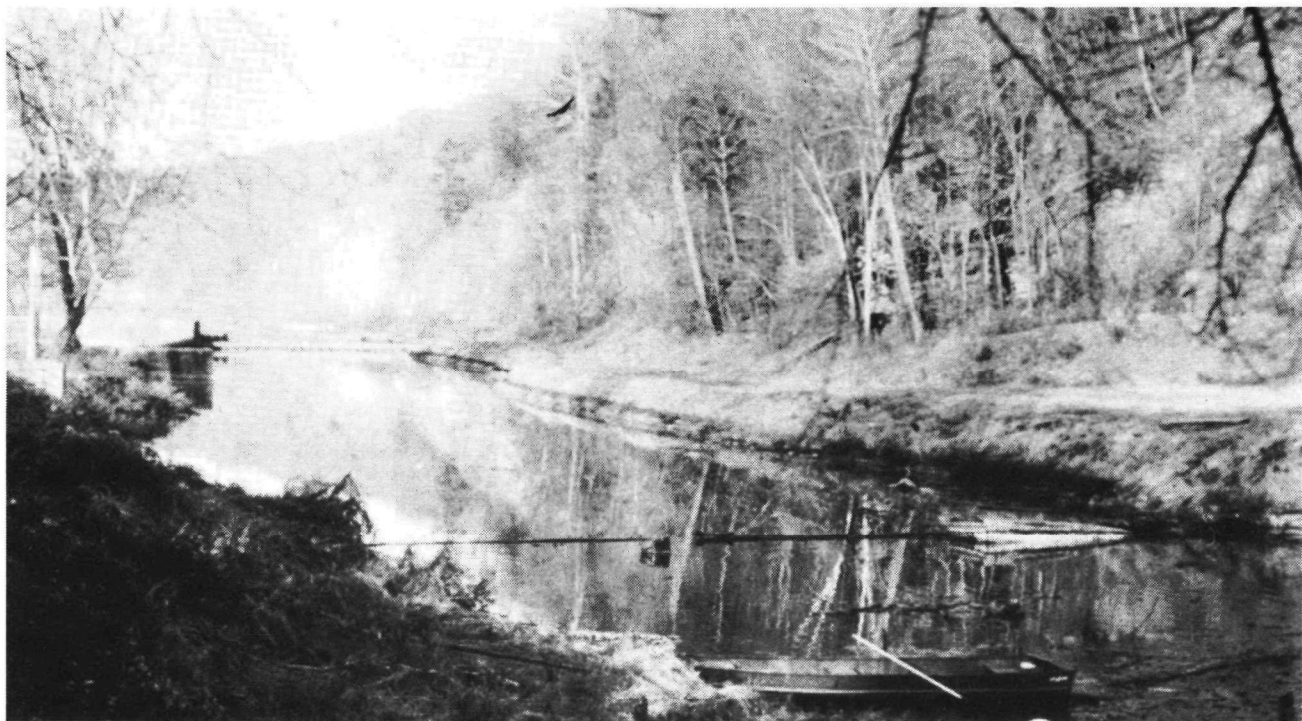
SLIDE A-23. -- Upstream half of filter fence. Note rapid current of river.



SLIDE A-24. -- Upstream fence in place, deflected by current of river.



SLIDE A-32. -- Lock 60, Black Rock Dam, Mont Clare, Pennsylvania, showing oil and debris collected in the abandoned lock.



