Oil Spill Debris Disposal

A MANAGEMENT PLAN FOR COASTAL NEW HAMPSHIRE

February 1982

CENTER FOR NATURAL AREAS

South Gardiner, ME. ; Washington, D.C.

Oil Spill Debris Disposal:

A Management Plan for Coastal New Hampshire

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preface

In the last decade, planning efforts to deal with the occurrences and impacts of oil spills in coastal and inland waters have focused on the development of area-specific contingency plans. The emphasis of these plans has generally been on the identification of personnel, equipment, and methods required to effectively contain, collect and stockpile the spilled oil and associated debris. Insufficient attention has been placed on the ultimate disposal of oily debris which, if undertaken improperly, has the capability of releasing the collected oil into the nation's ground and surface waters. This lack of pre-planning for ultimate disposal, coupled with the emergency nature of oil spill cleanup efforts, has resulted in less-than-adequate disposal practices in the past throughout the country.

The recently prepared Oil and Hazardous Materials Pollution Contingency Plan for the State of New Hampshire, prepared by the Water Supply and Pollution Control Commission, briefly addresses the subject of ultimate disposal in Section 1803 of the plan. As this section indicates, there are presently no approved methods of disposal available to the state and no overall plan for the management of spill debris. In order to remedy this situation, the New Hampshire Office of State Planning contracted with the Center for Natural Areas of South Gardiner, Maine to develop an oily waste disposal program for coastal New Hampshire.

The ensuing report reflects the results of this eight-month study and provides the State of New Hampshire with an implementable disposal plan that reflects state-of-the-art approaches to final disposal of oil spill debris and is designed to meet the particular needs of the State's coastal zone region.

Incorporation of this proposed program into the State's contingency plan will complete the pre-planning process for oil spill emergencies and help ensure that future contamination of precious surface and ground waters is prevented.

This report represents the recommendations of the consultant after eight months of research into the subject of oil spill debris disposal. Many of the recommendations may change during implementation. Therefore, the user of this report should check with the applicable state agencies (Water Supply and Pollution Control Commission, Bureau of Solid Waste Management, and Office of State Planning) to establish the status of the plan.

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acknowledgements

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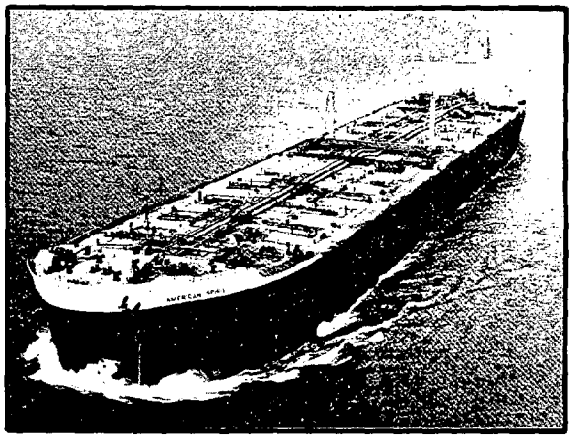
The authors wish to acknowledge the important assistance provided by John Dewyea and Richard Rugg of the Lamprey Regional Solid Waste Cooperative. Future use of this facility for incineration of combustibles is an important component of the Center's plan.

Finally, this report would not be possible without the assistance of the Center's support staff. Lauren Stockwell and Priscilla Slack provided the much needed editorial review to the authors. Betsy Kehoe developed the graphics, and Carmen Belanger was responsible for the extensive word processing necessary to complete this report.



EXECUTIVE SUMMARY

Executive Summary

The coastal region of New Hampshire experiences oil spills each year. During the five-year period from 1975 through 1979, a total of 103 spills were recorded resulting in the release of 68,651 gallons of petroleum products into coastal waters. The State's response to these spills resulted in the recovery of 17,017 gallons, leaving a balance of 50,138 gallons in the ground, as debris, or in the ocean.

Whereas the recovered oil is easily handled as waste oil and is usually reintroduced into the marketplace for reuse, the remaining oil usually moves ashore, contaminating beaches, plant and animal life, and private property. The resultant oil-soaked debris and oil/water emulsions require special handling and disposal to keep the oil from reaching precious surface and ground waters of the State.

In the past, the State of New Hampshire has focused its resources on containing and removing the oil and oil-soaked debris with little attention being paid to ultimate disposal. Final debris disposal has taken place on a case-by-case basis resulting in disposal at local sanitary landfills, through on-site incineration of debris, and by removal for treatment out-of-state.

The responsibility for overseeing the response, cleanup, and disposal of oil resulting from oil spills is the responsibility of the Water Supply and Pollution Control Commission (WSPCC) under New Hampshire Revised Statutes Annotated 146-A (Supp.). To meet their legislated objectives, the WSPCC has developed an Oil and Hazardous Materials Pollution Contingency Plan.

Section 1803 of the plan briefly addresses the ultimate disposal of recovered oil and oil-soaked debris. Disposal guidelines are presented but there is no description of disposal methodologies or an overall debris disposal management strategy. Also, there are no currently approved sites for debris disposal in the State.

In recognition of the need for an overall management plan for the disposal of oil spill debris in the coastal zone, the Office of State Planning contracted with the Center for Natural Areas, South Gardiner, Maine to (1) conduct a study of disposal methodologies currently available for oil spill debris disposal; (2) assess the existing disposal capabilities within and outside the State; and (3) develop an implementable management plan to meet the State's disposal needs. The results of this study are presented in the ensuing chapters of this report and are highlighted in the Executive Summary that follows.

Disposal Methods

The technology for disposal of oil spill debris currently exists. It is based on the past experiences of the oil industry in handling refinery wastes and in their past experience with oil spills. A detailed assessment of this technology is presented in Chapter 2.

Briefly, debris disposal is approached as part of an overall strategy that begins at the cleanup site. Here, emphasis is placed on recovering as much usable oil as possible, by minimizing the volume of debris accumulated, and through on-site sorting of debris into combustibles and non-combustibles.

Once all oil-recovery efforts have been exhausted, the next step is to incinerate the combustibles at an approved incinerator. Approximately 80 percent of all debris is combustible. Thus, incineration reduces the volume of debris requiring land disposal.

The remaining debris will consist mainly of non-combustible solids. This debris will have to be disposed through one of a number of land disposal techniques. These are: landspreading (aerobic biodegradation), landfilling (burial), and landfilling with refuse.

Of the three methods, controlled landspreading is the most advisable since complete biodegradation of the oil takes place within three growing seasons. However, this method requires more land area than the other methods, and has received a less than acceptable public response. Because of these factors, landspreading was not investigated further in this study.

The other two methods essentially result in long-term storage of oil, since no breakdown will take place. Landfilling in a secure landfill--one that incorporates clay liners, monitoring wells, and a leachate collection system--is an accepted practice and is the method chosen for application to the New Hampshire situation.

A cornerstone to the whole disposal strategy is a storage/stockpiling site. This site is located following some very strict site criteria and is made secure through the installation of a clay liner, protective dikes, and a runoff collection system. Its purpose is to provide a secure area for storage of debris following cleanup operations, and to allow for further debris separation and later staging for disposal. Its presence will insure that disposal will take place through the best method by providing the time necessary to choose an appropriate disposal method.

Design Volume

In order to design a program for the State of New Hampshire, a design volume is necessary that reflects a compromise between the estimated annual debris volume and that which could be expected from a catastropic spill event. This volume is called the "target volume." For the coastal region, this is estimated as:

Contaminated Water	=	75,000 gallons
Combustible Debris	=	12,000 cubic yards
Non-combustible Debris	=	3,000 cubic yards

It is this volume for which the Center has assessed the capabilities, both in and out-of-state, to handle debris disposal, and has designed a recommended management plan. Chapter 3 of this study presents a detailed assessment of the technical requirements for disposal of this debris volume. A detailed cost analysis of the various options to manage debris disposal is presented in Chapter 4.

Summary of the Recommended Plan

As this study progressed, it became apparent that the New England States were gradually closing their doors to land disposal of oily wastes from adjoining states. The philosophy is rapidly approaching one of in-state disposal responsibility. The exceptions to this are incineration and oil/water separation. Massachusetts has licensed oil/water separators which are currently handling out-of-state wastes. The City of Auburn, Maine has a municipal incinerator currently accepting oil-soaked combustibles and is licensed by

the State for this purpose. The Center discussed use of the facility for disposal of New Hampshire's wastes with the Auburn Director of Public Works, and there is a good possibility that their incinerator could be used for this purpose, pending future negotiations between New Hampshire, the City of Auburn, and the Maine Department of Environmental Protection.

There are existing facilities in the State of New Hampshire that could, with modification, be utilized for in-state disposal through incineration and landfilling. There is also the possibility of in-state oil/water separation at C. H. Sprague's terminal in Newington. However, use of the Massachusetts facilities for this purpose will probably remain the best approach for the short term.

It is therefore recommended that a combined program of out-of-state disposal of contaminated liquids and in-state disposal of combustibles and non-combustibles solids be pursued as the management plan for the State of New Hampshire.

The recommended plan will follow the basic strategy summarized below:

(1) develop a two- to three-acre, long-term storage site at a central location within the coastal zone;

(2) identify and approve three to five locations within the coastal zone where emergency stockpiling can take place during cleanup operations;

(3) send contaminated liquids out-of-state for treatment and disposal;

(4) incinerate combustibles at the Lamprey Regional Solid Waste Cooperative facility in Durham;

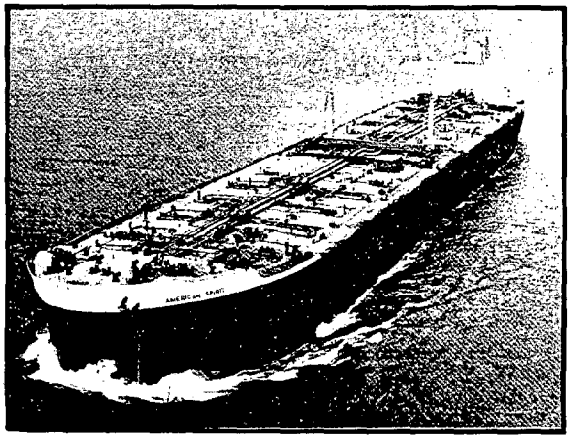
(5) landfill non-combustibles at a secure landfill site: Turnkey Landfill of Rochester, Inc. has been identified as the best candidate site for this program.

The responsibility of ensuring implementation of this plan should be the responsibility of the Water Supply and Pollution Control Commission working in conjunction with the Bureau of Solid Waste Management and the Air Resources Agency. The Office of State Planning can aid in developing public acceptance of the plan and work as an intermediary in the event of interagency disputes.

At the writing of this report, it appears that the capital costs necessary for implementation of the plan are approximately $150,000, mainly for development of a long-term storage site and purchase of materials to store for the emergency stockpiling sites. This estimate is tenuous, since cost-sharing arrangements with the Lamprey Regional Solid Waste Cooperative are in their infancy and may result in some capital investment on the part of the State.

It is also assumed that Turnkey Landfill will become a secure site through its adherence to the State's Solid Waste Guidelines, developing the necessary clay liner, leachate collection, and ground-water monitoring on its own.

The detailed plan and recommendations for its implementation are presented in Chapters 5 and 6 of this report.



1.

INTRODUCTION

1. Introduction

OIL SPILLS IN THE COASTAL REGION

Oil Spill. The words invoke images of contaminated beaches, oil-soaked bird life, massive fish kills, and other disturbing damages to the coastal environment. In 1979, oil spilled on the seas of this planet reached an all time high of 328 million gallons. Yet, this amount only represented a small percentage of the total 1.8 billion gallons of petroleum discharged annually into the ocean.' Whenever oil is transported, handled, stored, refined, or removed from reservoirs deep inside the earth's crust, the potential for oil spills results and New Hampshire is no exception.

In the period from 1975 through 1979, a total of 103 spills were recorded in the New Hampshire coastal zone resulting in the release of 68,651 gallons into the State's waters. Table 1 summarizes these spills and Figure 1 shows their location. These data coincide with national spill information: spills tend to occur in greater number and volume in those areas of concentrated petroleum activity. Six major oil terminals are located along the Piscataqua River. According to statistics from the U.S. Army Corps of Engineers, these terminals transfer approximately 20 million barrels of petroleum products a year. It is understandable, therefore, that these terminals should account for approximately 50 percent of the total volume of oil spilled during this period of record.

While these five-year statistics are not overwhelming (the release of oil from the Tamano in Casco Bay, Maine in 1972 resulted in a spill of 100,000 gallons), they are, however, sizable enough to pose serious cleanup and disposal problems. Any release of oil will result in some contamination, especially if containment efforts are unsuccessful.

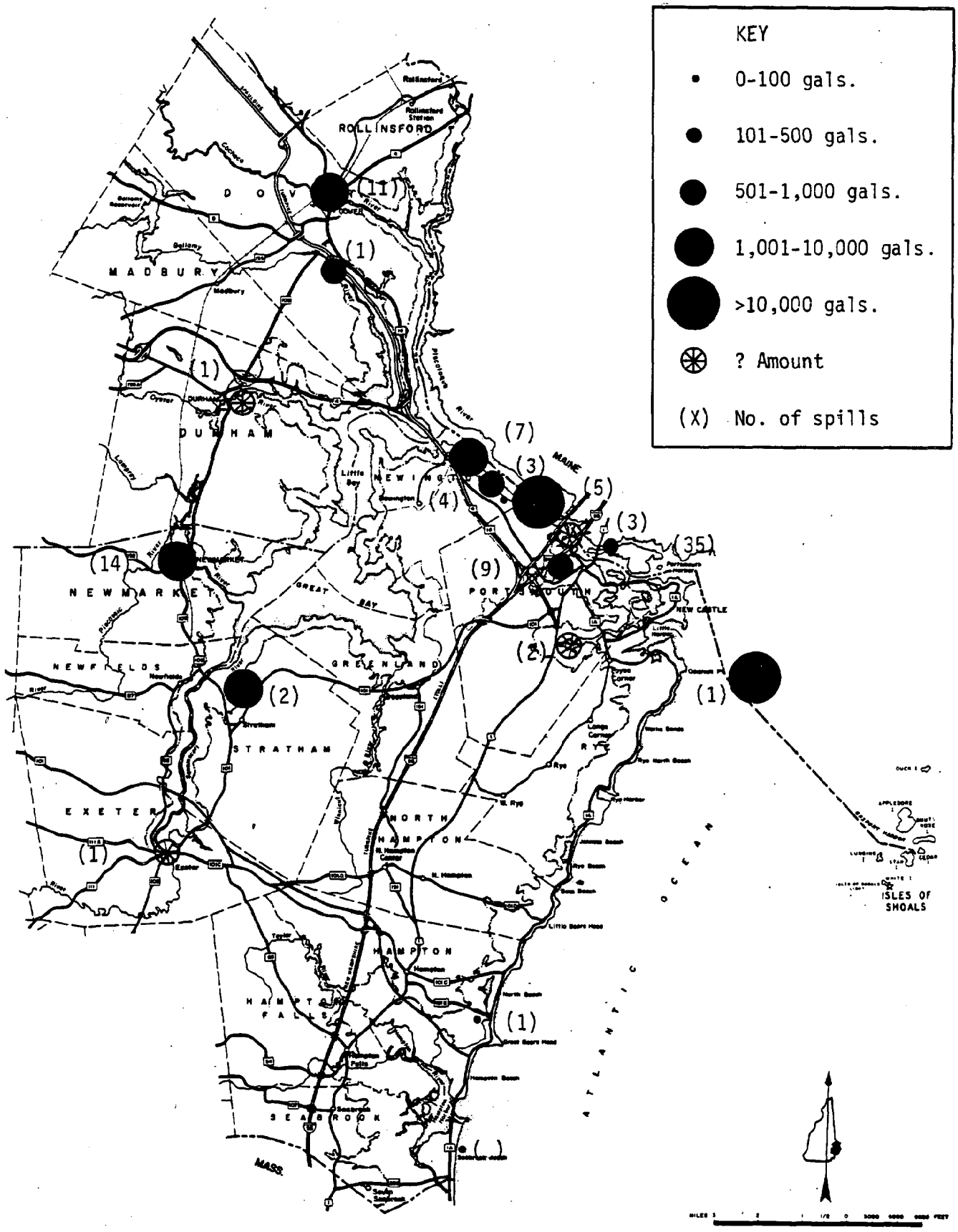


FIGURE 1. Location/Volume/No. of Spills (Strafford-Rockingham Regional Council, 1981).

The coastal zone has experienced a complete range and variety of petroleum spills as shown in Table 2. From the numerous small spills of less than 100 gallons (which account for 83 percent of the total number of spills but only 1.4 percent of the total volume) up to the catastrophic spill of the New Concord in 1979 which released 25,000 gallons of heavy oil into Great Bay, the coastal region has had its share of spills deposited upon its fragile environment.

TABLE 1. Number and Volume of Oil Spills in the New Hampshire Coastal Zone.

Location	Number of spills	Volume (Gallons)*
Piscataqua River		
Terminals-Portsmouth	8	25,065+
Terminals-Newington	10	8,881+
Portsmouth	11	1,016+
Newington	4	36+
Portsmouth Harbor	35	390+
Off-Shore	1	10,000+
Dover	12	12,390+
Newmarket	14	1,030+
Stratham	2	9,800+
Seabrook	1	3+
Exeter	1	unknown
Hampton	1	40+
Durham	1	unknown
TOTAL	103	68,651+

*These are known minimum amounts. The exact volume is often unknown.

Source: Strafford Rockingham Regional Council. 1981.

TABLE 2. Range, Number of Spills and Volume of Oil Spilled in the New Hampshire Coastal Zone.

Range	Number of Spills	% of Total	Total Volume (gallons)	% of Total
Unknown Volumes	38	36.9	+	-
?100 gallons	47	45.6	961	1.4
101-500 gallons	9	08.7	2,190	3.2
501-1,000 gals.	1	01.0	900	1.3
1,001-10,000 gals.	6	05.8	29,600	43.1
?10,000 gals.	2	01.9	35,000	50.9
TOTAL	103	99.9	68,651	99.9

Source: Strafford Rockingham Regional Council, 1981.

While the New Concord did release enough oil to cause damage to Great Bay, it was a small spill in comparison to the 1969 spill of the Robert L. Poling on the Piscataqua River. This spill resulted in the release of 200,000 gallons of No. 2 oil into the surrounding environment. Yet, even this spill is small in comparison to the potential that is present during tanker operations in the river. If a 35,000-DWT vessel were to release its cargo, 10,300,000 gallons of oil would be spilled into the river. This represents a volume 50 times larger than the Robert L. Poling.

One hopes that a truly catastrophic spill will not occur in the coastal zone. However, as history has shown, the spillage of petroleum products has, and will continue to occur and with it the recurring task of containing, cleaning up, and disposing of the oil and oil-soaked debris.

DEFINING OIL SPILL DEBRIS

As the tides, currents, waves, and other riverine and coastal processes work on the spilled oil, it can be carried great distances from the spill source and deposit itself over a vast area. Cleanup operations attempt, where possible, to keep the dispersed oil from moving on-shore. This has proven to be a difficult, if not impossible task, resulting in the contamination of all materials, organic and inorganic, that come in contact with the oil.

During cleanup operations, every attempt is made to recover as much of the liquid as possible. However, the solids that eventually are contaminated by the oil will remain, requiring removal, transportation and final disposal. These solids comprise the key management problem currently facing the State of New Hampshire. This "oil-spill debris" can be composed of floating organic material; such as seaweed, driftwood, logs and other lumber as well as any of these materials stranded on shore; and contaminated vegetation on land, shore, or the intertidal zone (marsh grasses, for example) that are harvested during cleanup. It can include miscellaneous beach and waterfront litter and other associated inorganics. It will usually contain a high percentage of inorganic sands, gravel, cobbles, rocks, mud and other non-biodegradables. Debris may also include the carcasses of dead animals, such as birds and fish, and many contaminated fresh and salt water organisms. Finally, there will definitely be a large amount of sorbents, both natural and man-made, that were utilized to soak up much of the spilled oil.

During the period 1975 through 1979, attempts were made to clean up 36 of the spills in New Hamsphire's coastal zone. Although these were only 35 percent of the total number of spills, they did represent 98 percent of the total volume spilled. However, only 17,017 gallons of oil were recovered, leaving a balance of 50,138 gallons of oil in the ground, as debris, or out to sea.

While records have been kept of the volume and number of spills that occurred, very little data exist on the resultant volumes of debris removed and ultimately disposed. The only relevant information available is for the New Concord spill in 1979. Records show that 18,500 gallons of liquid were recovered (7500 recyclable, 11,000 non-recyclable) along with 2080 cubic yards of solid debris.

If one was to apply this ratio of oil spilled to that recovered as debris to the spill statistics for the 5-year period of record (assuming the ratio remains constant), then the total debris picture for that period would be as shown in Table 3.

TABLE 3. Historical 5-year Estimate of Spill Debris in New Hampshire Coastal Zone.

Item	Volume
Recovered oil	20,600 gallons
Contaminated water	30,200 gallons
Oil-soaked debris:	
combustible	5,500 cubic yards
non-combustible	200 cubic yards

It is important to note the breakdown of the debris into combustible and non-combustible characteristics. Understanding this relationship is important to the decision for ultimate disposal. The combustible properties of debris are strongly affected by the amount of water contained in the debris after cleanup. Most attached seaweeds and marsh grasses as well as sorbents have high water content. This must be taken into consideration when reviewing disposal alternatives. Table 4 lists the various debris types to be expected in the coastal zone.

TABLE 4. Expected Oil Spill Debris Type in New Hampshire's Coastal Zone

Combustibles			
A. Oil-soaked Solids			B. Liquids
Marsh grasses	Wood		Recovered oil
Seaweeds	Litter		
Most sorbents	Flotsam		
Non-combustibles			
C. Oil-soaked Solids			D. Liquids
Sand	Ice & snow		Contaminated fresh & saltwater (Oil/water emulsions)
Rocks	Some sorbents (highly saturated)		
Boulders			

Combustibles normally make up 80 percent of the debris collected following a spill. This relationship is important in view of disposal options. Proper separation of the debris will allow for an 80 percent volume reduction through incineration, reducing the amount of debris requiring ultimate land disposal. This disposal strategy is discussed in more detail in Chapter 2.

Aside from this combustibility aspect of oil-spill debris, there are a number of other characteristics that affect cleanup and disposal. The oil type has a strong influence on resultant debris. Because of differences in viscosity and color in particular, certain types of oil pose special problems to the personnel involved in cleanup. Heavier oils can be readily seen because of their color and tendency to adhere to the materials with which they come in contact. Lighter oils are harder to see because, they tend to blend in when they float on water. The viscosity of lighter oils allows them to penetrate most sediments rapidly, where they may become hidden from view. Because of these proper-

ties, the lighter oils are oftentimes harder to locate resulting in a lowered recoverability. Some of the more relevant properties of the different oils are shown in Table 5.

TABLE 5. Classification and properties of Various Oil Types.

Class	Designation	Typical Oil Types	Diagnostic Properties	Response Properties
A	Light oils	Distillate fuel and light crude oils (all types)	Highly fluid, usually transparent or opaque, strong odor, rapid spreading, can be rinsed from plant sample by simple agitation	May be flammable, high evaporative loss of toxic components, assume to be highly toxic when fresh, tend to form unstable emulsions, may penetrate substrates, responds well to most control techniques.
B	Heavy sticky oils	Residual fuel oils; medium to heavy asphaltic and mixed base crudes	Typically opaque brown or black, sticky or tarry, viscous, cannot be rinsed from plant sample by agitation	High viscosity, hard to remove from surfaces, tend to form stable emulsions, high S.G. and potential for sinking after weathering, low substrate penetration, low toxicity-biological effects due primarily to smothering, will interfere with many types of recovery equipment
C	Waxy oils	Medium to heavy paraffin base crudes	Moderate to high viscosity, waxy feel	Generally removable from surfaces, soil penetration variable, toxicity variable -- may be high in fresh oils, decreased tendency to form stable emulsion
D	Nonfluid oils (at ambient temperature)	Residual and heavy crude oils (all types)	Tarry or waxy lumps	Nonspreading, cannot be recovered with most equipment, cannot be pumped without heating or slurrying, relatively nontoxic, may melt and flow when stranded in sun

New Hampshire annually receives an almost equal volume of heavy and light oils as shown in Table 6. During the period of 1975 to 1979, 50 percent of the oil spilled in the coastal zone was residual fuel oil, the rest were lighter oils such as diesel and gasoline. As these statistics indicate, the coastal zone can expect the complete range of oil types and resultant debris that will warrant a diversity of cleanup and disposal procedures.

TABLE 6. Ship Transfers of Oil in New Hampshire's Coastal Zone.

Oil Type	Volume (BBLS)* 1977	% Total	1978	% Total
Crude oil	3,561,677	18.0	2,434,152	13.9
Residual fuel	8,020,247	40.7	7,180,745	41.1
Gasoline	1,075,760	5.4	1,482,789	8.5
Jet fuel	657,454	3.3	319,564	1.8
Kerosene	520,363	2.6	302,832	1.7
Distillate fuel	5,657,634	28.7	5,271,732	30.1
Naptha & Petroleum solvents	234,861	1.3	501,091	2.9
TOTAL	19,727,995		17,492,905	

*From U.S.A.C.E. statistics - changed from short tons to BBLS using average figure of 6.35 BBLS/short ton.

PAST DISPOSAL PRACTICES

Oil spills on the scale of the New Concord are emotional events. They are emergency in nature and strain the response personnel to the maximum as they attempt to face the seemingly insurmountable task of cleanup. The local population is usually in shock at the vision of an oil contaminated landscape. This shock gradually turns to outrage towards the spiller, as people start facing the aesthetic, physical, biological, and financial losses that result.

This heightened emotional state has typically forced the cleanup crews to place primary emphasis on removing all traces of spilled oil from the water, land and private and public property, as well as the injured wildlife that may be involved. As a result, little thought has been given to the ultimate disposal of debris, oftentimes resulting in less-than-adequate disposal practices as debris-laden trucks rush to local landfills to get rid of their loads and return to the scene. Typically, debris is bagged and/or loaded into trucks and hauled to a local landfill or dump to await approval for ultimate disposal at a more secure site by State and local officials.

Under New Hampshire's Revised Statutes annotated 146-A (Supp), the Water Supply and Pollution Control Commission (WSPCC) has the responsibility for the cleanup of all oil spills in state waters. In the Oil and Hazardous Materials Pollution Control Contingency

Plan (Section 2023), it is recognized that the role of the WSPCC during a spill incident is:

> "to provide that the recovered pollutant and all contaminated debris are disposed of in a manner acceptable to the state."

Final disposal of all debris is the responsibility of the Bureau of Solid Waste Management (BSWM) under the State's Solid Waste Regulations.

The responsibility for oil spill debris disposal is thus shared between WSPCC and BSWM. To date, however, no pre-planning for debris disposal has been accomplished.

The State has generally relied on the case-by-case approach, deciding on a method and location for disposal after cleanup operations are completed.

Due to this case-by-case approach, records have not been adequately maintained on disposal unless approval was necessary from the State of New Hampshire Bureau of Solid Waste Management. Records for oil spills maintained by State and Federal agencies do not indicate the types of debris accumulated and where disposal took place.

The recent study on oil spills in the coastal zone, conducted by the Strafford Rockingham Regional Council, provides an overall picture of the State's past disposal practices. This discussion is presented below:

> The oil spill inventory shows that Dover experienced several spills to which the Dover Department of Public Works responded. The Director of Public Works stated that on these occasions, oil debris was disposed of in the old town dump off River Road. Approval in each instance was given by the state investigator from the N.H. Water Supply and Pollution Control Commission. (In actuality, approval was given by BSWM through the WSPCC investigator.) While the amount of oil debris that was landfilled was not known, it was thought to be small. Records were not available from the Bureau of Solid Waste Management indicating formal approval for disposal.
>
> In two Newmarket oil spills, approval was obtained from the New Hampshire Air Resources Agency to burn oil debris at the local landfill. On one occasion during the winter, approval was granted to burn oil trapped by ice on the Lamprey River and oil debris (absorbants) in place.

Oil debris from the New Concord was finally disposed of at the Coakley landfill in Greenland after being stored there temporarily for nearly a year while alternative means to landfilling were explored. A small amount of oil debris was taken to the Durham incinerator and incinerated as an experiment. This proved to be a costly means of disposal and it was finally decided to dispose of the debris permanently in the Coakley landfill, a privately-operated facility. The Greenland selectmen were notified by the N.H. Bureau of Solid Waste Management of its intentions to permanently dispose of the material. While not considered a hazardous waste by the N.H. BSWM, precautions were taken and the material was sealed in a clay liner to prevent oil from leaching into the groundwater.

The fact that the debris from the New Concord spill was stored almost a year before the decision was made to permanently dispose of it at the Coakley pit is worth noting. This is understandable, since New Hampshire has no pre-approved sites for ultimate disposal. However, this typical, long-term storage, while awaiting approval for ultimate disposal, has the potential for oil migration into adjoining ground and surface waters. After spending a great deal of time and money cleaning up an oil spill, it makes no sense to reintroduce the spilled oil back into the environment. This possible contamination is more threatening than the oil spill itself since it could result in contamination of subsurface drinking water supplies upon which a majority of the coastal region population relies.

THE NEED FOR A MANAGEMENT PLAN

Secondary pollution from oil-soaked debris is a serious consideration in the overall management process for oil spill response. It has received insufficient attention in the past. Yet, the possibility for pollution and the intense emotions associated with a spill warrant pre-planning so that an appropriate disposal method and a suitable site are available before a spill occurs. (These conditions can be met either in- or out-of-state.)

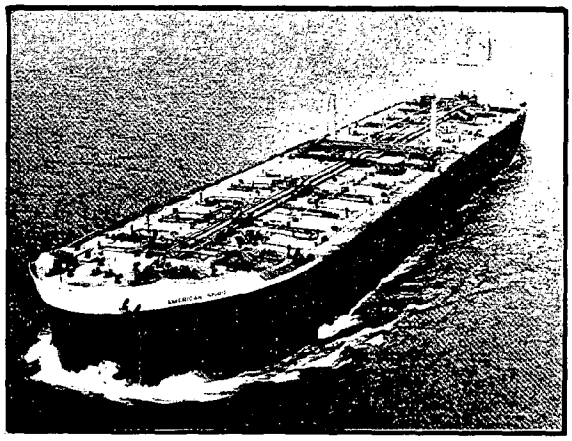
Development of an implementable management plan for the disposal of oil spill debris will fill the void currently existing in contingency plans at the local, State and Federal levels. The need for a rational plan is obvious based on the presence of major oil terminals in the coastal zone, the past history of oil spills,

and the present lack of approved storage and disposal facilities in the State.

To meet this objective, the Center for Natural Areas has conducted an eight-month study under contract to the Office of State Planning into the problem of oil spill debris disposal. Emphasis has been placed on assessing those methods of disposal currently in use that could be utilized by the State in the most cost effective, yet environmentally acceptable manner.

The resultant plan and its recommended implementation are presented in Chapters 4 and 5 of this report. The results of CNA's state-of-the-art review of disposal methods are included in Chapter 2 with an assessment of their application to the New Hampshire situation discussed in Chapter 3. Other information relevant to the study, yet unnecessary for the text are in the appendices.

This plan is a simple and logical one. It offers no "high tech" solutions, only utilization of existing "best available technologies" and a basic management philosophy that will prove adequate for the future disposal needs of the State.



2.

DISPOSAL OF OIL SPILL DEBRIS:

AN OVERVIEW

2.
Disposal of Oil Spill Debris: An Overview

A MANAGEMENT STRATEGY

The management of oil spill debris disposal follows a basic strategy that consists of a series of interrelated steps and decisions. The beginning of the process starts before a spill takes place and involves the identification and approval of key sites and facilities necessary for debris storage, recycling of recovered oil, and final disposal of debris. This can be accomplished through the use of and/or modifications to existing facilities, construction of new facilities either by the public or private sector or reliance on out-of-state disposal facilities, if available.

The results of this pre-planning phase can then be incorporated into the overall contingency plan so that when a spill occurs, the disposal options are clearly laid out, leaving only the decision of which methodology to use and where to accomplish it to be made by those responsible for cleanup and disposal operations.

Cleanup Strategies

The ultimate disposal of debris can be minimized as a result of correct on-site cleanup operations. It is at this stage that much can be done to reduce the overall volume of debris requiring disposal. This can be accomplished through (a) utilization of appropriate debris harvesting techniques and (b) recovering as much of the usable oil as possible.

The Environmental Protection Agency has a series of publications which address in detail the various cleanup strategies that should be followed. These are:

> Maiero, D.J., R.W. Castle, O.L. Crain. 1978. Protection cleanup and restoration of salt marshes endangered by oil spills: A Procedureal Manual. EPA-600/7-78-220, U.S. Environmental Protection Agency, Cincinnati, Ohio.
>
> Schrier, E., C.R. Foget, M. Cramer, and R. Castle. 1979. Manual of practices for protection and cleanup of shorelines. Volumes I and II, EPA-600/7-79-187 a and b, U.S. Environmental Protection Agency, Edison, New Jersey.

The more important aspects of the strategies are summarized below.

recovering the oil

Following a spill, oil is removed from the water by skimmers of various sizes, pumps, vacuum trucks, or sorbents. Without going into detail about specific machines or sorbents, it can be stated that both oil and water will be recovered when using these devices. The key points to remember are that oil recovered in liquid form is easier to recycle and that recovered oil with low water content retains a higher value. Skimmers that sort out debris and limit the amount of water that is collected are the preferred method for recovering free floating oil. Vacuum trucks and pumps without skimmer heads will have a tendency to collect much more water than other methods of recovery because they have no way of discriminating between the oil/water interface. Sorbents that collect oil and resist water penetration should be used on spills as a way to reduce the amount of contaminated water that must be disposed.

The other source of recoverable oil is in the harvested debris itself. If the weather is warm (above 50 degrees) and the oil content of the debris very high, then oil can be separated from debris by placing it on a grid platform over a pit with a 12" layer of water. The oil will tend to flow off the debris and into the pit where it can be removed by a vacuum truck and reprocessed. The pit can either be built on-site, or be constructed at a storage or disposal site (further information regarding this separator is found in the section on storage sites in Chapter 3).

The emphasis here is oil recovery: the more oil recovered, the less liquid that will require further separation and treatment later on.

debris harvesting

Although plants are usually harvested during oil spill cleanup, harvesting is very detrimental to plant populations and must be done with caution. Oil, especially of light fractions or freshly spilled, may be deposited on intertidal plants at low tide and then lifted off with subsequent high tides (as observed during the Amoco Cadiz spill). In such cases, oil may be pumped or skimmed at high tide without disturbing the plants. It is best to get the advice of a trained biologist, but as a rule oil-soaked plants should only be harvested if very heavily oiled and then to prevent remobilization of the oil and further contamination. When harvesting seaweed, large, mature plants should be left on the shore every few meters (approximately 1-2 percent of the population) to expedite recolonization. This is especially critical for the recolonization of Ascophyllum nodosum, a dominant species in the New Hampshire coastal zone. Salt marsh vegetation should be cut at the sediment surface. Marsh sediments should not be disturbed as the sediment height in respect to sea level is critical for the establishment and survival of marsh plants. The effect of harvesting on intertidal plants probably varies with the timing, but there has been little studied to date (Topinka, personal communication 1981).

Plants should always be removed manually and should never be mixed with non-combustible wastes. Manual harvesting can be done with any type of grass cutting device. Sickles and sythes are effective on marsh grass. Knives and scissors are effective on attached seaweeds. In the past few years, gasoline or electrically-operated "string" type, upright rotary trimmers have been used with a great deal of success in situations where there has been extensive contamination.

When the cuttings are raked, care should be taken to keep rocks out of the material. Whenever possible, cuttings should be transported in plastic bags so the operator can readily see whether or not the material is compatible with the disposal method.

When the volume of combustible waste is compared to that of non-combustible waste, it is apparent that much more combustible waste is recovered annually. In fact, using the New Concord as an example, we find that 25 times more combustible waste was recovered than non-combustible.

From this, it can be readily understood that the key to reducing the problems of disposal of most spill debris is to keep the waste homogenous so the best and quickest disposal technique of incineration remains open. If combustible wastes are always kept free of non-combustible wastes, disposal is much simpler.

Sediment can be recovered manually using hand tools to dig, rake or grade. The rule of thumb for use of these tools is to take as much oil and as little sediment as possible. In large spills, use of these tools is effective only when there is a large work force available. This technique is preferable to the use of heavy machinery in most areas of the intertidal zone and especially in areas of fine-grained sediments, mud, or other areas with low weight bearing surfaces.

The key is to keep combustible materials out of the debris collection containers during harvest of sediments so that removal of these items at a later date can be avoided. Also, sediments of similar grain size should be isolated from dissimilar sediments as they are gathered and when they are stored. It is relatively easy to keep sediments of similar size isolated when sediment is gathered by hand.

In large spills, some pieces of heavy construction machinery; such as tractors, backhoes, beach graders, gradalls; can be used to excavate oil-contaminated sediments. They are basically used to remove the layers of oil-soaked earth down to the deepest penetration and have the advantage of being able to recover as much material as can be recovered manually. Thus, they can be used to speed up sediment or ice and snow removal. This machinery has three big disadvantages, however. First, the operator cannot always discriminate as well as a person on foot where the beach penetration depth changes. Therefore there is a tendency to treat each geological area similarly which could result in taking too much material in one place and, perhaps, not enough in another. Second, large pieces of excavation equipment are very heavy and can bury top sediments contaminated with oil deep into the beach where it will not be recovered during cleanup. Third, this equipment removes sediment in bulk which makes it more difficult to recycle and reuse without extensive processing.

A Debris Storage Site

A cornerstone to the overall management strategy is the establishment of a storage/stockpiling site that is available to the on-scene coordinator. This storage site (or sites) can either be emergency in nature -- the site is made secure through establishment of a liner and some sort of protection dike -- or a sophisticated, long-term storage site designed to protect against outward oil migration.

The purpose of the site(s) would be as a staging area during cleanup operations, where debris that requires further separation into combustibles and non-combustibles could be stored for later separation, and/or previously separated solids could be stored if existing disposal facilities were unavailable at the time of the spill or the spill debris exceeded their immediate ability to process the waste. This is especially necessary in the case of incineration when most facilities would be unable to handle the combustibles from a large spill. The storage area would allow for delay of delivery of combustibles over the period of time necessary to complete incineration.

The presence of this site would allow for a smoother cleanup operation providing a secure location for the trucks to quickly unload and return to the cleanup site. Debris separation at the site would greatly aid in reducing the debris which would require land disposal, thus providing a higher degree of environmental protection. The technical requirements for both the emergency and long-term sites are presented in ensuing sections of this chapter.

Choosing A Disposal Method

There will come a point when all possible material has been reclaimed and/or sorted, and a choice of ultimate disposal is required. Assuming all technical requirements are met and all local, State and Federal permits received, the managing State agency has a number of options available for ultimate disposal. These are summarized in Table 7.

TABLE 7. Applicability of disposal methods to different types of oil spill debris.

Disposal Method	Size of Solid Matter	Biodegradability of Debris	Oil Content
Incineration	No general limitation; some municipal incinerators may have handling limitation; may require bagging of material to ease handling	Not applicable	High oil content solids may require special handling and mixing with other materials due to high BTUs
Landspreading	Debris should be relatively small in size, less than 15 cm (six inches), e.g., oiled soils; some larger vegetation may be acceptable, such as seaweed or brush. Bulky matter may be separated for landfill disposal	Predominantly oils and soils are best; nondegradable sorbents or inorganic trash should not be present	Landspreading best suited for heavily oiled debris
Landfilling with refuse	No limitation on size	No limitation on materials	In general, no limitation on debris oil content; regulatory agencies may object to disposal of heavily oiled or high water content debris in a newer landfill where relatively little refuse is present to absorb the liquids
Burial (above ground)	In general, no size limitation; bulky debris, such as poles, may pose operational problems; disposal trenches may require widening to accommodate bulky items	No limitation on materials	No limitation on oil content as long as site conditions are acceptable

Source: Farlow, 1977.

There is a definite priority in choosing a disposal method. Every attempt should be made to rely on burial as a last resort after all other options are exhausted. The order of priority is as follows:

1. Incinerate Combustibles. Since 80 percent or greater of all solids are combustible and are assumed to have been sorted either at the cleanup site or at the storage site, incineration will take care of the major portion of disposal. Complete combustion has the advantage of

converting the oil to carbon dioxide and water, leaving no aromatics to get into the ground water or complex organics to be taken up by plants at any land disposal sites.

2. Landspread materials less than 6 inches in diameter. Natural occurring organisms exist in the soil mantle in New Hampshire that can utilize the hydrocarbon in oil as an energy source. Experience so far with this method indicates that aerobic decomposition can be completed in three growing seasons. The advantage of this method is that after decomposition, water pollution potential becomes non-existent. The process has been widely used to dispose of oil refinery tank bottoms and API separator sludge wastes for decades. Bulky materials, especially sorbents, cannot be disposed of by this method.

3. Landfill with refuse or employ above ground burial for the remaining debris. From an environmental protection standpoint, anaerobic burial should be the last choice for disposal. However, from a cost, practical, and political standpoint, it is the method most often utilized for final disposal ("out-of-sight, out-of-mind"). Anaerobic decomposition is negligible; therefore the oily debris remains in place essentially undecomposed for centuries with the constant potential of contaminating ground-water supplies. Consequently, ground-water protection and monitoring is an essential component of this method.

   One final note: Due to possible health risks, vegetation for direct or indirect human use should not be grown on any land disposal site. Research in this area is, as yet, inconclusive. However, following the conservative path is the recommended option.

This, then, is the recommended disposal strategy upon which this study has based its research and recommendations. It shows up in its basic form in the recommended management and implementation plans presented in Chapters 4 and 5. These methodologies represent the current thinking in oil spill debris disposal. Research continues to refine these methods and identify new technologies. For now, the recommended approach is the "best available technology" that can guarantee environmentally-sound disposal.

STORAGE/STOCKPILING CONCEPTS

The need for a storage/stockpiling site has previously been defined. The ideal situation would provide for one long-term storage site to handle the bulk of storage requirements; and a series of pre-designated sites where emergency storage could be developed. The emergency sites would provide on-scene staging as well as extra capacity in the event of a catastrophic spill event. These sites could also serve the State as interim storage areas until a long-term site is developed at a suitable location.

Emergency Sites

Figure 2 shows a proposed emergency stockpiling cell. The cell is 20 feet by 100 feet with a working capacity of 60 cubic yards. This is based on the utilization of two 20-foot by 100-foot rolls of synthetic liner material. One roll is utilized as a bottom liner, and is placed over hay bales as shown in Figure 2 to provide for containment of the debris. The other roll is a 6 mil polyethylene and is utilized as a final cover to prevent infiltration of precipitation. To prevent puncturing, it is recommended that 2 to 6 inches of sawdust and wood chips be placed underneath and on top of the bottom liner. This will help maintain the integrity of the sheet while providing an absorbent if a leak were to occur.