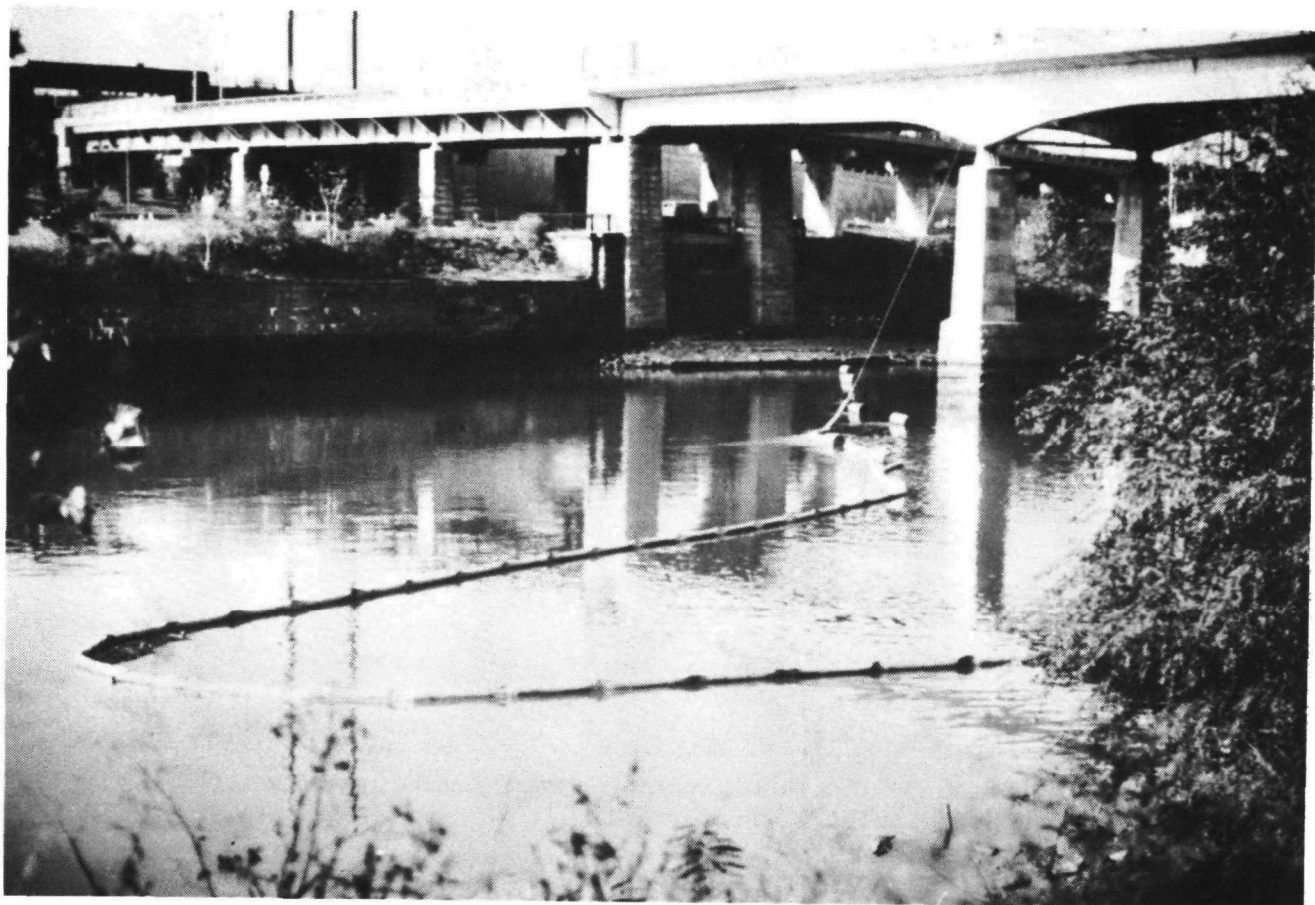
SLIDE A-34. -- Upstream entrance to Lock 60.



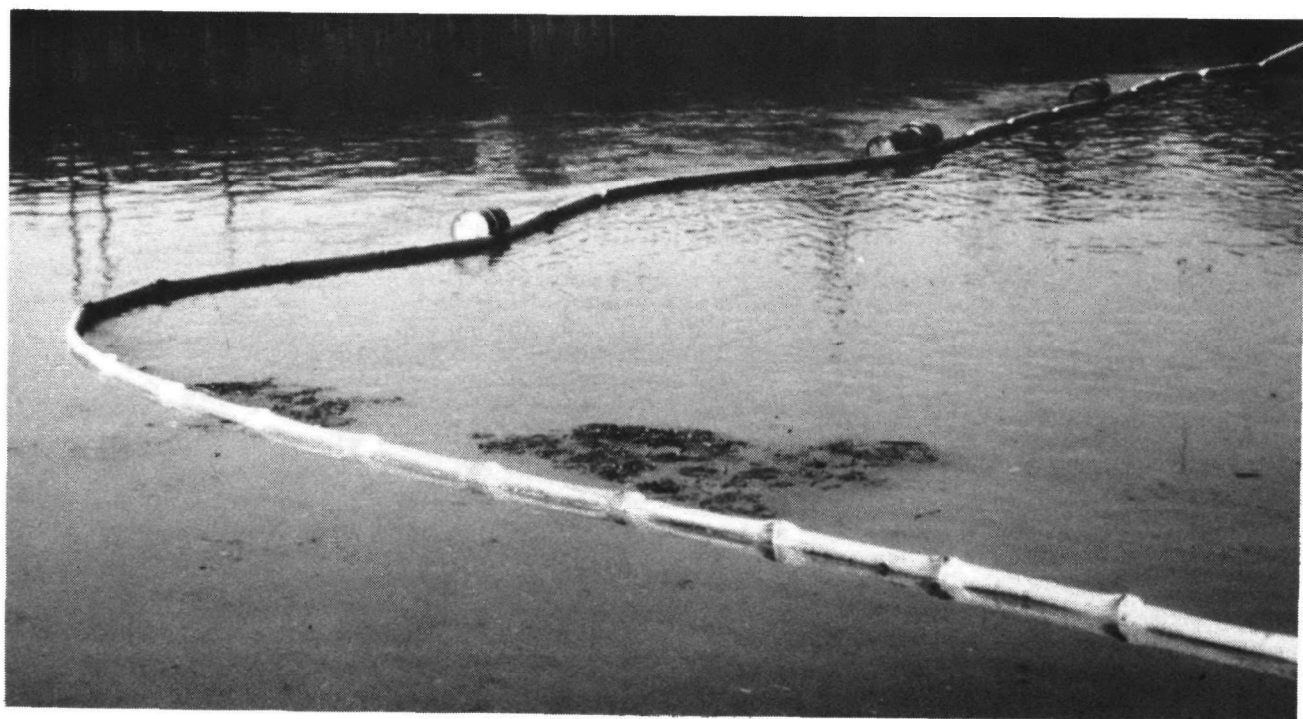
SLIDE A-35. -- Oil-and-debris rake (center, right) built on site. Control ropes are being pulled from the left.



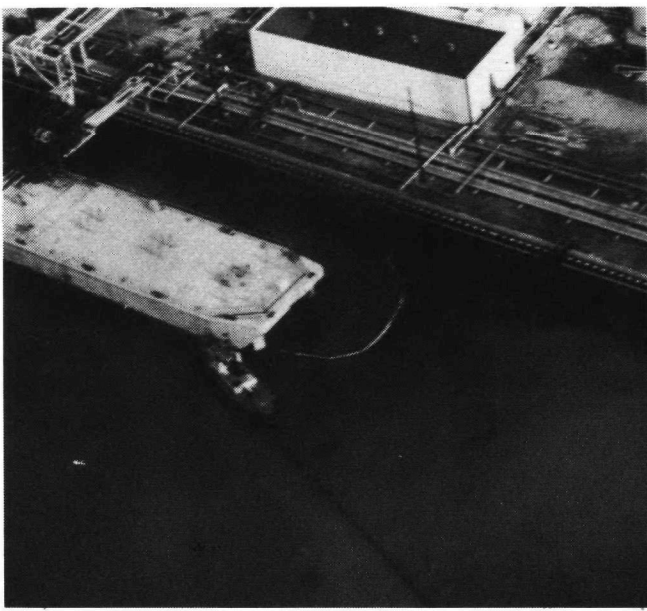
SLIDE A-33. -- The large, floating debris rake, now pulled up to shore, is cleaned out with long-handled rakes.



SLIDE A-20. -- Boom at Spring Garden Street Bridge.

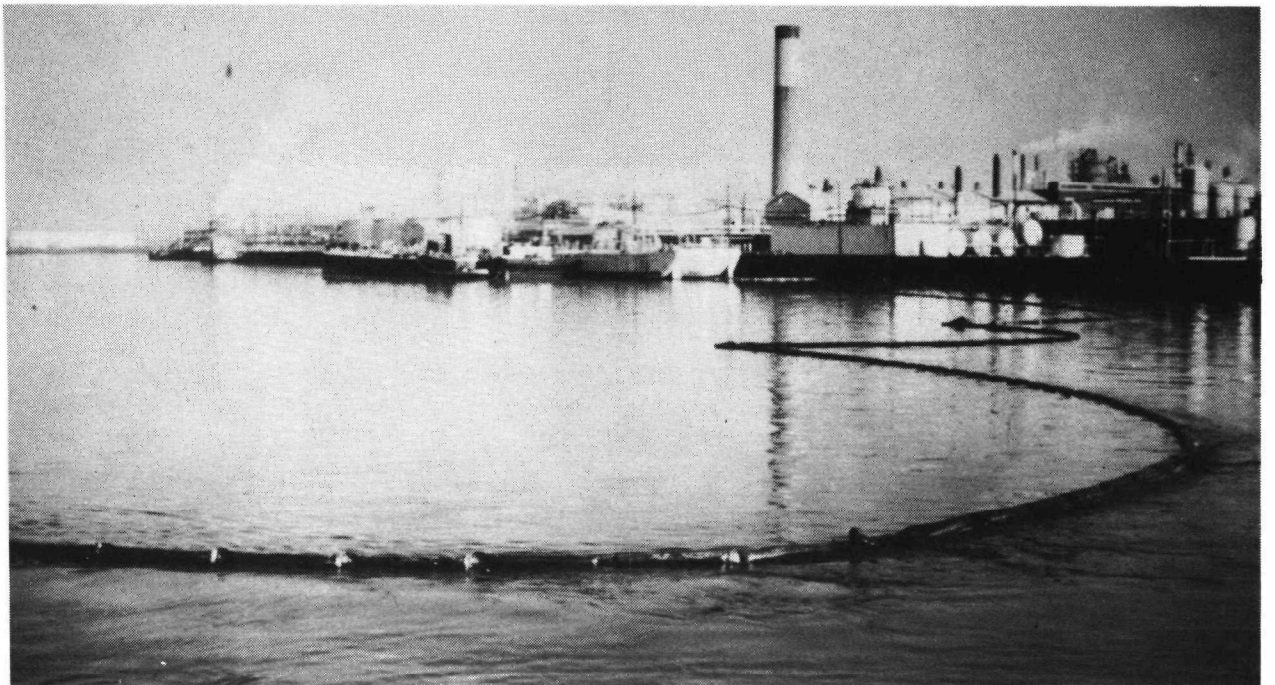
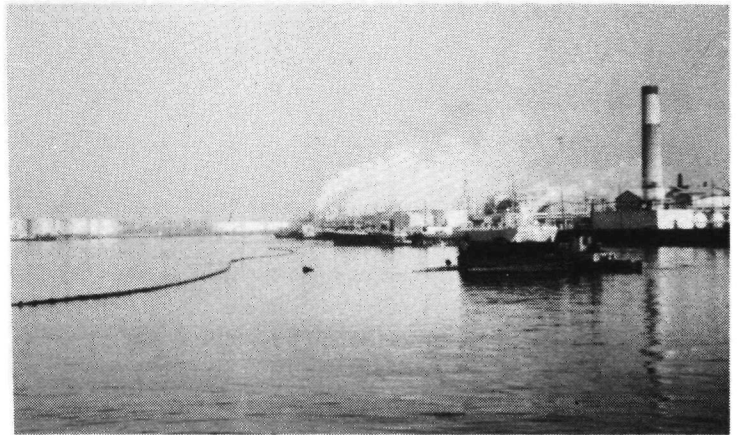