For the bottom liner, there are a number of options which are summarized in Table 8. One possibility that is not included in this table is 8 mil woven/laminated polyethylene. This material has a high tear resistance and is relatively inexpensive.

A better alternative to the polyethylene liner is the use of 30-mil polychloroprene or 30 mil polyvinyl chloride (PVC) material. As Table 8 shows, polyethylene has an expected longevity of less than one month when in contact with petroleum products. The use of the PVC liner would be the recommended option since it offers an estimated longevity of about a year and is one-fourth the cost of the polychloroprene. Liner technology research is in its early stages with new materials under development. It is advisable to check with the Environmental Protection Agency about availability and status of any of the newer materials if they are used.

TABLE 8. Summary of Data on Membrane Liners Potentially Usable for Oil Spill Debris Stockpile Areas

Membrane type/material	Thickness avail. (mils)	Precautions		Estimated installed cost range, $/sq. yd.
		Placement*	Expected Longevity+	
Polychloroprene (reinforced with polyester)	30	Exposable to sun	>1 yr	6.75-8.55
Thermoplastic polyester	7	Exposable	<1 yr	Experimental
Polyvinyl chloride (PVC)	10-30	Unexposable	<1 yr	1.17-2.16
Coal tar pitch and PVC	100	Unexposable	<1 yr	1.50-3.50
PVC reinforced with nylon	10-30	Unexposable	<1 yr	1.50-3.50
Chlorosulfonated polyethylene	20-45	Exposable	<1 mo	2.88-3.37
Polyethylene	10-20	Unexposable	<1 mo	0.90-1.56

* All liners require subgrade preparation by removal of sharp objects and rocks and may require a coarse soil base. Unexposable liners must be covered with soil to prevent damage by ultraviolet sunlight and atmospheric contaminants.

+ Longevity data from Haxo, H.E., Evaluation of Selected Liners When Exposed to Hazardous Wastes. In: Proceedings of the Hazardous Waste Research Symposium, Residual Management by Land Disposal. EPA-60019-76-015, U.S. Environmental Protection Agency, 1976. 102 p.

Source: Stearns, 1977.

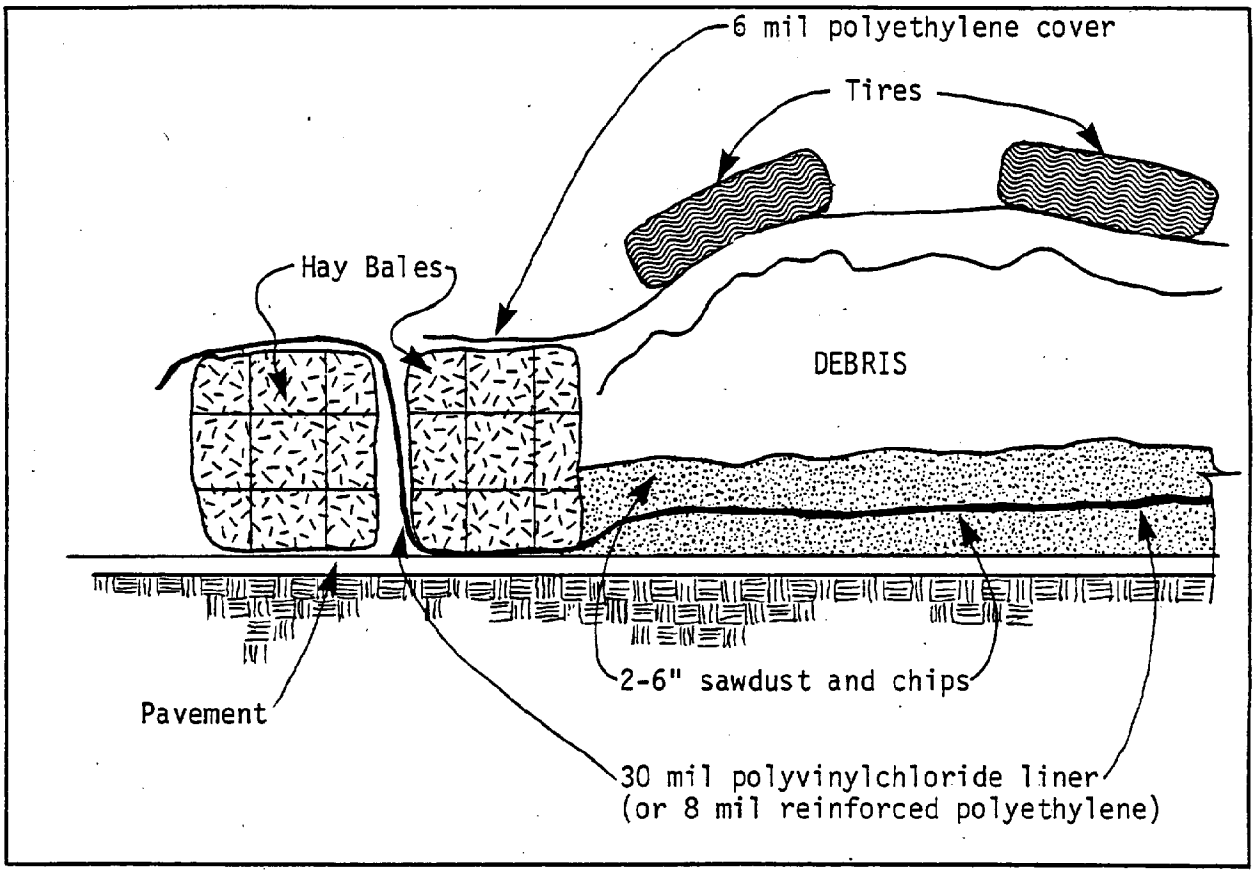


FIGURE 2. Cross-section of emergency stockpiling site

During cleanup, material would be dumped into the cells from trucks. A second sheet of 6-mil polyethylene would be placed on the top to keep precipitation off the area. Removal of the debris would have to be done extremely carefully either by hand or by starting at one end of the cell and gradually removing the material with a front-end loader, rolling up the polyethylene as one progressed towards the end of the cell taking care to avoid any spillage. Any accumulated oil would have to be removed by use of sorbents or by forcing the oil into a corner of the cell and skimming it into a vacuum truck.

These emergency sites would preferably be located on a paved parking lot. In lieu of the parking lot, an open area such as a public baseball or football field could be utilized, or a gravel parking area. Location of the sites would have to adhere to some very basic guidelines so as not to endanger existing environmental quality. These recommended siting guidelines are presented in Appendix C.

The best approach to the use of emergency sites is to predesignate three to five locations within the coastal zone that meet the site criteria. These sites would have pre-approval so that they could be utilized immediately by establishing the recommended liner system. Predesignation would prevent random site location and free the On-Scene Coordinator from the involved task of searching for a suitable site.

The Center has incorporated this approach into the management plan. Specific sites and implementation recommendations appear in the ensuing chapters.

A Long-Term Site

The purpose of a storage/stockpiling area is to provide a single facility that has been located, designed and constructed for environmental protection and where the oil-soaked debris from a spill event can be stockpiled for eventual separation and disposal. Reclaiming and recycling material would be a major component of the area. The presence of this site would provide the long-term, temporary storage necessary to allow for a timely choice of an ultimate disposal technique. Whereas the emergency sites are useful in the short-term, long-term storage (greater than two months) would be necessary to process combustibles, since most existing municipal incinerators do not have the capacity to handle the volume generated during large spills.

technical requirements

A storage/stockpiling site necessitates certain technical requirements to meet its stated objectives. These requirements hold regardless of the configuration chosen. Summarized below are the key requirements that the Center feels are critical to site design:

a. The site must be able to handle the variety of oil-soaked debris expected from any spill. This requires sufficient area for separation into combustibles and non-combustibles and for storage based on the estimated maximum volume of debris expected from a major spill event for the area in question. There also should be a separate staging area for sorting incoming debris.

b. The site must be designed to safely store the wastes for between one and five years. This would necessitate construction of a containment dike.

c. The site must be resistant to climatic and seasonal variations.

d. There must be enough area for maneuverability of debris handling equipment.

e. Maximum height of debris storage should not exceed 4 1/2 feet to allow for unloading by dump trucks.

f. There should be adequate drainage facilities to intercept internal runoff.

g. There must be equipment and facilities to handle treatment of contaminated runoff from the site.

h. The storage area must be able to be constructed using available technology and materials.

i. The site must conform to all applicable local, State and Federal laws and regulations.

j. The site location must satisfy all site selection criteria (see Appendix A).

k. A monitoring program to determine leachate movement should be installed.

liner systems

Liner systems for storage and burial of oil spill debris fall into the following categories:

-- asphaltic liners
-- soil cements
-- synthetic liners
-- soil sealants
-- clay liners

Liners underlie the site area that will be utilized for storage and stockpiling. They are the key to preventing outward migration of any oil that may leach from the debris. Asphaltic and soil cement liners, although used in water-related application, will not stand up to petroleum storage usage. This is also true of the various synthetic liners currently available as well as the soil sealants. As a result, these liner systems are not considered applicable for the long-term site.

Bentonite-Clay Liner Systems

The most acceptable liner system to date is one of bentonite clay. This clay is a natural, polymeric mineral that will swell to 10 times its original volume when in contact with water. This property of the clay creates a virtually impermeable seal to water and oil-water emulsions when the clay is incorporated as a liner and mixed with soil according to its specifications. Bentonite is a currently available homogenous mixture that, while expensive, ensures maintenance of the required physical and chemical liner characteristics.

Figure 3 shows a typical configuration of a bentonite liner system. A layer of compacted sand and gravel is placed on top of the clay to maintain the necessary moist conditions which ensure proper hydration of the clay. This layer will also protect the clay from freezing and damage by heavy equipment.

The system has an outer earthen berm constructed with a bentonite liner as shown. The berm prevents lateral migration of oil/water emulsions and helps maintain a static water level which is necessary to hydrate the clay.

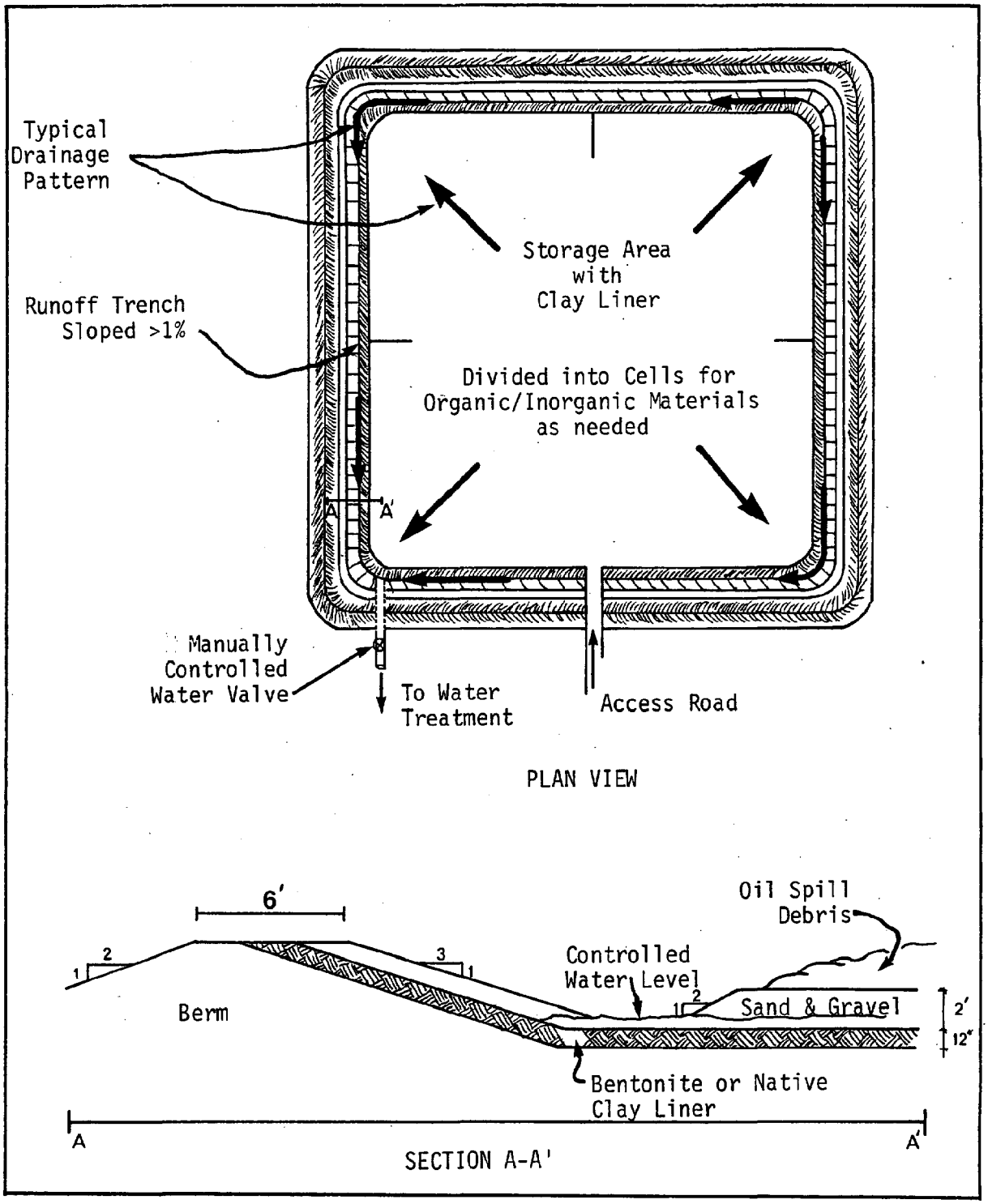


FIGURE 3. Basic clay-lined, stockpiling/storage site concept (Source: SCS Engineers, 1979).

Bentonite clay liner systems offer a simple design for a spill debris storage site and, if properly sited, will ensure adequate environmental protection.

Native Clay Liners

Native marine clay is an acceptable option for a liner system. Soil surveys of the coastal region show large areas of these glacial, marine-lacustrine deposits. Native clay would offer an inexpensive option to the more expensive, bentonite-clay liner that is currently being proposed as the state-of-the-art for oil spill debris storage and disposal. Site development would be similar to the bentonite clay site, except for the substitution of native clay as a liner.

additional site requirements

There are other support facilities that would either be required or needed to maintain an environmentally sound site. Proposed regulations under Section 3004 of the Resource Recovery Act will require storage for runoff from a 25-year storm of four hour duration at facilities handling oily wastes. This will eventually necessitate construction of a clay-lined storage lagoon to handle the anticipated runoff volume. The oil can be skimmed from the surface of the lagoon and the water retained for fire purposes.

If discharge to a stream were necessary, then a coalescing type oil/water separator would be required to meet the probable discharge requirement of 15 mg/l of oil. Installation of a separator would also provide a place to separate contaminated liquids from a spill event, a deficiency that currently exists in New Hampshire.

Another suggested site facility is an oil-recovery unit to separate oil from oil-soaked debris. The unit, shown in Figure 4, consists of a concrete box covered by a steel grate. An access ramp allows trucks to dump debris onto the screen. One foot of water is maintained at the bottom of the box as a separating medium. Separated oil can be skimmed from the surface by a waste oil contractor.

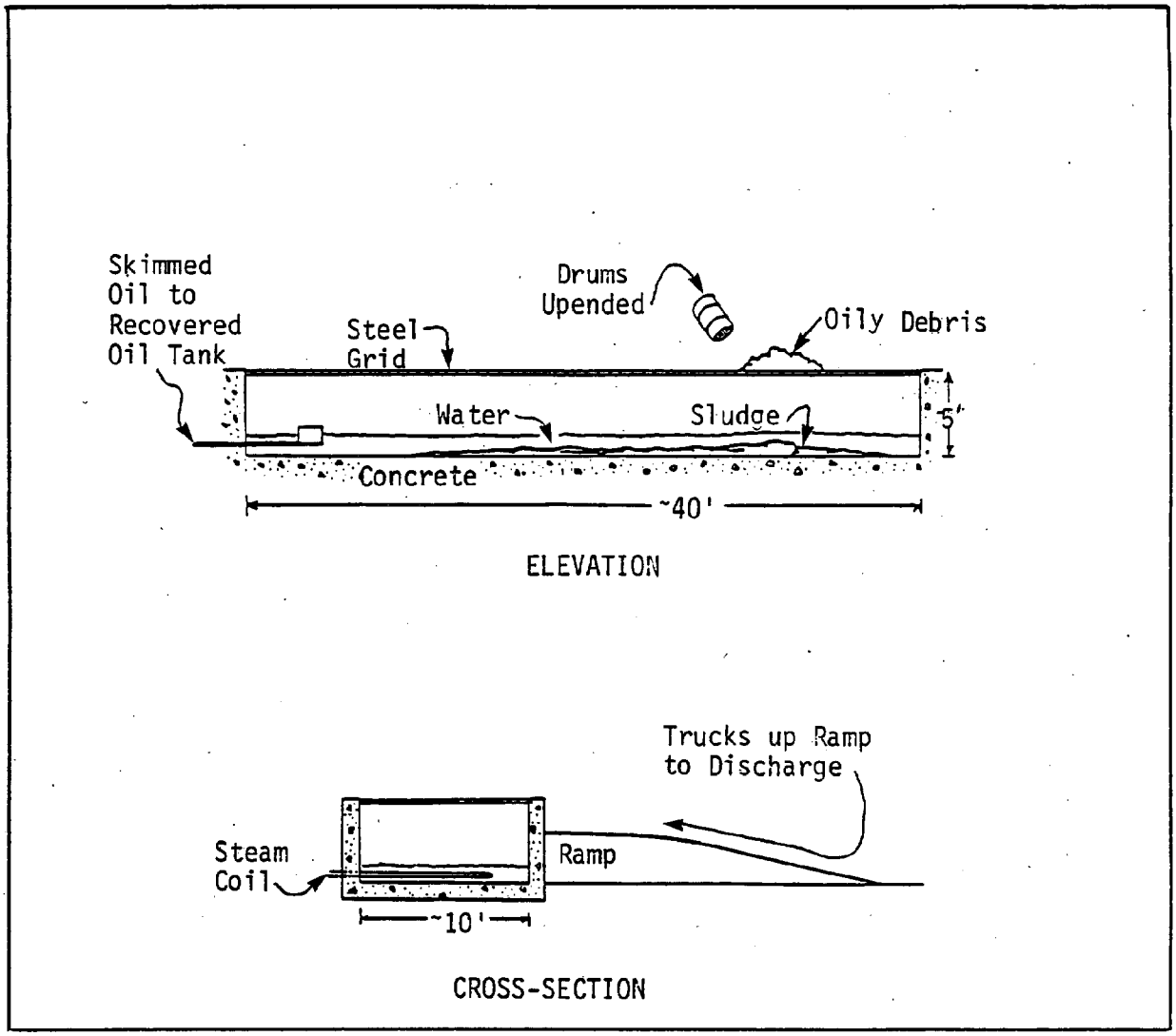


FIGURE 4. API Oil Recovery Unit for Storage/Stockpiling Site (Source: SCS Engineers, 1979).

To further protect the ground water, installation of a secondary diking system is suggested. The liner of the outer dike is keyed into the underlying impermeable soils. This creates a perched water table condition within the site, which keeps the clay hydrated.

Figure 5 shows a conceptual plan of a fully developed, clay-lined, storage/stockpiling site. This site represents the current thinking relative to debris storage. A proposed site for the South Portland region in Maine has been designed by SCS Engineers. To date, however, public resistance has blocked its construction. The Center is of the opinion that the simpler site shown in Figure 3 would be effective if well engineered and if adequate monitoring wells were installed. Also, some runoff collection and treatment would be necessary to meet future Federal requirements.

site location

Location of a long-term storage site requires strict adherence to a set of criteria that reflect the various physical, biological, sociological and other environmental criteria. These criteria are presented in detail in Appendix A.

There are two approaches to the location process. One approach is to attempt to locate available public or private land that is currently in industrial use. Existing sanitary landfill sites are a logical first choice, with oil-terminal sites a close second. In this approach, the land is identified first and then the criteria are applied to see if the site is acceptable. Utilization of an existing landfill provides a site that is already in use for disposal of municipal waste. It will also lower the overall site development costs significantly.

The other, more involved approach, is to run through a screening system as outlined in Appendix B. This overlay method reveals where areas are located that are not constrained by the more critical site criteria. Hopefully, the existing landfills, or other available lands will fall within the screened areas. If not, then a search for unused land would be necessary.

The Center feels that the first approach will provide a less expensive solution to site selection. This approach was followed during the study resulting in identification of some candidate sites. These are presented in Chapter 3.