SLIDE D-14. -- Some of the oil and debris collected by boom at Spring Garden Street Bridge.



SLIDE R-7. -- Diversion boom trailing from Corps of Engineers barge moored near Penrose Avenue Bridge.

SLIDE R-20. -- Diversion boom, looking upstream.



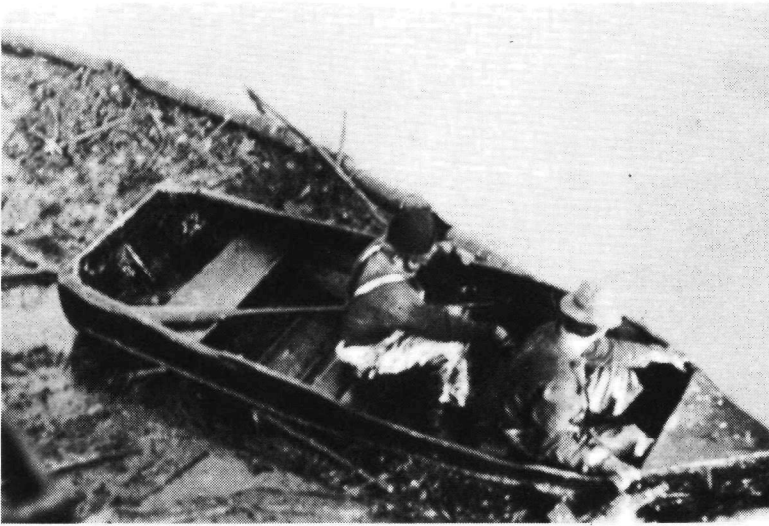
SLIDE A-5. -- Current under bulge in diversion boom.



SLIDE A-6. -- Operations at Penrose Avenue Bridge, work boat pulling boom in place.



SLIDE A-2. -- Oil and debris accumulation at Penrose Avenue Bridge site.



SLIDE D-4. -- Work boat in oil and debris near boom at Penrose Avenue Bridge site.



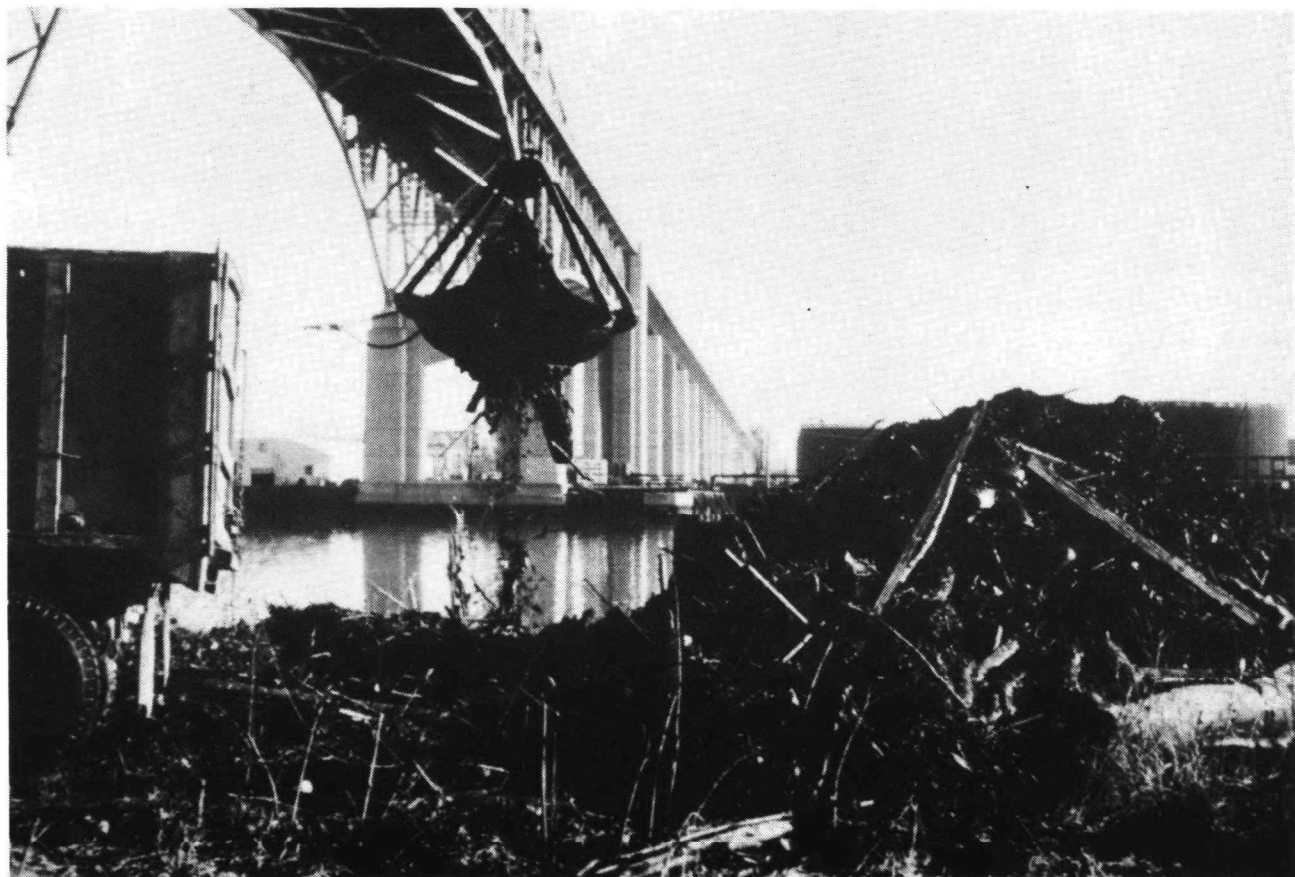
SLIDE A-3. -- Oil and debris accumulation near Penrose Avenue Bridge.



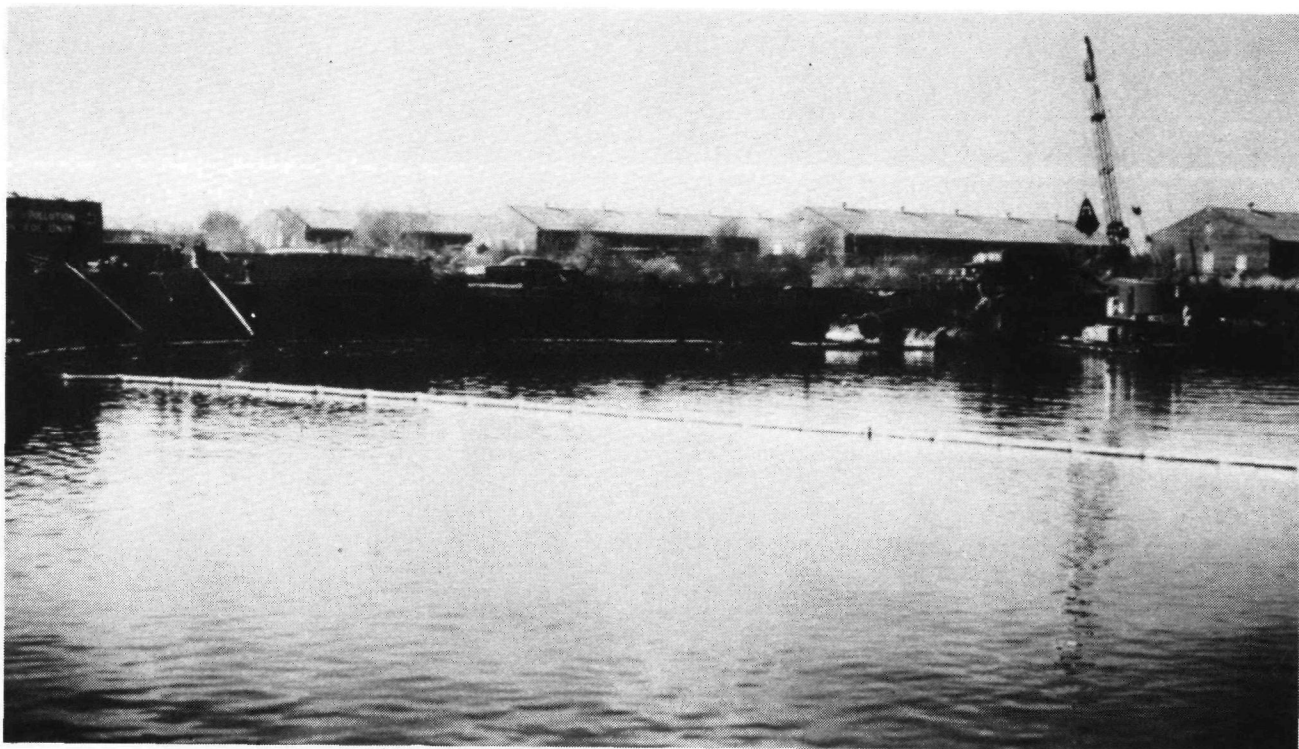
SLIDE A-4. -- Debris pickup near Penrose Avenue Bridge.