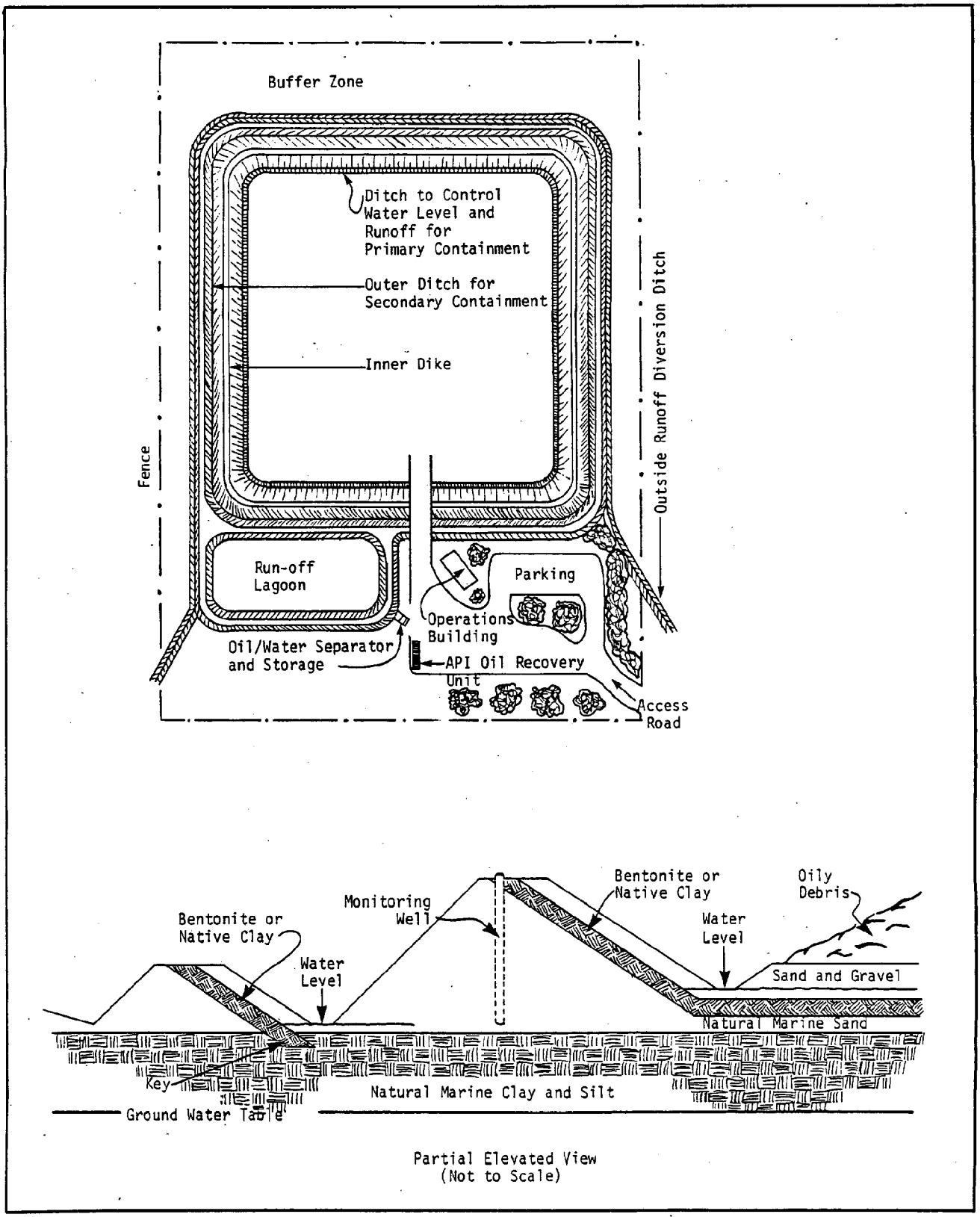


FIGURE 5. Fully developed clay-lined storage/stockpiling site (Source: SCS Engineers, 1979).

FINAL DISPOSAL

The following technical discussion of the various disposal options available for New Hampshire is intended to be informative, yet brief. Enough information is presented to follow the development of the recommended plan. If specific facilities are developed during implementation, further engineering studies will be required.

The reader is directed to the following reports for a more detailed technical discussion of the various methodologies:

SCS Engineers. 1979. Oily wastes manangement, an investigation of alternatives for the State of Maine, prepared for the State of Maine, Department of Environmental Protection, Augusta, Maine.

Stearns, R.P., D.E. Ross and R. Morrison. 1977. Oil spill decisions for debris disposal. Volume I, Procedures Manual. EPA-600/2-77-153a. U.S. Environmental Protection Agency, Cincinnati, Ohio. 100 p.

Stearns, R.P., D.E. Ross and R. Morrison. 1977. Oil spill: Decision for debris disposal. Volume II, Literature Review and Case Study Reports. U.S. Environmental Protection Agency, Cincinnati, Ohio. 165 p.

Disposal of Contaminated Liquids

The liquid oily wastes encountered in oil spill cleanup are typically in one of three forms: directly recoverable oil (sediment and water less than 10 percent), contaminated oil-water mixtures, and oil-water emulsions.

Oil with bottom sediments and water less than eight to ten percent can usually be sold as off-specification waste oil. Most of the recovered oil, however, will need some processing. The recovery process can involve gravity separation, using heat to speed up the process of breaking oil-water emulsions; centrifuging; or, in some cases, re-refining or chemical separation.

The usual method of handling contaminated liquids during a spill is to bring them to a tank storage facility specifically earmarked for waste oils. Liquids are generally put in settling tanks where the heavier solids and water settle to the bottom of the tank and the oil and lighter solids float to the top. This is usually undertaken by the spill cleanup contractor.

API specification gravity oil-water separators are generally suitable for treating oily water that has been picked up during oil-spill cleanup operations. As long as there are not extensive oil-water emulsions and as long as the rated capacity of the individual unit is not exceeded, a gravity separator can normally achieve the 15 mgl discharge criteria required by the EPA and the State of New Hampshire for simple oil-water mixtures. An acceptable oil-water separator is generally the best, quickest and most realistic way to recover oil and dispose of water collected during cleanup operations. A 400-gpm vertical coalescing unit has been recognized as the most viable separator for this purpose.

The longer the oil has been in the water, however, the more likely that an oil-water emulsion has formed. When this happens or when emulsions occur from vacuuming or pumping, one of the more difficult and expensive techniques for recovering usable oil will have to be employed.

Incineration

Incineration has been a traditional method of disposal for combustible oily wastes. Since combustibles represent up to 80 percent of the total spill debris volume, incineration offers significant debris volume reduction and should be a key component of any management plan.

The Environmental Protection Agency has investigated the various incineration methods currently available for oil debris disposal. Research has focused on three methods: fluidized bed, air curtain pit burner, and rotary kiln. The EPA has chosen the rotary kiln method for its mobile incinerator project due to its ease of operation and ability to meet current emission standards.

Utilization of a rotary kiln incinerator in New Hampshire would require the purchase of a new unit, since there are no existing units in the state. There is, however, an alternative to the rotary kiln and that is incineration at an existing municipal facility. This has been successfully accomplished in the past, and can be utilized in the future as long as a facility can handle

the types of wastes generated during spill cleanup operations and meet emission standards. The State of Maine is successfully utilizing this approach at the City of Auburn incinerator. This is discussed in detail in Chapter 3.

Of the various municipal incinerators in place in New Hampshire, Consummat units appear to have the basic characteristics required to handle oily debris (see Chapter 3 for their location in New Hampshire). These units are dual chamber types. Debris is introduced into one end of the lower, primary chamber where it is slowly moved via reciprocating rams to the far end. This process takes around 8 hours. While moving through the lower chamber, the debris is "cooked" at a temperature around 1200^{0} F. Very little air is introduced in the lower chamber creating oxygen starvation and incomplete combustion of gases. These gases rise to the upper, oxygen-rich chamber where the temperature is around 1700^{0}F, and final combustion takes place.

The Consummat units are highly successful at burning off particulate matter and could be utilized for combustion of oil-soaked debris if the debris were mixed with municipal refuse. This would help lower the overall BTU of the waste stream, ensuring satisfactory usage of the units.

Landspreading

Landspreading of oily wastes is an acceptable and proven method of disposal. It has been utilized mainly in the Southern United States, but has also been successful in colder regions of the country. It involves the application of the wastes (liquid and solid) directly to the soil in amounts determined through past research. The wastes are then dissipated by biodegradation and evaporation. The aerobic microbes present in the upper soil horizons utilize the hydrocarbons as a carbon source to produce new cells, thus breaking down the oil present in the wastes. Aeration of the upper soil layer through continual cultivation enhances biodegradation as does the addition of nutrients through the use of fertilizers. The end products of this natural process are carbon dioxide, water and increased humus content.

New Hampshire's climate and rainfall conditions would limit landfarming to a five-month period from May through September. This would decrease the volume of debris that could be disposed in a warmer climate, thus necessitating a larger area.

Landfarming is applicable to both solid debris and contaminated liquids. It is limited to material less than five to six inches in diameter in order to adequately mix it with the topsoil during cultivation. Larger pieces of material would either have to be reduced in size or disposed in a secure landfill site.

The land area required for disposal by landspreading depends on the volume of debris and its concentration of oil. About 23 square feet of land per gallon of oil is required for landspreading. Since oil-soaked debris usually accounts for up to 20 percent of the oil spilled, about two to four acres of land will handle the saturated debris for a spill the size of the New Concord.

Preparation of a site for landfarming involves assuring proper access for cultivation equipment and transport vehicles. At the site all rock, logs and other hard materials larger than 6 inches in diameter and any brush should be removed. The soil is scarified to a depth of 2 to 4 inches. It is usually necessary to construct a berm, and/or develop diversionary drainage around the site.

Disposal of oil-soaked debris by landspreading involves five basic steps: site cleanup; receipt of debris; spreading; drying and mixing with soil; periodic recultivation; and return of the land to its original use.

Once the debris is received, it is preferable to spread it immediately to avoid double handling. If this is not possible, then stockpiling near the disposal site using a bermed and impermeable area to prevent runoff or infiltration of the oil will be necessary.

Spreading and mixing of the debris with soil will expose the oil to oxygen and microorganisms in the soil. The debris will be spread in thin layers and allowed to weather until the soil is no longer moist or sticky. Mixing of the oil-soaked debris to a depth of 2 to 4 inches is done utilizing locally available equipment such as a rototiller or a tracked vehicle. Proper mixing is accomplished when the oil dispersed in the soil is no longer visible and there is no ponding of oil or water.

Subsequent remixing of the site is done periodically until the oil is degraded. This can be done by visual inspection. In cold climates this process may take up to three growing seasons. Once the mixing is completed, the site should look like recently plowed farmland with evidence of the disposal removed. After using a plot for disposal of oil-soaked debris by landspreading, it can be revegetated with rye grass, etc. and converted to other uses or kept available for further oil spill contingency use. One problem

is that vegetation grown on a landfarming site should not be used for animal or human consumption because of potential trace metal contamination.

Another problem with this methodology at the present time is the lack of empirical data pertaining to site operations in colder climates. In the state of Vermont, the municipal sanitary landfill in Bristol has been designated as an acceptable landfarming site for oil saturated debris. Other sites may be developed in the state for landspreading within the near future. This site is not available for disposal by other states. However, the success of this program should be of interest to the State of New Hampshire for future possible landspreading in-state. Contact with Vermont can be made through:

Mr. Richard Valentinetti
Air and Solid Waste Division
Agency of Environmental Conservation
State Office Building
Montpelier, Vermont 05602
828-3395.

Landfilling

In the landfilling disposal process, oily wastes are placed on land, usually above ground to ensure ground-water protection and allow for detection of any leakage. The technique is anaerobic in nature and does not result in biodegradation of the wastes. The wastes are best applied in a solid form to eliminate hydraulic pressure effects.

Landfilling is conducted on a natural clay or silty clay liner with provisions for a leachate collection system. The clay should be of sufficient depth to inhibit migration with a permeability no greater than $1x10^{-7}$ cm/sec. Separation from the water table should be at least five feet.

A perimeter runoff diversion ditch is constructed to intercept surface runoff and prevent it from flowing onto the landfill area. To protect the ground water, a leachate under-drain and collection system is installed, which would include a storage/monitoring lagoon constructed of clay berms and a liner. Further protection is provided by a series of monitoring wells located at various points. Figure 6 shows a typical cross-section of a landfill site.

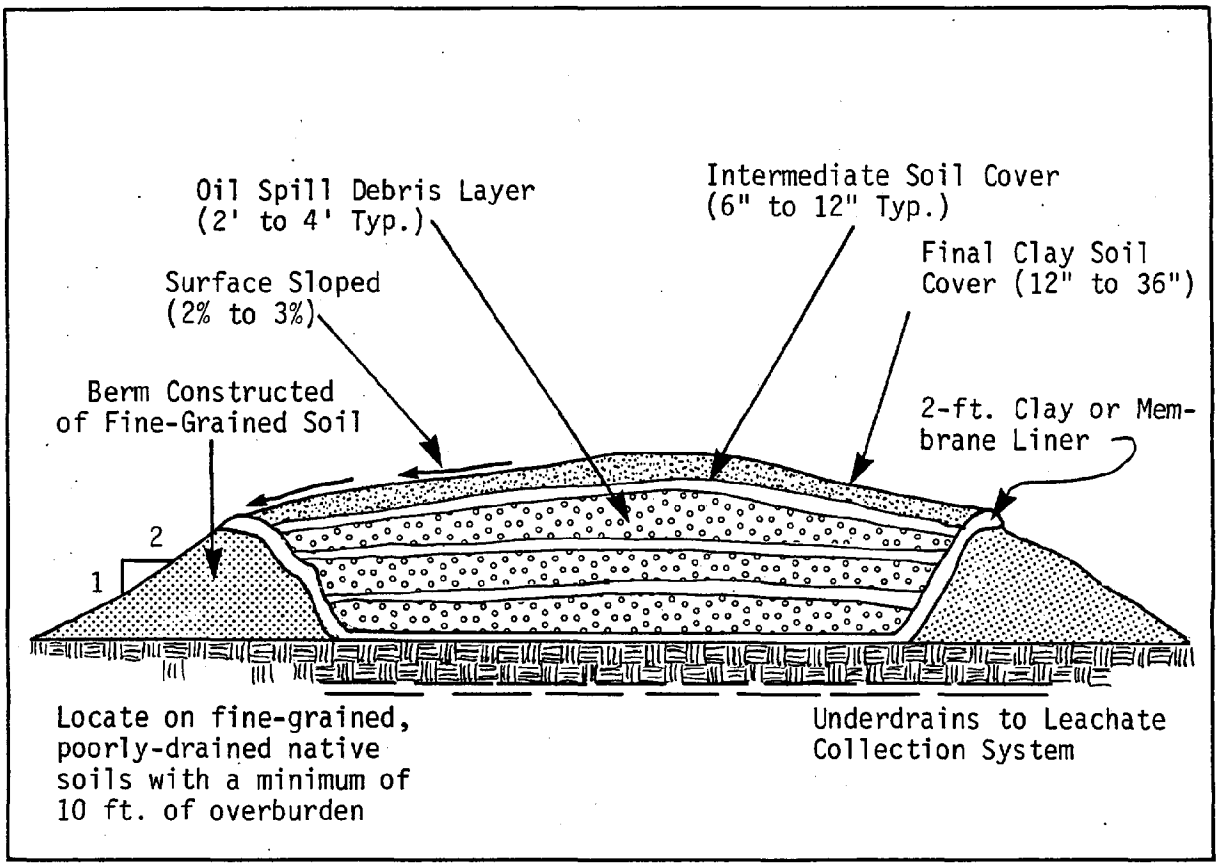


FIGURE 6. Cross-section of typical landfilling site.

Landfilling could take place at a local or regional sanitary landfill site, providing the clay and ground-water conditions could be met. It is the least costly disposal method currently available, yet it presents the greatest possibility for environmental degradation due to the long term nature of the presence of hydrocarbons at the site.

The final location of any landfilling site should adhere to the guidelines presented in Appendix A for the stockpiling sites, and in Section 1803.5-1 of the State of New Hamsphire's Oil and Hazardous Material Pollution Contingency Plan (1980).

Landfilling with Refuse

This process follows the same technical and site guidelines of above-ground landfilling except that it takes place at a secure landfill site where the oily debris is mixed in with the daily refuse. The literature indicates that the refuse acts as an absorptive agent, further preventing downward migration of the oil assuming an adequate impermeable cover is in place.

There are a number of potential problems that may arise if this method is utilized. First, if the landfill operator does not keep the general area covered daily with fine-grained material, the chances of downward oil migration increase.

Another problem is the possibility of refuse/oil ignition. This potential decreases over time but still remains. Any equipment operating in the refuse/debris area would need proper spark arrestors or exhaust pipes.

This method offers a minimum of site development costs if the other site criteria are presently being met at the site.. Typically, however, this is not the case, since the majority of landfills are not constructed in very satisfactory soil/water table conditions. Also, the State of New Hamsphire/EPA guidelines for land disposal of oily wastes recommend not mixing refuse with debris.

ASSESSMENT OF DISPOSAL METHODS

Table 9 summarizes the basic characteristics,, as well as a rough unit cost, for the various disposal methods. No disposal management program can rely on just one method due to the variability of oil spill debris. Purposefully left out of this table and ensuing discussion is the disposal of contaminated liquids. This is because there are no options to assess for this element of a disposal program. Liquids need separation. Separators currently exist. The only issue warranting consideration is whether this can be accomplished in or out-of-state. This subject is addressed in Chapter 3.

TABLE 9. Summary of oil spill debris disposal methods.

Method	Physical Site Needs	Operational Factors: Equipment Needs	Operational Factors: Flexibility	Environmental Factors	Estimated Costs
Incineration	--Loading area	--Front-end loader	--Stockpiling is necessary --Can use existing facilities	--Air emission controls necessary to meet standards --Removes over 80% of debris from waste stream thereby reducinc overall environmental threat.	$15-$30 per ton
Landspreading	--Runoff collection system --Monitoring wells --Possible liquid storage tanks	--Tractor --Rototiller, disc, harrow, or plow	--Adaptable to many areas --Requires no special skills --Access road may be req'd.	--Minimal hazards if runoff controlled --No danger to ground water --No spontaneous combustion problems --Land may be tied up for disposal only temporarily (2-3 yrs.)	$8-$15 per c.y. (not incluuding cost to construct access roads, if any)
Landfilling with refuse	--Leachate collection and treatment --Protective clay liner --Perimeter runoff system --Runoff collection system --Monitoring wells	--Use equipment available at landfill;generally a D-6 track dozer or larger	--For relatively small volumes of debris most landfills can readily accept --Many landfills available --Stockpiling usually unnecessary	--Improper landfill location may cause undue threat of oil pollution --Refuse can act as sorbent to impede flow of oil and contaminated water from site --Possibility of spontaneous combustion --Continuous long-term dedication of land to waste disposal	$3-$6 per cu. yd.
Landfilling (above-ground burial)	--Impervious dikes --Clay liner --Leachate collection and treatment --Monitoring	--1 D-8 sized tractor or larger. --1 backhoe may be necessary	--Stockpiling may be necessary --Access road may be required	--Oil will reamin undegraded at site for more than 100 years --A plot of land, heretofore unused for waste disposal, will be dedicated for such long-term usage	$3-$10 per cu.yd. (not including cost to construct access road, if any)

An effective disposal management program would deal with oil spill debris based on its different disposal characteristics. This means that a disposal method would be made available depending on whether the material was liquid, solid combustibles or solid non-combustibles.

The key to this approach is the presence of a storage/stockpiling area where the debris can be separated into the different waste streams. Once separation has taken place, the choice of disposal becomes more apparent.

Combustible debris should be disposed of through incineration. Non-combustibles require use of an acceptable land-disposal method: landfarming, landfilling with refuse, and burial. Landfarming offers the most complete disposal for debris less than 6 inches in diameter. However, due to the lack of concrete data for New Hampshire's climate, the Center feels that this method should be shelved in the short term. The most acceptable method for land disposal of non-combustible solids then becomes above-ground landfilling (not with refuse). To meet these objectives, the Center has based their recommended disposal plan presented in Chapter 5 on the following program approach:

1. During cleanup operations:

    (a) minimize the volume of debris through adherence to sound harvesting techniques;

    (b) recover as much oil on site through the use of skimmers and skimmer attachments on vacuum trucks; and

    (c) attempt to sort debris into combustibles and non-combustibles.

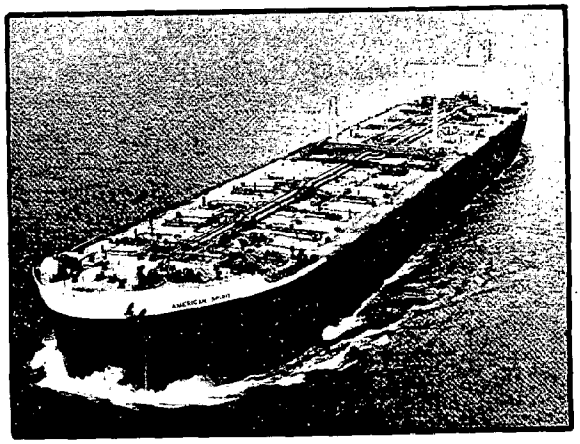
2. Provide for storage of oil-soaked solids at an engineered, single-purpose, debris stockpiling site.

3. Provide for contaminated liquid storage.

4. Dispose of contaminated liquids through oil/water separation.

5. Incinerate combustibles.

6. Dispose of non-combustible solids by landfilling at a secure landfill site.



3.

MEETING NEW HAMPSHIRE'S NEEDS

3. Meeting New Hampshire's Needs

Designing a management program to meet the oil spill debris disposal needs for New Hampshire is a function of a number of variables. These are: development of an estimated volume around which specific facilities can then be designed; definition of the technical and facilitative requirements necessary to meet the need of the design volume; and finally, assessment of the adequacy of both in-state and out-of-state facilities, where they exist, to handle the disposal requirements in a manner which reflects the current recommended methods of oil spill debris disposal as outlined in Chapter 2.