SLIDE D-1. -- Oil and debris in pile near Penrose Avenue Bridge.



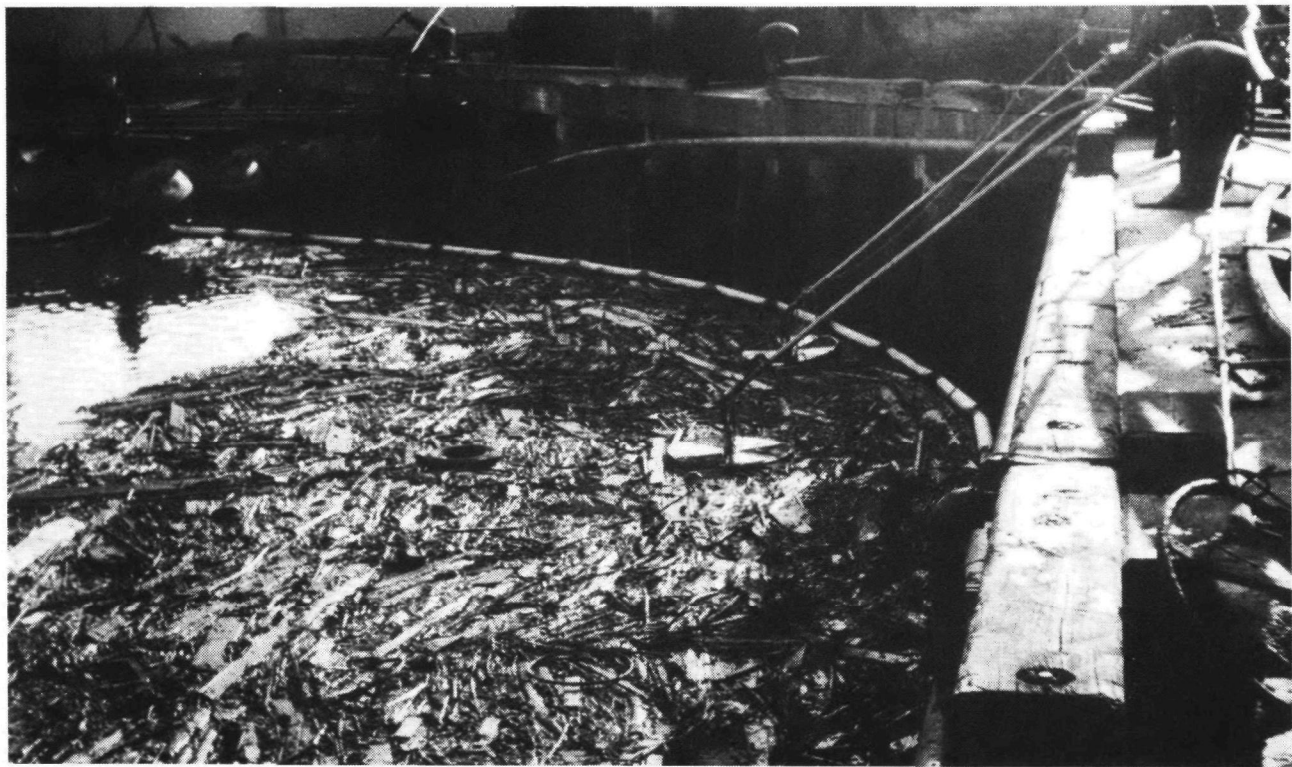
SLIDE A-9. -- Oil and debris is loaded on truck for disposal.



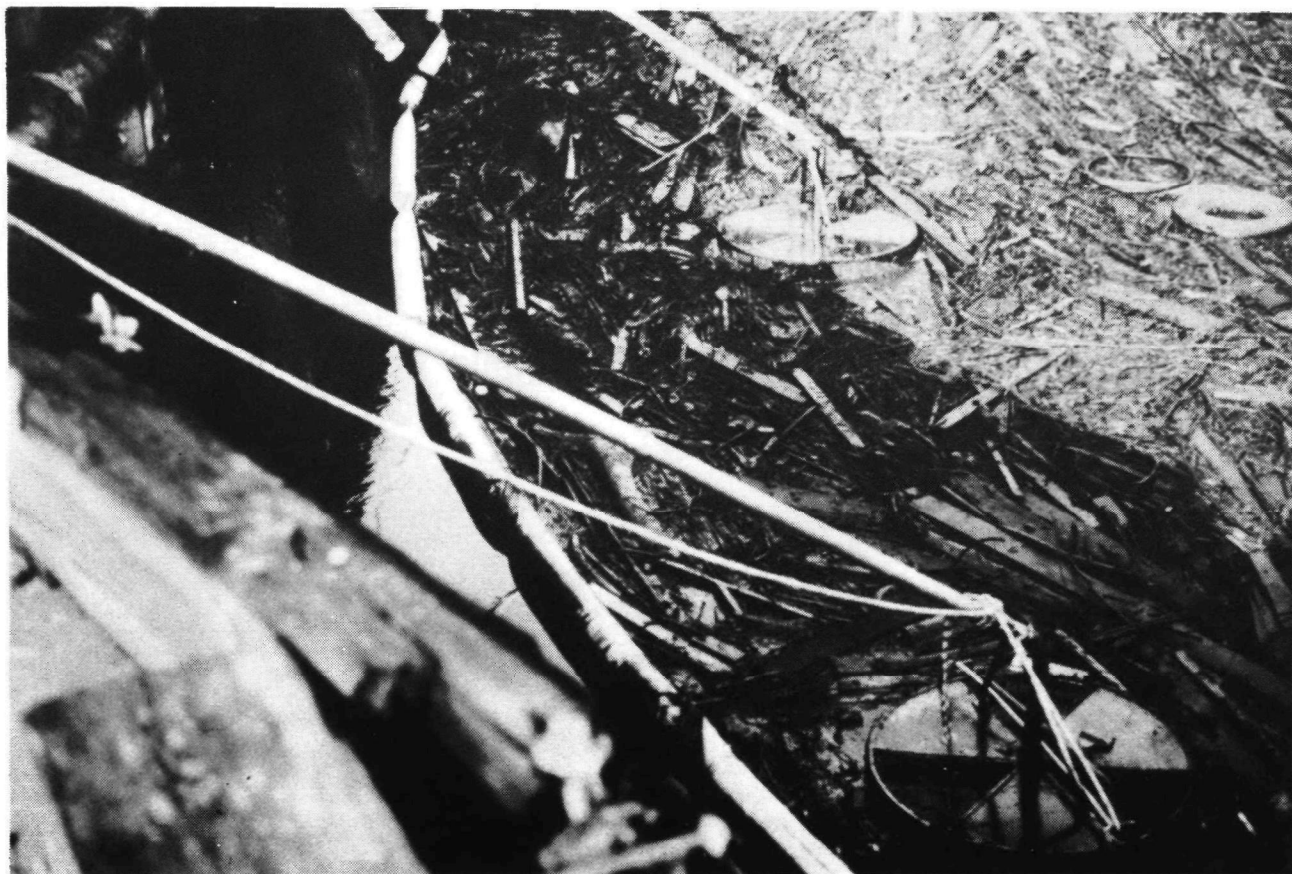
SLIDE A-12. -- Operations at Fort Mylin Pier showing boom on water and crane (right).