The establishment of these basic facts lays the ground work from which final program design begins. Since one of the financial goals of a program of this type is to utilize existing facilities wherever possible as a means of lowering costs, the assessment portion is a critical one. Once the available resources are determined, costs for adapting existing facilities and/or developing completely new facilities can be developed.

This chapter, then, lays this essential ground work. Included are a discussion of the design volume, a description of the facilitative requirements, an assessment of in- and out-of-state capabilities to handle debris disposal, and, in conclusion, an assessment of the ability of the State to meet its disposal needs within its borders.

HOW MUCH DEBRIS: THE TARGET VOLUME

There are two distinct types of oily debris disposal situations that the state of New Hampshire has to address through its management program. The first is the chronic, small spill that occurs every year in the state. These spills, if cleaned up, require little, if any, storage and handling and can be successfully hauled out of state for disposal or buried at a nearby secure landfill site.

The second, more complicated situation is the large, single event spill like the New Concord. Spills of this size severely tax the existing cleanup mechanisms available in the State and present an entirely different scenario to the cleanup coordinator responsible for spill management. The large volumes of contaminated liquids and oil-soaked debris require a degree of labor, equipment, and available storage and disposal sites that dwarf the requirements of the chronic, small spill.

During this study, the Center estimated the minimum amount of oil debris per year that can be expected to be generated in the state. An estimate was also made of the debris that could be expected from the total loss of a 35,000 DWT ship loaded with heavy oil (see Chapter 1). It is obvious that planning for a spill event of this size would be unrealistic due to the capital investment that would be required to develop the necessary storage and disposal facilities and the low frequency of occurrence of this scale of event. There is, however, a more realistic volume that lies somewhere between the average annual debris estimate and the large spill event. The Center has called this the "target volume." It reflects our best estimate of a workable figure around which the state should develop its management program. This volume provides the capacity for the expected yearly volumes as well as a spill the size of the New Concord. The respective volumes of these three scenarios are summarized below in Table 10.

In developing a program to manage these spill scenarios one must be aware of their inherent differences relative to storage and disposal. Whereas there may be enough existing capacity to handle storage and disposal of the smaller spills, the larger spill will require either: (a) total reliance on out-of-state disposal; (b) development of new or retrofitted storage and disposal facilities in-state; or (c) a mix of in-state and out-of-state disposal.

TABLE 10. Estimated Oil Spill Debris Scenarios in New Hampshire.

Item	Annual Minimum	Large Spill Event	Target Volume
Contaminated water	6,041 gal.	4,620,000 gal.	75,000 gal.
Combustible debris	1,098 cu.yd.	840,000 cu.yd.	12,000 cu.yd.
Non-combustible debris	40 cu.yd.	33,600 cu.yd.	3,000 cu.yd.

TABLE 11. Summary of Facility-Site Requirements for Oily Wastes Disposal of the Target Volumes in New Hampshire.

Disposal Methodology	Facility/Site Requirements
Storage of contaminated liquids	75,000 gallons (one tank)
Oil/water separation	400 gpm vertical tube coalescing separator 1/2 acre site Storage tanks (100,000 gals.)
Solids stockpiling site	2 to 2 1/2 acre site Primary containment Clay lined Surface runoff collection and treatment API oil recovery unit
Incineration	30 to 50 ton/day unit modified to handle oily waste 1/2 acre site
Landfilling	1 to 2 acre site Clay berms Leachate collection and treatment Runoff diversion

The choice between these three debris management options will be based on a combination of economics, technical feasibility, and applicability to the average and target volumes.

WHAT IS REQUIRED?

Table 11 summarizes the facility/site requirements necessary to handle the target volume. This summary assumes no existing facilities; it is just a theoretical estimate on what is needed for disposal. In the ideal scenario, one site would be developed that would incorporate all these storage/disposal methodologies, be centrally located to the coastal area and accessible by both highway and railroad. Due to economic, legal, site, and political constraints, however, this "ideal" scenario is practically unattainable. A more scaled-down approach would locate each methodology at existing facilities within the State and, when otherwise not feasible, transport wastes out of state to an approved oily wastes disposal facility.

Contaminated Liquids

This is a straightforward situation. The target volume estimate is for 75,000 gallons of contaminated liquids. This could easily be handled by a standard tank similar to those used at any oil terminal. There would be a need for space for vehicle entrance and movement, piping, a buffer zone, and fencing. A one-half acre site could easily handle these requirements.

Oil/Water Separation

In order to meet the Federal discharge requirement of 15 mg/l of oil, a coalescing type oil/water separator would be required. A unit with a capacity of 400 gpm would be capable of handling the 75,000 gallons of contaminated liquids. Storage tanks would be required to hold the liquids for gradual release into the separator. A total of one-half acre of land would technically be required for access of vehicles, a buffer strip, operations building and fencing.

Solids Storage

Assuming a 4 1/2-foot depth of solids stockpiling, the 15,000 yd^3 of estimated oiled solids would require 2.0 acres. In order to allow for the movement and access of vehicles and the construction of the other required elements, a total of 2.5 to 3 acres would be required.

The ideal site for this activity would include a primary and secondary clay containment system, facility runoff lagoon, oil/water separator, API oil-recovery unit, operations structures, and monitoring wells.

Incineration

Environmentally safe incineration of oily wastes can be handled at some existing municipal incinerators if mixed with the municipal waste to allow for proper feeding of the waste stream as well as the lowering of the high BTUs associated with straight burning of oily combustibles. This procedure is being followed at the Auburn, Maine incinerator in the disposal of spill debris in that state.

One 30- to 50-ton/day incinerator (such as a Consummat) could handle the combustibles from the estimated spill volume. It would take at least two weeks to handle all the burnables associated with such a spill, which is where the storage of solids plays an important role.

A half-acre site would be required for the incinerator, access road, handling area and a small amount of lined storage.

Landfilling

There will necessarily be some oily solids as well as the ash by-products from incineration that cannot be disposed through incineration or landfarming. These wastes will require burial, preferably above ground where monitoring can easily be undertaken, in a secure landfill site that meets the site criteria presented in Chapter 2.

It is estimated that a 1- to 2-acre site would be adequate for the burial of the non-combustibles and ash as estimated in the target volume. It could also handle the average annual volume for a long period of time until a larger spill is experienced. It is assumed that landfilling would take place at an existing landfill, which would not require the necessary access roads and buffer strips.

HANDLING THE TARGET VOLUME IN-STATE

Liquid Waste Storage

There are currently five locations in New Hampshire where contaminated oil could be stored following spill cleanup operations. These are:

C. H. Sprague Company (formerly ATC)
Old Dover Road
Newington, New Hampshire

-- Atlantic Terminal has a 5,000-barrel product tank (200,000 gallons) that might be available for storage pending corporate approval. There is also a 12,000-barrel (500,000 gallons) tank, previously designated for waste oil storage, that is currently mothballed. The tank might be useable in an emergency spill operation pending investigation of the tank's structural integrity.

Mobil Oil Corporation
Newington, New Hampshire

-- 5,000-gallon storage available

Jackson Waste Oil Company
Piermont, New Hampshire

-- Jackson has approximately 50,000-gallon storage in their existing tanks and access to 40,000 gallons for a total storage capacity of 90,000 gallons. The storage is currently utilized for Jackson's own products but it could be made available during a spill event depending on the utilization of the tanks at the time. An approximate cost for storage at this facility would be five cents per gallon if stored over six months.

Beede Waste Oil Corporation
Kelley Road
Plaistow, New Hampshire

-- Beede Corporation has storage for waste oil. However, initial contact with company representatives did not reveal the total amount.

Portsmouth Naval Shipyard

-- The shipyard has a 1,386,000-barrel capacity for recovered oil.

There is obviously a considerable volume of storage in the existing oil terminals located within the study region. However, this storage volume is dedicated totally to day-to-day storage and transfer of products at these terminals, making this volume unavailable for storage of contaminated liquids.

Oil/Water Separation

There are no licensed oil/water separators in New Hampshire that are approved to dispose of the contaminated liquids from an oil spill. There are, however, three separators currently in use at C.H. Sprague's terminal in Newington (formerly ATC). One, a Wemco unit, has a 200 gpm through-volume capacity and, according to George Pennock, Sprague's Environmental Engineer, might be able to handle separation of certain contaminated spill waters. Use of the separators would require:

a. Further negotiations between C.H. Sprague and the State of New Hampshire.

b. Alteration of C.H. Sprague's NPDES permit.

c. Lab tests of the spill water to see if they are acceptable to the unit.

Use of this separator is a future possibility for certain spills, but could not be relied upon for an in-state program due to the uncertainties involved.

Emergency Storage Sites

This is a new concept proposed for this study. Therefore, emergency sites as discussed in Chapter 2 would require location and subsequent review and approval by the Bureau of Solid Waste Management. When applicable, approvals by relevant municipal boards and officials will be required.

The Center did conduct a short site location study to preliminarily establish some sites within the coastal zone. Three sites were identified after careful review of soils and ground-water data for the area. Contact was made with the persons responsible for the land to request their tentative approval for use of the site(s). These sites are shown in Figure 7 and discussed below. Their use is included in the Recommended Plan (Chapter 5). Recommended site location methods to secure their use are presented in Chapter 6.

Site 1: C.H. Sprague diked area, Newington.

Site 1 is approximately 1.5 acres in size. It has a large perimeter dike and a smaller intermediate dike and is located at C.H. Sprague's Newington storage facility on the Piscataqua River, near the General Sullivan Bridge. The soils in this area are Buxton silt loams; marine soils that are moderately well-drained and consist of an upper layer of silt loam over a silty clay. Depth to bedrock is typically greater than six feet and seasonal high water table is between 1.5 and 2 feet. The site is not near any public water supply and is a long distance from the closest identified aquifer at Pease Air Force Base.

The site is presently unused and, according to Wesley Hallowell, C.H. Sprague representative, it has no near-term proposed usage and could be utilized for an emergency site as long as local approval occurs. The contact for this site is:

Wesley Hallowell
Terminal Division
C.H. Sprague Company
290 Gosling Road
Portsmouth, New Hampshire
436-4120

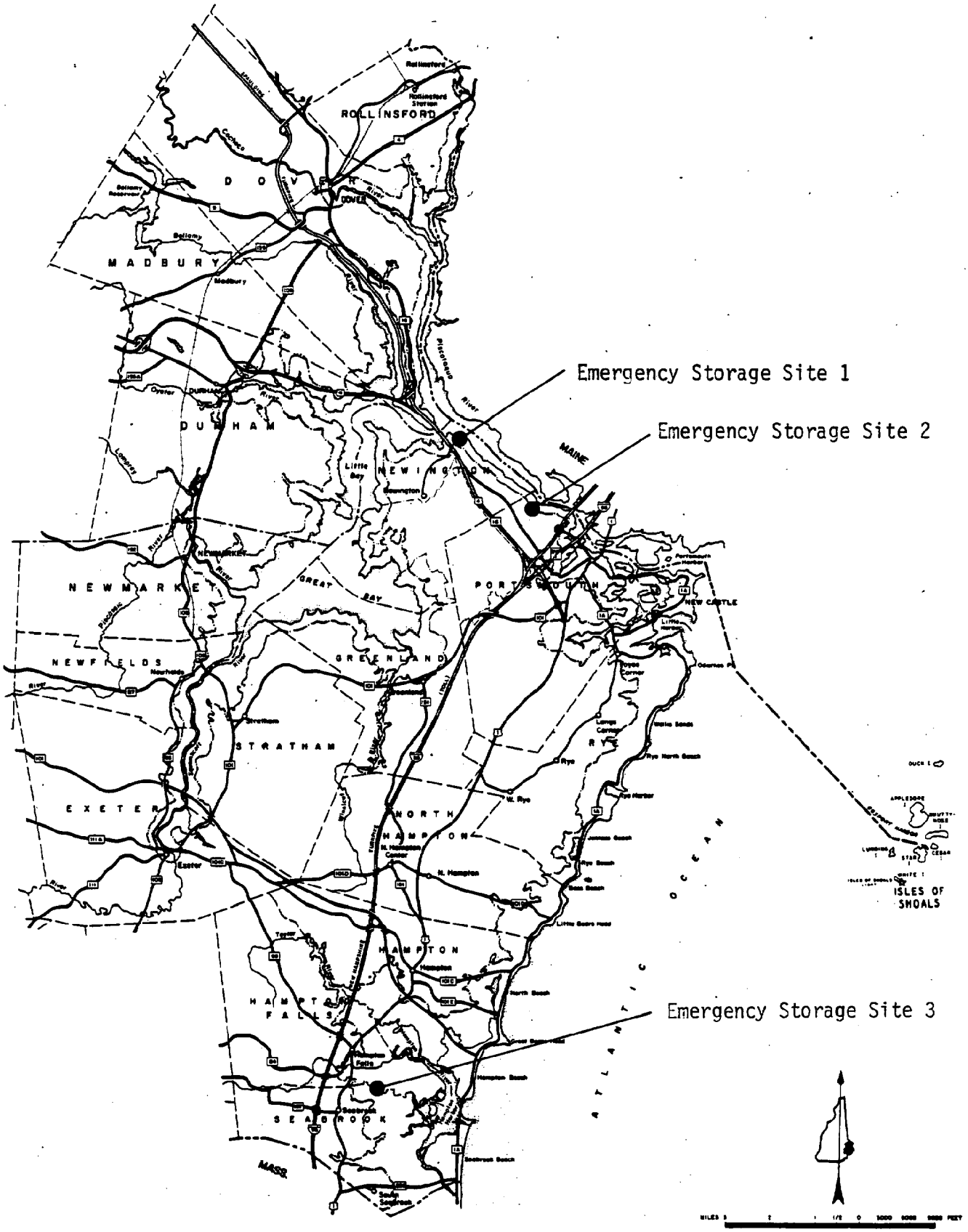


FIGURE 7. Location of Emergency Stockpiling Sites.

This site is ideally situated for its intended use, since it satisfies all the recommended siting criteria. Use of the area for emergency purposes will require some partial hay-bale diking to prevent oil from migrating into the unused portions of the site.

Site 2: Public Service Company diked area, Portsmouth.

Site 2 is located within the diked area for No. 1 tank of Public Service Company's storage tanks for their Newington Station power plant.

The area adjoins the Schiller Station. It has an area of approximately 0.5+ acre adjoining the tanks that can be utilized for emergency storage. The contact person at Public Service Company is:

Warren Harvey, Vice President
Production and Power Supply
Public Service Company of New Hampshire
Manchester, New Hampshire
669-4000

Mr. Harvey indicated that he would inform his personnel of the potential use of this site. In the event of a spill, the State OSC would call the above number and ask for the Dispatcher to find out the status of the site and gain entry.

There are no soils information for this site available from the Soil Conservation Service. A check should be made with Public Service to see if they have any available soils information. There are four monitoring wells above the area and four water supply wells used for makeup water at the Schiller Station plant. Hydraulically, these sites probably are not connected. The monitoring wells would provide a warning if necessary. In all other respects, the site satisfies the siting criteria. It is easily accessible by heavy equipment and is already diked. It is close to the Piscataqua River, but use of a liner should easily protect it.

Site 3: Public Service Company, Seabrook Nuclear Power Station.

This site is also under Mr. Harvey's jurisdiction. He indicated that the construction parking lot could be made available for an emergency site as well as other unused land at the facility. The actual amount of land available is unknown. The soils in this area are typically fine sandy loams overlying more coarse sands and gravels. There are, however, a number of pockets of Elmwood soils which are less well-drained and overlie silts and clays. Any soils information available at Public Service should be checked. If at all possible, any storage site should be located on the poorly drained Elmwood soils, since any break in the integrity of the liner could cause rapid migration of oil in the highly permeable soils that predominate. There are no major aquifers at this site and no public wells close by.

Alternative Sites

There are five other possible sites that have been field-checked and offer the possibility for emergency storage during a large spill event if the above-mentioned sites are not available. The following three sites are under ownership of the New Hampshire Department of Resource and Economic Development.

(a) Fort Stark, New Castle

There is a 0.5+ acre flat area at the entrance to the facility that could be utilized. The access road is through a private road and would require local approval.

(b) Wallis Sands Beach State Park, Rye

The parking lot is large and could easily be utilized if needed, especially during the 9-month offseason.

(c) Hampton Beach State Park, Hampton

The parking lot is in excess of 30 acres and would offer an important storage site in the event that oil was spilled or spread this far south.

(d) Pierce Island

The fourth site is Pierce Island in the Piscataqua River and is owned by the City of Portsmouth. There are two small locations on the island: the parking lot for Four Tree Island, and a small 0.25 acre site on the right before the treatment plant. Use of this facility would require negotiations with the City of Portsmouth through Cal Canney, the City Manager.

(e) Near Hilton Park

The fifth site is the area on the south side of Hilton Park which is under the jurisdiction of the New Hampshire Department of Public Works and Highways. This site has been used for similar oil cleanup purposes in the past. The soils are silt loams. The site offers an accessible location and should be considered as a strong alternative.

Other Possibilities

The list of proposed sites is by no means exhaustive. The sites are the best that could be identified and visited within the time and budget constraints of this study. There are numerous other public-owned (State and local) areas throughout the coastal region that could be utilized as well. Any of the existing sanitary landfills identified in the section could be used for emergency storage. These sites are listed in Table 12. Also, the Rights-of-Way Division of the Department of Public Works and Highways is developing a list of rights-of-way and maintenance yards that might warrant consideration as emergency stockpiling sites. The sites proposed should suffice as long as all the approval and agreements can be worked out and the site criteria are met. The emergency storage site location guidelines in Appendix D should be followed in the location of other sites if necessary.

Long-Term Storage Sites

Because of its relative newness in the field of oil spill debris management, long-term storage sites have not been developed in the State of New Hampshire. The Center investigated a number of sites during this study that offer strong possibilities for use as storage sites. The investigations were brief consisting of a

TABLE 12. Municipal Waste Disposal Facilities in Rockingham and Stafford Counties.

ROCKINGHAM COUNTY

City/Town	Owner-ship	Oper. By	Type of Facility SLF	OD	TP	BD	RR	INC	Tons/Yr Estimated Waste Gen.	Remarks
Atkinson	Private	Private			X				2,270	Uses Pvt SLF in Hampstead
Auburn	Public	Public				X		X	1,810	INC Bldg up. INC in place
Brentwood									1,280	Uses Kingston Landfill
Candia	Public	Public				X		X	1,850	OD not closed
Chester	Public	Public	X			X			1,370	
Danville									840	Uses Kingston Landfill
Deerfield	Public	Public	X			X			1,170	
Derry	Public	Public	X			X			18,400	Brush dump approval 12/31/79
E. Kingston									710	Uses Kingston Landfill
Epping	Public	Public	X			X			1,850	Going w/Lamprey River Regional
Exeter	Private	Private	X			X			11,630	Under orders
Fremont	Public	Public							910	Uses Kingston Landfill
Greenland	Public	Public		X					1,470	Durham-UNH Project
Hampstead	Public	Public			X	X			2,560	Uses Pvt SLF in Hampstead
Hampton	Public	Public	X			X			10,300	Under orders
Hampton Falls	Public	Public				X		X	1,030	
Kensington	Public	Public	X			X			2,860	
Londonderry	Private	Private	X			X			13,050	
New Castle									640	Uses New Hampton Landfill
Newfields									610	Uses Newmarket Facilities
Newington									450	Uses North Hampton Landfill
Newmarket	Public	Public		X		X			2,530	Brush dump approval 12/31/79 Going w/Lamprey River Regional
Newton	Public	Public			X				2,150	Uses Kingston Landfill
N. Hampton	Private	Private	X			X			2,520	Coakley Pit (Newington)
Northwood	Public	Public		X					1,350	TP being built Durham-UNH Project
Nottingham	Public	Public				X	X	X	1,010	
Plaistow	Public	Public	X			X			6,200	
Portsmouth									24,350	Uses N. Hampton Landfill
Raymond	Public	Public	X			X			3,350	
Rye	Public	Public	X			X	X		3,200	
Salem	Public	Public	X			X			28,400	Under orders
Sandown	Public	Public	X			X			1,090	
Seabrook	Public	Public			X				6,000	TP to SCA Services, Amesbury
S. Hampton									480	Uses Newton
Stratham	Public	Public		X		X			1,500	Durham-UNH Project
Windham	Public	Public					X	X	3,470	

STRAFFORD COUNTY

Barrington	Public	Public		X					2,560	Durham-UNH Project
Dover	Public	Public	X			X	X		25,200	Voluntary Recycling Going to Turnkey LF, Rochester
Durham	Public	Public				X	X	X	3,420	Refuse to Energy Project w/UNH and 12 towns
Farmington	Public	Public	X			X			2,900	
Lee	Public	Public			X	X	X		1,350	Uses Kingston Landfill Durham-UNH Project eventually
Madbury									600	Durham-UNH Project
Middleton									430	Uses Wakefield Facilities
Milton	Public	Public	X			X			1,620	OD not closed
New Durham	Public	Public	X			X	X		760	
Rochester	Public	Public	X			X			22,300	Under order Going to Turnkey LF, Rochester
Rollinsford	Public	Public	X			X			1,630	OD not closed
Somersworth	Public	Public	X			X			11,400	TP authorized 5/10/78
Strafford	Public	Public		X		X			1,000	Durham-UNH Project

KEY:

SLF = Sanitary Landfill; OD = Open Dump; INC = Incinerator; BD = Brush Dump; RR = Resource Recovery
TP = Transfer Point

Source: New Hampshire Bureau of Solid Waste Management.

review of existing soils and ground-water data for each site and a site visit. In order to develop these sites, more detailed studies would be required and local and State approval would have to be sought. The sites are described below:

(a) C.H. Sprague's diked area in Newington (Emergency Storage Site 1). Though smaller than the recommended size, this site is a good candidate due to its ease of access, soil and ground-water conditions, present land use, and the fact that it is about the right size and already diked, which would substantially lower development costs (a clay liner would still be required). Wes Hallowell indicated that C.H. Sprague might consider leasing the site for use as a storage/stockpiling site as long as they maintain ownership for possible future uses. He suggested that a proposal for its use be made to the company by the State to start discussions on the subject. Some preliminary site investigation consisting of soil borings and a site overview would be necessary to ascertain if the site is worth further study.