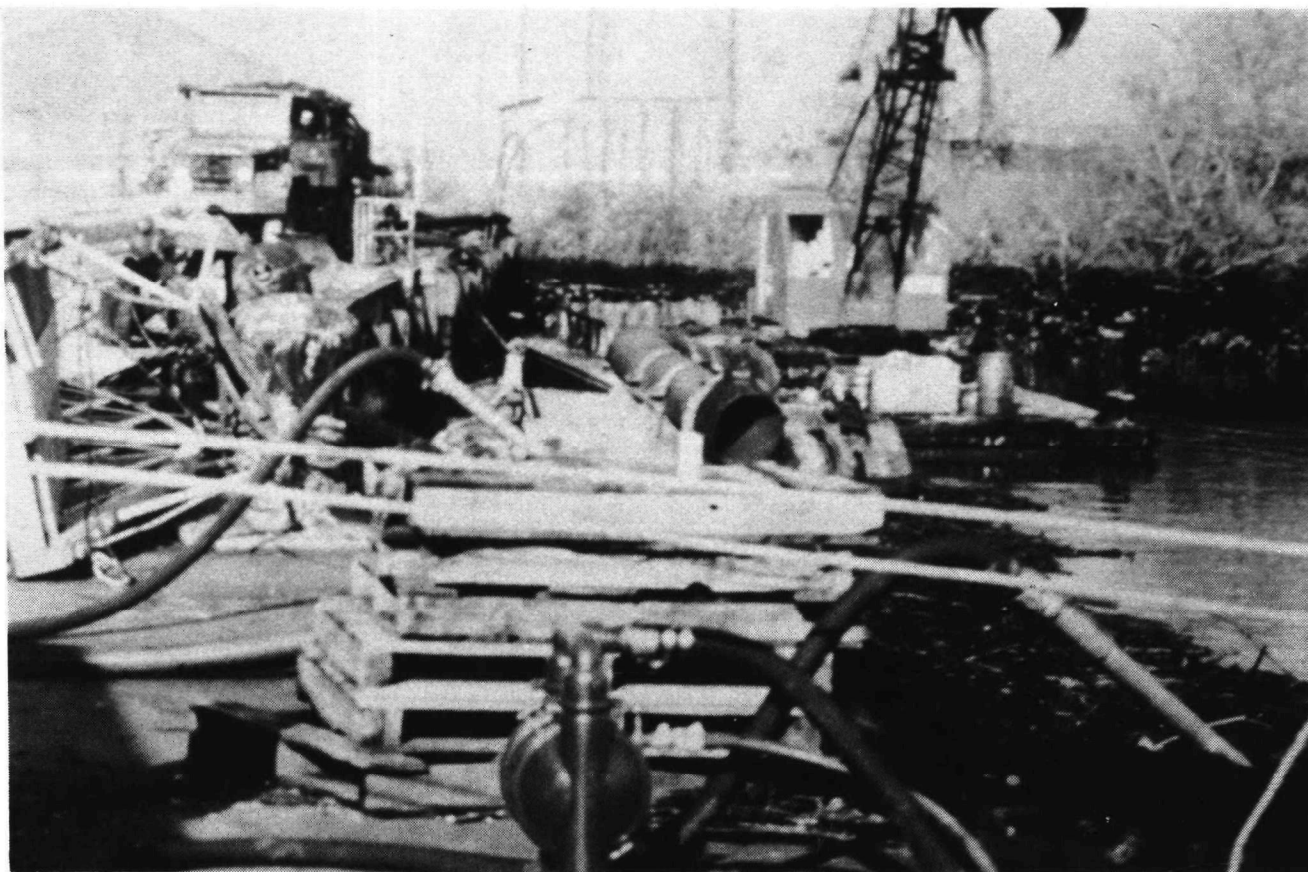
SLIDE A-13. -- Oil and debris accumulation at Fort Mylin Pier.



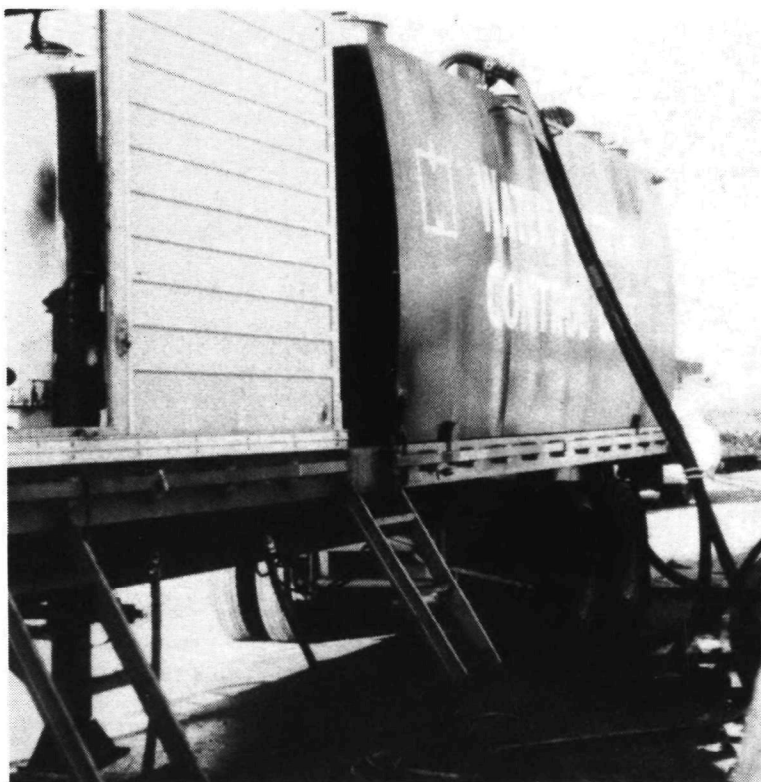
SLIDE D-6. -- Oil and debris accumulation at Fort Mylin Pier. Oil skimmers at left.



SLIDE A-15. -- Oil skimmer sucks up oil at Fort Mylin Pier.



SLIDE A-14. -- Oil is pumped from skimmers to nearby tank (shown below) at Fort Mylin Pier.



SLIDE A-16. -- Portable separating tank at Fort Mylin Pier.