(b) Turnkey Landfill of Rochester. Discussion with Pat Banfield of Turnkey revealed that he would make a small site available for storage/stockpiling in the existing site or the proposed new site that is presently under engineering stuides. Mr. Banfield would lease the site to the state or the oil companies, who would be responsible for site development costs and permit approval from the Bureau of Solid Waste Management and the City of Rochester.

This site has clay available which would lower the development costs. It is relatively accessible, but slightly out of the project area, and would require longer transportation to and from the site than a more centrally located one such as the Sprague site. It is a strong candidate due to its location on a site presently in use for disposal purposes.

(c) New Hampshire Urban Forestry Center, Portsmouth. The Urban Forestry Center is a large piece of land (160 acres) bordered by Route 1 and Elwyn Road in Portsmouth and under ownership of the Department of Resource and Economic Development. It is centrally accessible to the major areas of concern and could be developed in such a way that it would be out of view from local traffic. A major portion of the site is underlain by sand and gravel deposits which are not the preferred soils. However, there are areas of fine sandy loams and some silty clays indicated on the old Soil Conservation

Service soil maps. These areas may be suitable for site location. The site development costs would be significant here because of the clearing, site preparation, and road development that would be necessary. Also, public and State response to such a proposal may be negative. It should not be discounted as a possibility, however.

There are obviously other candidate sites that could be considered. The Bureau of Solid Waste Management feels that there are four other landfill sites that might qualify. These are:

1. Madbury: town special-purpose landfill (possible aquifer recharge area)

2. Newmarket: town special-purpose landfill (former sanitary landfill)

3. North Hampton: Coakley pit (private landfill)

4. Exeter: town sanitary landfill (secure landfill with groundwater monitoring in possible aquifer recharge area)

Other options are the small State-owned rights-of-ways that are the property of the Highway Dept. The Rights-of-Way Division is presently developing a list of all parcels greater than two acres that may be available for this purpose.

One possibility for site location that was investigated was Pease Air Force Base in Newington. Correspondence was sent to the Base Commander, Colonel Lloyd A. Brown, describing the project and the storage/stockpiling concept. Colonel Brown responded that:

> "Unfortunately, this base does not have any facilities that could be used for this purpose. Our defense mission requirements are such that we already are using all available resources on this base that would be suitable for the purposes you propose. Even if this were not the case, it is doubtful we could assist you. Present guidance restricts use of our base property for storage of waste to that generated by the installation itself. I am sure you can understand this restriction when you examine the sensitive nature of our mission and the large number of military families that reside on Pease."

If none of these candidate sites are suitable, then further site location studies would be necessary. A review of the soil types in the study region shows that there are a number of soil groups that satisfy the surficial geology criteria for the location of

stockpiling, landfarming, or burial sites. These soil types are:

Biddeford silty clay loam
Belgrade silt loam
Buxton silt loam
Elmwood fine sandy loam
Raynham silt loam
Scitico silt loam
Suffield silt loam
Swanton fine sandy loam
Whatley fine sandy loam

These soil types are typically underlain by deep marine and lacustrine deposits scattered throughout the study region and would provide the required natural barrier to outward oil migration.

Incineration

Table 13 lists the location and type of existing public and private municipal incinerators in the State. Due to the high BTUs associated with combustible oily wastes, most municipal incinerators would not be able to handle their combustion. An exception to this are the Consumat Units. These incinerators could handle oily waste through minor modificaion of the units, specifically by mixing the oily waste into the municipal waste stream. The units are heavier duty than other commercial units currently in use throughout the State.

TABLE 13. Location of Incinerators in New Hampshire.

Town	No. of Incinerators	Type	Owner-ship	Suitable for Oily Waste?
Meredith	2	Kelley	Public	No
Wolfeboro	2	Kelley	Public	with Mod.
Northumberland	1	Env. Con-trol Prod.	Private	No
Bridgewater	1	Kelley	Public	No
Plymouth	1	Combus-tion Eng.	Public	No
Litchfield	1	Consumat	Public	with Mod.
Pelham	2	Comtro.	Public	No
Wilton	1	Consumat	Public	with Mod.
Canterbury	1	Kelley	Public	No
Pittsfield	1	Kelley	Public	No
Sutton	1	Kelley	Public	No
Auburn	1	Kelley	Public	No
Candia	1	Kelley	Public	No
Hampton Falls	1	Keewanee	Public	No
Nottingham	1	Kelley	Public	No
Windham	1	Comp. Eng.	Public	No
Durham	3	Consumat	Regional (Lamprey)	Yes
Portsmouth*	4	Consumat		Yes

*Under planning and construction

Source: Personal Communication with New Hampshire Air Resources Agency, 1981.

The two most promising Consumat installations that are centrally located are the Lamprey Regional Solid Waste Cooperative at the University of New Hamshire and the City of Portsmouth units currently under construction at Pease Air Force Base. A discussion of these installations is presented below.

(a) Lamprey Regional Units

The Lamprey Regional Solid Waste Cooperative currently has three, 36 tons per day, Consumat, bi-level type units installed adjoining the power plant at the University of New Hampshire in Durham. Two units are currently being used with the third on stand-by. At the present time, the capacity is being utilized by the existing waste stream from the surrounding communities.

There is a tipping floor that measures 110 feet by 40 feet by 36 feet high with a central drain that goes to the municipal treatment plant. There is no storage area other than the tipping floor. A front-end loader is on hand to load the solid waste.

The Lamprey units recently incinerated spill debris from a spill off the Massachusetts coast. Subsequent testing indicated that the units could handle future incineration of oily debris at a rate of approximately 12 tons/day.

The hydraulic loading capacity for the system is designed for two units and one boiler. Lamprey is planning to add additional hydraulic capacity, however, which would allow for use of all three units. The steam is sold to the University of New Hampshire whose heating plant adjoins the facility. Use of all three units to handle oily debris would probably result in excess steam generation which would have to be wasted.

The Lamprey facility appears to have sufficient capacity to handle the anticipated combustible waste stream in New Hampshire. Its use will necessitate further negotiations between the State and the Operations Committee, modification of their existing air quality permit, adherence to certain technical requirements and some form of cost-sharing. These issues are presented in Chapter 6 of this report.

City of Portsmouth Units

The City of Portsmouth is presently constructing four 50-ton/day Consumat Units at Pease Air Force Base. The scheduled completion date for the facility is July 1982. Discussion with Mr. Jack Harrison of Global Development Engineering, Inc., Salem, Massachusetts, the designer of the project, indicated that these units

could handle oil spill debris. The only problem would be storage, since there is no available land at the site for the storage of oil spill debris awaiting incineration. An incineration schedule would have to be developed after spill debris has been stockpiled at an appropriate site. Debris would then be loaded onto trucks at the storage site and transferred to Pease for incineration when scheduling allowed.

Contact was also made with Cal Canney, Portsmouth City Manager, to discuss possible cooperation between the State and the City in the development of oil spill debris incineration capabilities through use of the City's new facility. Mr. Canney felt that an agreement could be worked out if the State was willing to contribute to the construction of their fourth unit. This would involve approximately $500,000 in State funds.

Landfilling

There are no approved sites for the landfilling of oil spill debris in New Hampshire. Chapter 1 pointed out that disposal has taken place at various landfills on a case-by-case basis and after approval by the Bureau of Solid Waste Management. Guidelines for debris disposal have been prepared by EPA in conjunction with the BSWM and are included in the State's oil spill contingency plan.

Two of the landfill sites where debris disposal has taken place in the past, and that offer the possibility for future utilization are Turnkey Landfill of Rochester, Inc., and the Coakley landfill site in Greenland. Both sites are also candidates for long-term storage.

Turnkey Landfill of Rochester, Inc.: This private landfill currently operates a 65-acre site for the disposal of municipal solid wastes. They have handled oil spill debris in the past on a case-by-case basis after receiving documentation of the components of the spill material and a permit from the Bureau of Solid Waste Management.

The soils at the site are Hinckley loamy sands and Podunk fine sandy loams. A three foot clay liner is being constructed and ground-water monitoring is in place. These precautions should allow for safe disposal of oil spill debris in the future, providing the clay layer remains intact and monitoring is continually undertaken. Also, a leachate collection system is being developed to further secure the site.

However, there is one critical aspect of this site's location: It is located within a major aquifer identified in the Corps of Engineers Southeastern New Hampshire Water Resources Study (March 1981). The study estimated that the aquifer had a sustained yield of 0.31 mgd and that it could be developed as a public water supply if further testing revealed that: (a) the aquifer is hydraulically connected to the Cocheco River, and (b) the Turnkey site has not, and will not in the future, seriously impact the water quality.

Further test borings would be necessary to determine these characteristics of the aquifer. Before the State proceeded to use the facility in the future, the site's hydraulic connection, if any, to the underlying aquifer should be determined as well as the existing water quality. If further study reveals that the site does not pose a threat to the aquifer, or that the existing water quality is not adequate for a public water supply, then use of the Turnkey site for burial of oily wastes could be pursued.

Mr. Pat Banfield, owner of Turnkey, indicated that the site could accept documented, solid oil-spill debris material in the future. Turnkey is investigating the development of a large clay site and is currently undertaking engineering studies. This type of site would be more acceptable for oil spill debris disposal. Mr. Banfield indicated that Turnkey might consider incorporating a stockpiling site at the new clay site if the market for debris disposal were there and/or an agreement could be worked out with the State.

Coakley Landfill: The Coakley pit is owned by Ron Coakley and located in the town of Greenland. As with Turnkey, this site is located in a gravel pit; soils which are not usually considered acceptable for spill debris disposal. With proper engineering, however, they may be utilized.

Ron Coakley indicated that he has handled oil spill debris at his site in the past. Spill debris from the New Concord spill intended for temporary storage at the site was eventually covered and buried, a practice often utilized in the case-by-case debris disposal approach. Mr. Coakley indicated that he could set aside the necessary 2 acres on this property in an area of 20 to 30 feet of sandy loam overburden. He has clay available for a liner.

The Coakley pit is located approximately 3/4 mile and 1 1/2 miles south of two identified aquifers. Recharge to both aquifers appears to be a combination of precipitation and lateral ground-water movement from the north. It appears that the site poses a minimal threat to the water quality of these aquifers, especially if ground-water flow through the pit is in a north to south direction towards Hampton River. Use of this pit for storage

and/or ultimate disposal would require further detailed site investigation.

Aside from these two sites are the other areas suggested in the preceding section on long-term storage. Since both landfilling and storage require similar site investigations, one study could identify a site or sites that are suitable for development if the suggested areas prove unsuitable.

OUT-OF-STATE DISPOSAL

One apparently obvious solution to the disposal problem facing New Hampshire is to utilize out-of-state resources. This has been done quite frequently in the past. From a capital investment standpoint it offers a low-cost alternative to the development of new facilities or modification of existing ones. However, there are a number of constraints to this approach.

First, adjoining state's policies on the transportation and disposal of oil spill debris may hinder utilization. Second, transportation costs to out-of-state facilities may cancel any benefits accrued from their utilization. Finally, the sheer volume of debris involved in a large spill would make the logistics of out-of-state disposal of solids highly improbable. Therefore, planning for out-of-state disposal for the smaller spill volumes may leave the State unable to handle a larger spill event in the future.

New England State Policies

Interviews were conducted with each New England State's representatives responsible for managing oil and hazardous wastes. The results of this survey are described in detail in Appendix F.

In general, all the states except for Maine were interested in a regional program for the disposal of oil spill debris since none of them presently have complete in-state capabilities. No state has an approved landfill site and follows the practice that has been New Hampshire's mainstay: case-by-case disposal at municipal and private landfill sites.

Massachusetts is the only state that has licensed oil/water separation facilities that are approved to handle oil-contaminated liquids. Maine and Connecticut are actively undertaking in-state incineration; the others send their combustibles out-of-state.

Massachusetts, Vermont and Rhode Island consider oily wastes as hazardous. Massachusetts, through which transportation often occurs, requires that oily wastes be hauled by a licensed hazardous-waste dealer and have to be manifested. This significantly increases the costs of out-of-state disposal to approved hazardous waste facilities in New York and New Jersey.

The feeling of most states at the present time is that they will handle their own wastes in-state wherever possible with the remaining wastes trucked out-of-state to licensed disposal facilities.

An exception to this has occurred at the Capuano Brothers landfill in Rhode Island. The state has authorized debris disposal from Massachusetts on a case-by-case basis, and might consider similar arrangements with the State of New Hampshire. This would require negotiations between the New Hampshire and Rhode Island officials. Again, transportation costs would be high due to the distance involved and the requirements of Massachusetts. Further contact on use of this facility should be made with:

Department of Environmental Management
Steve Fougere, Chief
Division of Enforcement
83 Park Street
Providence, Rhode Island
(401) 277-2284

Available Facilities

There are secure disposal options for contaminated liquids at any of the licensed facilities in Massachusetts. Incineration can probably take place at the Auburn, Maine municipal incinerator, assuming the necessary agreements between the State of New Hampshire, City of Auburn, and State of Maine are established and a storage site is constructed in New Hampshire. There is a slight possibility of utilizing the Capuano Brothers landfill in Cranston, Rhode Island for ultimate disposal. The only other secure landfill options are in New Jersey or New York. Appendix G provides a more complete list of available hazardous waste facilities out-of-state.

One final note. IT Corporation has proposed a multi-faceted hazardous waste facility (with a secure landfill) for development in Massachusetts. If constructed, the site would accept hazardous waste from out-of-state. At the present time, local approval of a site is being sought throughout the state. Massachusetts is a home rule state, and approval of such a facility may be next to impossible.

evaluation of existing disposal options

Table 14 summarizes the most obvious disposal options, both in- and out-of-state, that have come to light during the study. Treatment of contaminated liquids and incineration of combustibles are the best uses of out-of-state facilities. Both can be accomplished within a realistic transportation distance, and the facilities are approved for oily debris disposal in their respective states.

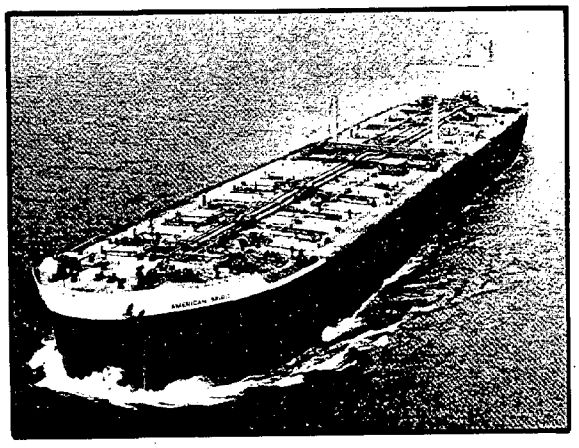
TABLE 14. Summary of in-state and out-of-state disposal facilities.

Disposal Method	In-State Facilities	Out-of-State Facilities
oil/water separation	--Some possibility for case-by-case at C.H. Sprague's terminal in Newington (formerly ATC)	--Recyling Industries Braintree, Mass. 02184 (617)848-0612
		--Jet Line Pollution Control, Stoughton, Mass. 02072 (617)843-2829
incineration	--Lamprey Regional Solid Waste Cooperative, Durham	--Auburn, Maine municipal incinerator
landfilling	--Turnkey Landfill of Rochester	--Slight possibility at Capuano Brothers in Rhode Island (contact Rhode Island Dept. of Health).
	--Coakley Pit, Greenland.	--CECOS International, Inc. P. O. Box 619, Niagra Falls, N.Y. 14302 (716)731-3238
		--SCA Services P. O. Box 200 Model City, N.Y. 14107 (716)754-8231

Landfilling out-of-state is the major roadblock. The New York facilities are over 500 miles away, and use of the Rhode Island facility is possible, yet questionable.

There are some definite options for a complete in-state program that have become apparent through this study: incineration at Lamprey, landfilling at Turnkey Landfill (or Coakley), and a possible use of the C.H. Sprague separator in Newington. Except for this separator, the other options have adequate capacity to handle the anticipated spill debris in New Hampshire with only minor modifications. Fortunately, the oil/water separation is not a problem due to the presence of licensed facilities close by in Massachusetts.

Chapter 4 presents a cost comparison of these two disposal management options to better portray the differences between them. This process is the basis upon which the recommended plan is founded.



4.

WHAT DOES IT COST?

4.
What Does It Cost?

No matter how technically feasible a debris management option may be, the cost of utilizing that option may prove prohibitive. On the other hand, an option may be cost-effective, but be unavailable due to local pressures and/or the restrictions placed by hazardous waste laws in adjoining states.

Chapter 3 established that disposal of oil spill debris can theoretically take place either in-state or out-of-state. This depends, however, on the modification of existing facilities in some cases, attainment of local and state approvals for most options, and in the case of in-state oil/water separation, development of a new facility.

Still, a key consideration in choosing a management approach is cost. The Center has developed estimated costs for the three management options that are available to the state: complete in-state program, out-of-state disposal or a combination of in and out-of-state disposal. Costs have been developed for transportation and disposal of the various waste streams, as well as for modification measures when necessary.

A word is necessary here about land costs. This is a highly variable figure and is left out of this assessment. The assumption is that land will be available for a minimal lease cost from public or private land. A check with local realtors in the coastal region revealed that land prices could range from $20,000/acre in the Portsmouth/Newington and coastal areas to as little as $500-$1000/acre in the surrounding rural towns. If low cost leasing is unavailable, then land costs could conceivably change the choice of management options.

STOCK PILING SITES

The necessity for some form of environmentally safe site to store and handle oil spill debris has been a constant theme of this study. A storage/stockpiling site allows for separation of wastes so that further volume reductions can occur. Since approximately 80 percent of the solids that result from spill cleanup activities are combustible, separation of debris results in a significant reduction in the volume that has to be disposed of in a secure landfill.

Even if out-of-state disposal is the management option chosen, storage availability will be necessary. This may be accomplished, for smaller spills, through reliance on the emergency sites. For a larger spill, the logistics of emergency sites becomes unmanageable due to the volume of debris involved, and a larger, more secure site becomes necessary.

Yet, the emergency concept does offer a solution to the problem of storage in the near term until a long-term site can be developed. In view of this, the Center has developed a cost estimate for the materials required for utilization of the emergency cells. This estimate is presented below and is followed by an evaluation of the long-term site.

Emergency Stockpiling Sites

Table 15 summarizes the estimated costs for materials, transportation and labor for one 20 ft. by 100 ft. emergency cell. Because of its resistance to hydrocarbon breakdown, use of the 30-mil PVC liner is recommended. These materials would have to be stockpiled in the Portsmouth area for ease of access and use.

TABLE 15. Cost Estimate for an Emergency Storage Cell

Item	Amount Required	Unit Cost	Total Cost
Hay bales	120	$1.50	$180.00
Sawdust bags	10	2.00	20.00
30-mil PVC liner	2000 sq. ft.	.20	400.00
6-mil polyethylene cover	1 roll (20'x100')	50.00	50.00
Labor and transportation (estimated)		150.00	150.00
TOTAL CELL COST			$800.00

Long-Term Storage/Stockpiling Sites

The emergency sites will provide the State with interim storage and stockpiling. For the long term, however, it is recommended that some sort of permanent site be developed within the coastal region. This can be accomplished through a number of different methodologies which will be explored in detail in Chapter 6.

For purposes of cost analysis, an estimated breakdown of site development costs has been prepared for a 3-acre site. This estimate does not include land costs as this value is highly variable depending on where the land is purchased, and whether it is to be developed at an existing landfill or other industrial site in conjunction with cost participation by the private sector.

This site would have a useful storage area of 400 feet by 190 feet (1.75 acres). The overall site would be approximately 480 feet by 290 feet to allow room for dikes, perimeter runoff, a buffer, access road, and future development of an API separator (Figure 5 in Chapter 2) and a 30 foot by 200 foot by 10 foot deep lagoon for runoff collection and storage. The lagoon could be sized for long-term storage so that the lagoon could act like a gravity type separator with oil being skimmed off the surface.

TABLE 16. Cost estimate for a three-acre, bentonite clay-lined storage/ stockpiling site (1979 dollars).

Item	Amount Required	Unit Cost*	Total Cost
Site clearing and preparation	3 acres	$4,000.00	$ 12,000
Perimeter drainage	1400 ft.	2.00	2,800
Bentonite-clay liner	95000 sq.ft.	1.10	104,500
Sand and gravel base course (two feet)	5700 cu.yd.	4.00	22,800
Dike construction	1180 ft.	20.00	23,600
Monitoring wells	6	200.00	1,200
Gravel access road	100 ft.	8.00	800
Engineering and contingencies	--	15%	25,155
TOTAL COST			$192,855

*Source: SCS Engineers, 1979.

If the surface water criteria could not be met from the discharge, then a coalescing separator would have to be installed. The lagoon/separator could theoretically be utilized for oil/water separation purposes for contaminated liquids depending on the water level of the lagoon. This would warrant further feasibility studies if this option were chosen. The following tables list the estimated costs associated with development of a storage/stockpiling site. Table 16 lists the costs for a bentonite-clay lined site; Table 17, a marine-clay lined site. Table 18 lists the costs for the associated support facilities.

TABLE 17. Cost Estimate for a Three-Acre, Native, Clay-lined Storage Stockpiling Site

Item	Amount Required	Unit Cost*	Total Cost
Site Clearing and Preparation	3 acres	$4,000	$12,000
Perimeter drainage	1,400 ft.	2.00	2,800
Clay liner	95,000 sq. ft.	.15	14,250
Sand and gravel base course	5,700 cu. yd.	4	22,800
Dike construction	1,180 ft.	20	23,600
Monitoring wells	6	200	1,200
Gravel access road	100 ft.	8	800
Engineering and contingencies		15%	11,620
TOTAL COST			$89,070

*Source: SCS Engineers, 1979.

TABLE 18. Cost Estimate for Support Facilities for a Long-term Storage Site

Item	Amount Required	Unit Cost*	Total Cost
Runoff Lagoon excavation	1000 cu. yd.	$1.50	$1500
clay liner	11000 sq. ft.	.15	1650
dike construction	460 ft.	20.00	9200
API Oil Recovery Unit	1	15,000	15,000
Engineering and contingencies		15%	4,000
400 gpm vertical coalescing separator	1	34,000	34,000
TOTAL COST			$65,350

*Source: SCS Engineers, 1979.

These costs are rough estimates at best. A detailed engineering and cost study would be necessary once a site was located. Also, other options may be possible that could lower the cost of the site. The C.H. Sprague site in Newington would reduce costs since it is already prepared and has dikes in place. This, and other options are discussed at the end of this chapter.

IN-STATE DISPOSAL

There is currently adequate capacity in the state to handle disposal of the estimated debris volume through above-ground burial (landfilling) of non-combustibles and incineration of combustibles. Contaminated liquid storage is available at five locations in the state, although the exact volume is highly variable depending on tank usage at the time of the spill. Adequate oil/water separation may not be available at present which would require construction of a new facility.

The landfill and incineration sites identified in Chapter 3 are not approved by either the State of New Hampshire or EPA for the purpose of handling oil spill debris. It is the opinion of the Center that these sites could be utilized through modification that would bring the sites in compliance with existing local, State and Federal guidelines. This assumption forms the basis of the ensuing cost estimate.

Contaminated Liquids

Use of the Wemco separator at C.H. Sprague's Newington facility for oil/water separation is a possibility. However, there are some obvious hurdles to overcome before its use could become a reality. Therefore, development of a new separator is assumed for purposes of the cost assessment.

The separator is assumed installed at the long-term storage/stockpiling site. This would require installation of a 75,000 gallon storage tank to store the waste for future separation. The costs for this method are summarized in Table 19.

TABLE 19. Cost Estimate for In-state Oil/Water Separation

Item	Capital Cost
400 gpm oil/water separator	$34,000
75,000 gallon storage tank	26,000
Engineering and Contingencies (15%)	9,000
TOTAL COST	$69,000

Source: SCS Engineers, 1979.

If it is assumed that the separator will handle the target volume and the estimated annual spill volume for the next 20 years, then the per gallon disposal cost can be assumed to be 35 cents. This figure is utilized in the comparative analysis.

Incineration

In-state incineration is a definite possibility at Lamprey Regional Solid Waste Cooperative in Durham. Certain technical requirements will have to be met and agreements reached between the state and Lamprey concerning cost-sharing, tipping fees, and handling. Also, air quality permits will require revision to handle oily debris incineration. These implementation measures are discussed in detail in Chapter 6.

For purposes of the cost assessment, a tipping fee of $30/ton has been assumed. This reflects one of the cost agreements suggested by the Operations Committee. If a lump sum payment by the state becomes part of the cost-sharing, then the tipping fee would be lowered resulting in a long-term fee close to the assumed $30/ton.

Landfilling

The Center has discussed with Pat Banfield of Turnkey Landfill of Rochester, Inc. the possibility of future landfilling of oily debris at his approved landfill. Disposal has been conducted in the past and could continue in the future if site conditions met the recommended guidelines for above-ground burial of oil-soaked debris.

It is estimated that future disposal costs would be tentatively based on a figure of $5/cubic yard. This figure is based on the fact that Turnkey is currently bringing their landfill up to standards through the incorporation of a clay liner and leachate collection system. Thus, capital costs associated with modification of Turnkey do not have to be included in this assessment.

If an existing site were to be modified by the private sector to meet current standards, then the per yard cost would hold, albeit variable as future costs increase in the industry. However, there needs to be an estimate of the costs associated with the development of an entirely new capacity, exclusive of land costs. This will form a basis for cost assessment if either a new site is developed or an existing landfill site is retrofitted. The site selection procedure and location guidelines are the same as those developed for the storage/stockpiling site in Chapter 2. The estimated costs to develop a new landfill site are summarized in Table 20.

OUT-OF-STATE DISPOSAL COSTS

Out-of-state disposal has provided an acceptable outlet in the past for management of oil spill debris. There are facilities within a day's drive that can handle incineration, landfilling and recovery of oil from contaminated liquids.

TABLE 20. Cost estimate for an oil spill debris landfilling site.

Item	Amount Required	Unit Cost	Total Cost
Clearing and site preparation	2 acres	$ 4,000	$ 8,000
Perimeter drainage	1300 ft.	2	2,600
Underdrains	--	6,000	6,000
Leachate collection and treatment	--	20,000	20,000
Dike construction	1300 ft.	10	13,000
Native clay liner	43000 sq. ft.	$0.15	6,450
Access road	100 ft.	8	800
Sand and gravel cover	3200 cu. yd.	4	12,800
Silt clay final cover	3200 cu.yd.	4	12,800
Engineering and contingencies		15%	13,000
TOTAL COST			$96,550

It should be pointed out that there is no approved site for the sole purpose of burial of oil-soaked debris in New England. The Capuano Brothers site in Rhode Island has state approval to handle the debris on a case-by-case basis. It is probable that this site could not handle debris disposal from a large spill, in which case disposal would have to occur at a designated location within the State of New Hampshire. For the purpose of the ensuing cost analysis, however, it is assumed that this site will be able to handle the anticipated spill debris volumes.

Shipping oil debris through Massachusetts to Rhode Island would require manifest documentation that would need approval from the State of Massachusetts, since the State considers oily debris a hazardous waste.

Table 21 lists the disposal facilities utilized for the comparative cost assessment. There are other locations in Massachusetts for contaminated liquid disposal than shown in Table 21. This facility was chosen for locational purposes only, not because of any evaluation of its particular operations.

TABLE 21. Out-of-State Disposal Facilities Used to Develop Comparative Costs

Facility	Disposal Method	Unit Cost for Disposal*
Recycling Industries Braintree, Mass.	Oil/water Separation and Reclamation	$.20/gallon $92/drum (55 gallon)
City of Auburn Municipal Incinerator Auburn, Maine	Incineration	$20/ton (assumed)
Capuano Brothers Crawston, R.I.	Secure landfill	$10/cu. yd. (assumed)

*Exclusive of transportation costs

COMPARATIVE COST ANALYSIS

Table 22 summarizes the transportation and disposal costs for the in-state and out-of-state disposal management options. Costs are presented for the average annual and target volume for each assumed disposal method.

Transportation costs are based on the utilization of private contractors for all phases--pickup, handling and disposal. The assumption is made that the debris is either hauled directly from the spill site or from the storage sites at a later time. The costs of moving debris from the cleanup area to the storage sites are not included--it is an assumed cleanup cost, separate from final disposal costs.

Transportation costs for out-of-state disposal are higher than disposal costs for both incineration and landfilling. Only in the case of contaminated liquids, which require less trips due to the large volume of the vacuum trucks, are transportation costs less than disposal.

In the case of incineration, it is less expensive to utilize the Lamprey facility for both the target volume and the estimated average annual volumes, even though disposal costs may be 50 percent higher at Lamprey.

Out-of-state disposal of solids is where the economics of transportation become excessive. The disposal costs at Capuano Brothers are four times that of Turnkey for the target volume due to the estimated $61,250 transportation costs required to haul the volume of debris 90 miles.

It should be noted that if the Rhode Island site is unusable for New Hampshire, then the only other options are to haul debris to New York, which is unreasonable at the very least, or to work out an agreement with another New England state--an option that is highly improbable at the present time.

TABLE 22. Cost estimate for transportation and disposal of oil spill debris.

1. IN-STATE PROGRAM:

Disposal Method	Oil-Water Separation (at new facility)		Incineration (at Lamprey)		Landfilling (at Turnkey)	
Debris Volume[1]	6,000 gal.	75,000 gal.	1,100 cu.yd. (440 tons)	12,000 cu.yd. (6,500 tons)	40 cu.yd.	3,000 cu.yd.[3]
TRANSPORTATION						
Volume of Truck	4,500 gals.	4,500 gals.	12 cu.yd.	12 cu.yd.	12 cu.yd.	12 cu.yd.
No. of Trips Required	2	17	92	1,000	4	250
Assumed Round Trip Distance (miles)	20	20	20	20	20	20
Time Required Per Trip (hours)	1	1	1	1	1	1
Operation Cost Per Hour[2]	$ 50	$ 50	$ 35	$ 35	$ 35	$ 35
TOTAL Transportation Cost	$ 100	$ 850	$ 3,220	$ 35,000	$140	$ 8,750
DISPOSAL						
Unit Cost	$.35/gal.	$.35/gal.	$30/ton	$30/ton	$5/cu.yd.	$5/cu.yd.
TOTAL Disposal Cost	$2,100	$26,250	$13,200	$195,000	$200	$15,000
TOTAL COST for Transportation and Disposal	$2,200	$27,100	$16,420	$230,000	$340	$23,750

2. OUT-OF-STATE PROGRAM:

Disposal Method	Oil-Water Separation (in Massachusetts)		Incineration (Auburn, Maine)		Landfilling (Rhode Island)	
Debris Volume[1]	6,000 gal.	75,000 gal.	1,100 cu.yd. (440 tons)	12,000 cu.yd. (6,500 tons)	40 cu.yd.	3,000 cu.yd.[3]
TRANSPORTATION						
Volume of Truck	4,500 gal.	4,500 gal.	12 cu.yd.	12 cu.yd.	12 cu.yd.	12 cu.yd.
No. of Trips Required	2	17	92	1,000	4	250
Assumed Round Trip Distance (miles)	160	160	180	180	300	300
Time Required Per Trip (hours)	4	4	5	5	7	7
Operation Cost Per Hour[2]	50	50	35	35	35	35
TOTAL Transportation Cost	$ 400	$ 3,400	$16,100	$175,000	$ 980	$61,250
DISPOSAL						
Unit Cost	$.20/gal.	$.20/gal.	$20/ton	$20/ton	$10/cu.yd.	$10/cu.yd.
TOTAL Disposal Cost	$1,200	$15,000	$ 8,800	$130,000	$ 400	$30,000
TOTAL COST for Transportation and Disposal	$1,600	$18,400	$24,900	$305,000	$1,380	$91,250

[1]The lower figure is the estimated average annual debris volume; the higher figure is the design "target volume."

[2]Operational costs are from Jet Line Pollution Control Stoughton, Mass. The price is for the vehicle and driver.

[3]This assumes that this site could handle this volume and state approval were given, an unlikely scenario, but necessary for cost comparisons.

A COMBINED DISPOSAL PROGRAM

In reviewing the various costs associated with each disposal option, it is obvious that some balanced approach which involves a combination of in-state and out-of-state disposal is warranted. At the current rate for disposal of contaminated liquids, and the small volume annually generated in the State of New Hampshire, out-of-state disposal appears to be the least costly option. For solids disposal, however, out-of-state disposal is always more expensive due to the high transportation costs involved.

The combined program therefore consists of out-of-state disposal of contaminated liquids and in-state disposal of oil-soaked solids, both combustible and non-combustible. This program, as well as the in-state program, assumes no State cost-sharing in the modification or development of a new landfill or incineration site. In the event that these costs are unavoidable, then the economics presented in this section will obviously change, depending on the level of costs that the State would be required to allocate for these purposes. The costs could range anywhere from partial cost-sharing with a private or municipal landfill to complete funding of a new site location design and construction. Since there is existing incinerator capacity within state, however, it is apparent that only the landfill costs would ever be incurred.

Table 23 summarizes the estimated disposal costs for the three debris management options. These costs involve some basic assumptions which if changed, would alter the totals for the various programs. However, the costs, as developed, do offer a basis by which the relative benefits and costs of the three options can be assessed and which will lead to the recommended program presented in Chapter 5.

One conclusion is readily apparent from Table 23; high transportation costs result in greater costs for disposal of solids out-of-state for both combustible and non-combustible debris. This is true for the estimated average annual debris volume as well as the target volume. Added to this is the uncertainty of the landfill site's future use for out-of-state wastes. It is therefore a sound management option to develop in-state capabilities for disposal of oil-soaked solids, assuming that environmental, technical, economic, and political constraints can be overcome. In-state facilities result in low transportation and handling costs, no interstate transportation problems, and ease of storage and disposal.

TABLE 23. Comparison of disposal costs for the proposed management options.

Item	In-State Disposal Average Annual	In-State Disposal Target Volume	Out-of-State Disposal Average Annual	Out-of-State Disposal Target Volume	Combined Program[2] Average Annual	Combined Program[2] Target Volume
1. Storage/stockpiling sites[1]						
(a) emergency site[3]	$16,000		$16,000		$16,000	
(b) long-term site		$154,420[5]		$120,420[4]		$120,420
2. Contaminated liquid disposal	2,200	27,100	1,600	18,400	1,600	18,400
3. Incineration	16.420	230,000	24,900	305,000	16,420	230,000
4. Landfilling	340	23,750	1,380	91,250	340	23,750
TOTALS OF 2, 3, and 4	$18,960	$280,850	$27,880	$414,650	$18,360	$272,150
TOTALS OF 1 and 5	$34,960	$400,270	$43,880	$535,070	$34,360	$357,570

[1]These sites are an assumed component of all programs.

[2]The combined program assumes out-of-state disposal of contaminated liquids and in-state disposal of all solids.

[3]This cost is assuming that emergency sites are used in the near term for storage until the long-term site is developed.

[4]Assumes site has a runoff lagoon and API oil recovery unit.

[5]Assumes oil/water separator in place for purposes of treating contaminated liquids in-state.

It is worth noting that the cost difference between in-state and out-of-state disposal of non-combustible solids is significant enough to justify the economics of developing a new disposal site within the state or cost-sharing in the modification of an existing landfill. Once developed, disposal fees would offset the annual operating costs and amortization costs. The private sector could be encouraged to develop a site once the economics of the project could be justified and the market place warranted its involvement.

The economic ramifications relative to the storage/stockpiling site of a large spill the size of the target volume can be assessed. If it is assumed that reliance on a complete out-of-state program would eliminate the development of a long-term storage site, then a large number of emergency sites would have to be developed to handle the debris generated from cleanup operations. Since no facility or contractor could handle immediate disposal,

storage sites would be necessary to help process the wastes over time. If we assume use of the emergency site concept, then 250 of these cells would be required in lieu of an approved location at a previously developed site. This is an unrealistic approach. Most likely the debris would be piled higher in a smaller number of cells which could cut the cost in half. However, locating these many sites in the coastal region would be extremely difficult, if not impossible.

Therefore, over the long-term, development of an adequate storage/stockpiling site would be economically justifiable and provide the State with a monitored, environmentally sound location for the processing of spill debris.

This comparative analysis provides an insight into the relative merits of the three disposal options and establishes the necessary foundation for development of the recommended disposal management program that the Center feels is best suited to the particular needs and conditions of the State of New Hammpshire. Chapter 5 presents these recommendations that have come together as a result of the research conducted during this study.

REDUCING COSTS

The major economic factor that has arisen during this cost analysis is the development of a long-term storage site. If the Turnkey Landfill completes its program to make the site a secure facility, then capital costs for a landfill site will have been accomplished by the private sector, unless other site requirements related to oil spill debris disposal are required. Any site modification required specifically for landfilling of oily debris may require some form of State cost-sharing.

If a tipping fee arrangement can be agreed upon between the state and the Lamprey Regional Solid Waste Cooperative, then capital costs for this component of the in-state program will be unnecessary.

The storage sites--both emergency and long-term--are a different story. It is unlikely that the private sector would undertake construction of a long-term storage site--the economics are not viable. Therefore, development of the site would be the responsibility of the State of New Hampshire.

The cost of the long-term site is high: $154,420 if the 3-acre site is developed with all ancillary facilities, $89,070 for a basic site. However, there are two other options for development of the long-term site that would lower the cost. The size could be reduced to two acres with a working storage area of 1 acre (8100 cubic yards). The extra storage volume required in a large spill event would be handled with a number of emergency cells. The smaller site would be able to handle the average annual volume and larger spills up to 40,000 gallons. Considering the past spill history, this may be a viable solution.

The costs for the 2-acre, marine-clay lined site would be reduced approximately 30 percent: to $61,731 for a basic site and $119,731 for a fully developed site. This is a savings of between $30,000 to $44,000 over the 3-acre site. Table 24 summarizes the costs for the 2-acre site.

The other option is leasing and modifying the C.H. Sprague diked area in Newington, which has been recommended for an emergency storage site. The working area of this site is less than 1 1/2 acres and would have to be supplemented with emergency sites during a large spill event. If engineering studies show that this site is suitable, it would offer the least costly storage option: $44,860 for basic modification, $102,850 for a fully developed site. The costs for this option are summarized in Table 25.

TABLE 24. Cost estimate for a two-acre storage/stockpiling site.

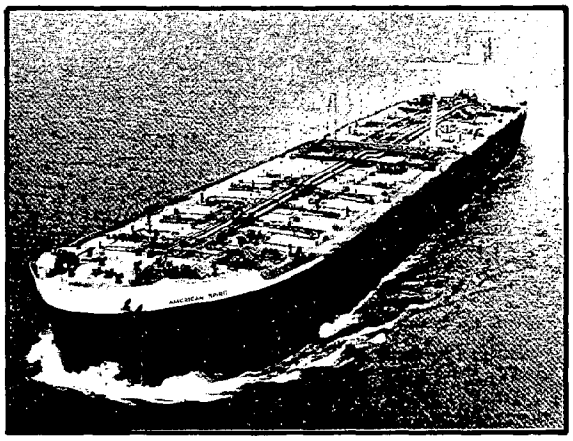
Item	Amount Required	Unit Cost*	Total Cost
Site preparation	2 acres	$4,000.00	$ 8,000
Perimeter drains	1,020 ft.	2.00	$ 2,040
Clay liner	55,900 sq.ft.	0.15	$ 8,385
Sand and gravel base (two feet)	3,226 cu.yd.	4.00	$12,906
Dike construction	1,020 ft.	20.00	$20,400
Access road	100 ft.	8.00	$ 800
Monitoring wells	6	200.00	$ 1,200
Engineering and contingencies		15%	$ 8,000
SUBTOTAL			$61,731
--Runoff lagoon	1	$9,000	$ 9,000
--API oil recovery unit	1	15,000	$15,000
--400 gpm oil/water separator	1	34,000	$34,000
TOTAL COST			$119,731

*Source: SCS Engineers, 1979

TABLE 25. Cost estimate for developing C. H. Sprague's diked area in Newington, New Hampshire.

Item	Required Amount	Unit Cost*	Total Cost
Site preparation	1.5 acres	$ 1,500.00	$ 3,450
Clay liner	65340 sq. ft.	0.15	14,250
Sand and gravel base course	4840 cu. yd.	4.00	19,360
Monitoring wells	6	200.00	1,200
Access road	100 ft.	8.00	800
Engineering and contingencies	--	15%	5,800
SUBTOTAL			$44,860
--Runoff lagoon	1	9,000.00	9,000
--API oil recovery unit	1	15,000.00	15,000
--400 gpm oil/water separator	1	34,000	34,000
TOTAL COST			$102,850

*Source: SCS Engineers, 1979



5.

THE RECOMMENDED MANAGEMENT PLAN

5.
The Recommended Management Plan

As this study has progressed it has become evident that the available management options for oil spill debris disposal are becoming limited with the implementation of State and Federal hazardous waste laws and regulations throughout New England. In-state storage and disposal are rapidly becoming the accepted method for spill cleanup operations as more and more states close their doors to disposal from outside their border. The exception to this would be the future development of a regional disposal site. The New England states are apparently interested in such a concept. It should be investigated as a future option.

Faced with this general trend, the State of New Hampshire must look towards developing the in-state capacity to manage its oil spill debris. It is the responsibility of the State to pursue this objective and to create an awareness on the part of industry and the general public of the need for this management approach. The plan that has evolved during the past eight months is presented in this chapter. It relies on the existing facilities in the State to provide the majority of the disposal capacity required to satisfy the current, accepted criteria for oil spill debris disposal.

It is the opinion of the Center that this debris management plan represents a simple, implementable approach for the State of New Hampshire that is economically justifiable over the long term. It places a strong emphasis on maintaining environmental quality, through adherence to the best practical standards. Since the prevailing source of potable water in the coastal region is ground-water, a major concern in the development of this plan has been the protection of the State's sensitive, subsurface water supply.

SUMMARY OF THE RECOMMENDED PLAN

The plan proposed for the State of New Hampshire emphasizes in-state storage of contaminated liquids and oil-soaked solids, out-of-state disposal of contaminated liquids, and in-state disposal of solids through incineration and landfilling. The key to this disposal program is environmentally sound storage. The storage of liquids and solids following an oil spill eases cleanup operations and allows for the sorting of debris into combustible and non-combustible solids. Since approximately 80 percent of debris is combustible, sorting significantly reduces the volume that requires final landfilling. Storage has usually been overlooked in the heat of the cleanup operation following a spill event, oftentimes resulting in less-than-adequate disposal conditions and the release of oil into the surrounding environment.

Table 26 summarizes the major components of the Center's proposed plan. These plan elements are the foundation for the future management of oil debris disposal in the State. The various facilities identified are by no means binding. They are, nonetheless, the most obvious options available to the state at the present time which offer in-state capacity and the ability to satisfy applicable site criteria.

It should be noted that some of these recommendations are tenuous at the present time. Use of the Lamprey incinerator will require modification of their air quality permit. Discussion on cost-sharing agreements have been instituted by the Center and remain to be formulated.

The Turnkey Landfill in Rochester needs approval by the State Bureau of Solid Waste Management (BSWM) to handle oily debris disposal. Also, local approval from the City Council will be required due to the change in use of this facility.

The emergency storage sites will require pre-approval by the State BSWM and local officials so that they can be utilized during an emergency situation without having to wait for approval.

Finally, the long-term storage site has a number of hurdles to cross. First is money. The estimated $100,000 plus cost of the site will probably have to be taken care of through State funding. Further engineering studies will be necessary to determine the suitability of the recommended locations, and approvals at the local and State level are necessary before site development can proceed.

TABLE 26. Summary of recommended debris management plan elements for coastal New Hampshire.

Recommended Management Approach	Location	Type of Debris Handled	Capital Costs Required	Disposal Costs Aver. Annual Volume	Disposal Costs Target Volume
1. In-state storage of contam. liquids	Approved waste oil dealers in N. H.	Contaminated liquids	None	not applicable	
2. Storage/stock-piling sites (a) Emergency Sites	--C.H. Sprague diked area, Newington, N. H. --Public Service Co., No. 1 tank diked area, Portsmouth, N.H. --Public Service Co., Seabrook Plant --Other sites as needed	Oil-soaked solids	$2400 for three sites	--	--
(b) Long-term Sites[1]	--C.H. Sprague diked area, Newington, N.H. --Turnkey Landfill or other approach site	Oil-soaked solids	$102,850 $120,000		
3. Out-of-state oil/water separation	Any Massachusetts licensed facility	Contaminated liquid	None	$1,600	$18,400
4. In-state incineration	Lamprey Regional Solid Waste Cooperative, Durham, N. H.	Combustible solids	To be determined through further negotiations	$16,420	$230,000
5. In-state landfill	Turnkey Landfill of Rochester, Inc., Rochester, N.H. (if approved)	Non-combustible solids	None (assumed)	$340	$23,750
TOTAL COSTS			$105,250-122,400[2]	$18,360	$272,150

[1]Assumes development of a facility with runoff collection, treatment, and an API oil recovery unit.

[2]Depends on final site location.

None of these limitations are insurmountable. They will require attention to implementation by the State of New Hampshire over the course of time. This implementation aspect of the plan is presented in Chapter 6.

The capital costs associated with the plan are keyed to the long-term storage site. If the Lamprey Regional Solid Waste Cooperative requires a substantial lump sump payment for use of its facility as they originally proposed then this could alter the capital cost requirements considerably.

At this point the assumption is made that the total capital cost to get this program underway is between $100,000 and $125,000. This is based on the premise that Turnkey's site will be suitable with no costs necessary from the State, and that Lamprey will agree to a higher tipping fee charged for oily wastes to help defray the extra handling involved and recoup some of the sizable capital investment.

ELEMENTS OF THE PLAN

The storage and disposal components of the recommended plan presented in Table 25 are part of an overall plan that is necessary to effectively manage the debris situation in New Hampshire. The individual recommendations that the Center has developed to create a comprehensive management program are presented below. Recommendations for implementing these measures, the final key step in the plan, are proposed in the next chapter.

(a) The State of New Hampshire should proceed with obtaining pre-approval for the three sites recommended for emergency storage in Table 26. If these sites cannot be utilized, then new sites should be located and approved utilizing the emergency storage site guidelines summarized in Appendix C.

(b) In conjunction with the designation of emergency sites, the state should purchase and store the necessary materials to secure three sites (see Table 15 for a materials list). This will cost $2400 and provide emergency short-term storage for future spill cleanup. Sources of these materials should be included in the State Contingency Plan for future reference.

(c) The State should undertake an engineering study, either in-house or through a consultant, for the location of a long-term storage site. C.H. Sprague's site should be investigated first. This will require negotiation with C.H. Sprague Company to work out any necessary arrangements for use of its site. The goal of this element is the establishment of a suitable site for development of

a long-term storage/stockpiling area.

(d) The State should undertake negotiations with Pat Banfield of Turnkey Landfill of Rochester, Inc. The purpose of the negotiation would be to establish an agreement on future use of the facility for the disposal of oil-soaked solids, develop operational guidelines for the site, agree on future disposal costs, and work towards local and State permit approval of the site.

(e) Because of its cost advantage at present, the State should continue to utilize out-of-state disposal facilities for contaminated liquids.

(f) Negotiations with C.H. Sprague should be undertaken to determine if its separator could be utilized for in-state treatment of contaminated liquids.

(g) The State should proceed with negotiations with the Lamprey Regional Solid Waste Cooperative to develop in-state incineration capacity at its facility.

(h) The State should make arrangements with the City of Auburn for use of its incinerator for the short term until arrangements can be made with Lamprey RSWC. The Auburn facility could then be utilized in the future as a backup or as an alternative to the Lamprey site.

(i) The State should attempt to utilize oil-soaked inorganics for road construction material whenever possible. Incorporation into highway foundation use is applicable to inorganics such as sand and gravel that have been contaminated with light oils such as gasoline, kerosene, and heating oil. These inorganics could be mixed with hot asphalt by passing them through a mixing plant enabling a cold patch to be produced which could be used in paving application. The feasibility of this approach would require a determination of the amount of petroleum product contained in the debris before a local asphalt plant could utilize it. This would require time and a laboratory analysis.

(j) Landspreading of oil spill debris is a sound technology that results in decomposition of oily debris. This technology has not been utilized in the plan due to the large area required and uncertainty of public acceptance. It should, however, be investigated as a future disposal option. The State of Vermont is conducting an experimental landspreading program for oily debris. The State should communicate with the Vermont Agency of

Environmental Conservation relative to its success with this program and its possible application to New Hampshire's situation.

(k) A major consideration in any management plan is the prevention of spills. This can best be accomplished through a continued public awareness program that focuses on recycling of waste oil by industry as well as the general public. The State should supplement its Used Oil Recovery Program with a booklet similar to Maine's program that provides detailed information on recycling methods, recycling depots, and spill reporting procedures.

(l) The State should undertake, as part of its overall public awareness program, a public information campaign that will educate the general public, local and State officials, and private industry on this recommended plan.

(m) Over the long term, the State should investigate a regional disposal program with the other New England states through a regional interstate agency.

DISCUSSION

Legal Constraints and Considerations

Since most oil debris is not considered a hazardous waste within the State of New Hampshire, its storage and disposal in-state, as recommended in the previous section, does not present any legal complications at the present time. Due to the nature of oil-soaked debris and the state-of-the-art in storage and disposal, the program elements can meet existing local, State and Federal regulations through modification of existing facilities and disposal methodologies.

There are no specific local regulations relative to the transportation, storage, and disposal of oil-soaked debris within the State. The proposed use of existing facilities will necessitate a zoning board approval since present use will be changed. In the case of storage sites, they would be new facilities and require non-residential site review and approval. In the implementation discussion in Chapter 6 these regulations are discussed relative to each plan element.

Interstate transportation of contaminated liquids to Massachusetts would require adherence to that State's regulations on manifesting hazardous waste. This should be the responsibility of the cleanup contractor and spiller, however.

The Political Climate

It is in the political arena where the major roadblock to implementation of the recommended plan could occur. The State of Maine's experience during its recent site location study for a 10-acre stockpile/transfer facility revealed the strong "not in my back yard" philosophy held by the general public. The plan was eventually dropped due to economic constraints, but the public's negative reaction, as well as that of local officials, played a significant role in the project's demise.

A precedent for adverse public reaction has previously been set in the State of New Hampshire. A major corporation attempted to site a chemical landfill in the State and received enough local political resistance to stop the project.

The Maine experience is particularly interesting since a considerable effort was made to produce an environment of supportive publicity. In this age of recurrent, hazardous waste well-contamination discoveries, such as in New York and Maine, the journalistic environment is far from favorable. Lacking journalistic support, and facing negative local reaction, the approval of oil spill debris-storage and disposal sites could be a difficult uphill battle.

A good public awareness program would be necessary to create the political climate necessary for local acceptance of this plan.

Environmental Constraints and Considerations

There is no guarantee that any of the recommended storage and disposal options will not cause some form of environmental degradation. The current state-of-the-art for disposal of oil-soaked solids relies on the physical properties of oil to prevent it from causing surface and ground water contamination. The philosophy is to place debris in such a way that it will either float to the surface when in contact with water (holding ponds, gravity separa-

tors) or be prevented from downward movement through the use of protective clay liners.

The technical assumption is that through proper monitoring and adequate prevention-design measures, migration of oil into surface and ground-waters can be prevented. If the recommended guidelines presented in this study are not adhered to, then there is a strong possibility that oil migration will occur. From an environmental standpoint, following the past practice of case-by-case landfilling at less-than-adequate sites, poses a greater environmental constraint than adhering to the recommended site development guidelines presented in this study.

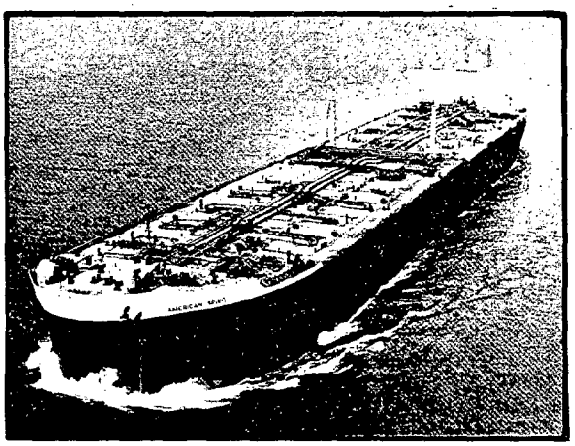
Existing water quality standards for most streams are obtainable in a coalescing oil/water separator. Certain streams would restrict construction of an oil/water separator due to stricter standards. This will not pose a problem at an existing licensed facility.

Air quality standards are being met by the City of Auburn which utilizes units similar to those at Lamprey RSWC. The Lamprey facility has undertaken some test burning of oily debris and feels that it can meet all State and Federal air quality criteria.

The Economics

This plan is based on the premise that all capital costs will be defrayed through utilization of existing facilities except for the development of a long-term storage site and purchase of materials for three emergency sites. This capital cost is estimated at $125,000. This is not an unrealistic amount, and the figure can be reduced substantially depending on the level of sophistication of the site (see Chapter 4; Reducing Costs). A number of funding sources are available at the State level for these sites. These sources are discussed in the next chapter.

If Lamprey RSWC stands by their initial request for a $200,000 cost-share, and/or monies are required for modification to Turn-key, then the overall costs of this program could place it out of reach in the near term. If this becomes the case, then the State should rely on the City of Auburn for incineration and reduce the scope of the long-term storage site to make funds available for landfilling.



6.

IMPLEMENTING THE PLAN

6. Implementing the Plan

Successful implementation of the Center's recommended oil spill debris management plan is the final key step in the overall development of a disposal strategy for the State of New Hampshire. The diverse activities involved in the disposal process require in-state agency coordination due to some overlapping of regulatory powers of the various State agencies. Also involved and playing a key role in the acceptance of this plan, are the local governments and the citizens of the affected towns.

Satisfactory regulatory authority currently exists at the State level to effectively implement this plan without the creation of a new bureaucracy or the formulation of new legislation. However, to ensure the effectivenss of the program, the needs of all the elements must be coordinated. Specifically, appropriate regulations must be adhered to, the necessary funding must be earmarked for site development and local approval must be solicited. To this end, the Center has studied the complexities of implementation and has developed recommendations relative to the overall plan and individual plan elements which it feels will ensure its viability over the long term. Where limitations pose constraints to some elements, notably the long-term storage/stockpiling site, an approach has been developed for pursuing the issue beyond the scope of this particular study so that it will be incorporated into future plans.

The emphasis of this plan is on in-state disposal wherever possible. In reviewing the regulations and policies of the adjoining New England states, it is becoming obvious that out-of-state disposal of oil-soaked debris other than recoverable oil and contaminated liquids will become practically impossible in the future as states implement more restrictive hazardous waste management programs. The feeling has become that each state

should be responsible for the wastes generated within its borders. It is, therefore, imperative for the State of New Hampshire to respond to this pressing need and develop in-state capacity as proposed by this study.

A DEBRIS DISPOSAL STRATEGY FOR NEW HAMPSHIRE

The individual components of the recommended plan are strongly interrelated and comprise an overall disposal strategy which should be followed. Figure 8 graphically portrays these interrelationships from cleanup operations to final disposal. Throughout the disposal process, there are a number of critical decision points that direct the spill debris to the recommended disposal options. This is the responsibility of the State's On-Scene Coordinator (OSC) currently Russell A. Nylander, Water Supply and Pollution Control Commission (WSPCC), or his alternate. These decisions will be clarified in the following discussion.

At the outset of the cleanup, the State OSC should:

(a) determine the exact nature of the oil spilled and expected debris makeup;

(b) contact the Lamprey Regional Solid Waste Cooperative to ascertain its burn capacity; and

(c) contact the Turnkey Landfill in Rochester to have its engineer visit the spill site to determine the acceptability of the debris for their landfill. (This should not be a problem in most cases.)

These steps will establish the availability of sites and methods for debris disposal. If incineration and/or landfilling cannot immediately take place, then the debris will have to be brought to either the long-term storage site or an emergency site. By determining disposal availability at the outset, the OSC can decide where debris is to be taken and whether or not emergency sites need to be secured.

During cleanup operations following a spill, the State OSC should make every effort to direct cleanup personnel to separate combustible and non-combustible solids. Hand harvesting of combustibles, oil-soaked sorbents and other burnables can be accomplished in such a manner as to reduce the need for further sorting.

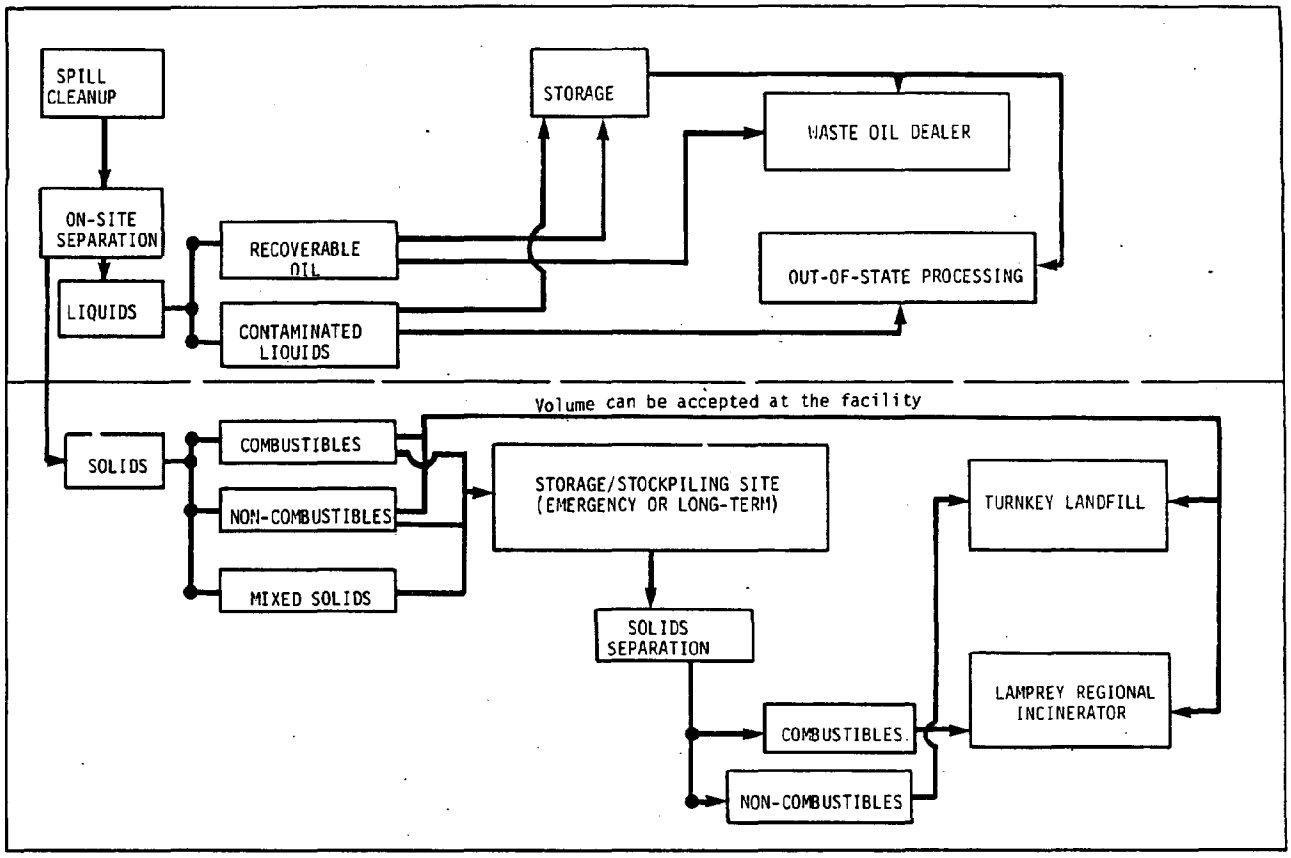


FIGURE 8. Spill Disposal Strategy Flow Chart.

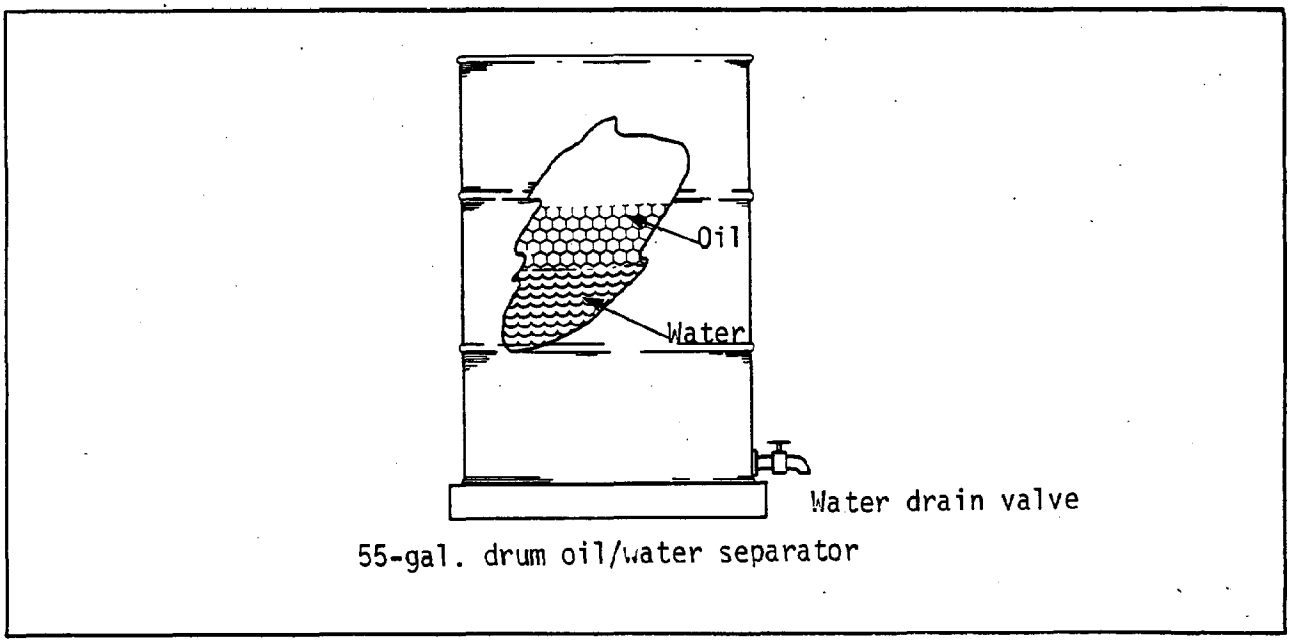


FIGURE 9. Emergency oil/water separator.

Recovery of useful oil should also be a major focus. Using skimmers and skimmer attachments on vacuum hoses helps recover a greater percentage of usable oil from the water's surface. Use of emergency separators on-site such as the one shown in Figure 9, will aid in oil recovery.

If there is available capacity at the Lamprey Regional facility then burnables can be sent directly to the incinerator. If there is no available capacity, then debris will have to be sent to the storage/stockpiling site until it can be processed over time.

If Turnkey Landfill of Rochester can handle the non-combustible waste stream, it should be directed immediately to the landfill for final disposal. Any debris that has been harvested but needs further separation should be sent to the stockpiling site where it can be attended to later. Excess combustibles and non-combustibles that cannot be accepted at the incinerator or landfill will also be directed to the site for storage until disposal can be undertaken.

In the near future, before a long-term site has been developed, the OSC will have to prepare one or more of the designated emergency sites with the sawdust/hay-bale, plastic-liner system as shown in Figure 2 (Chapter 2) before materials can be moved. These emergency sites are needed to help protect ground and surface waters from any oil migration. The identified personnel will have to be contacted for each site used. (This will not be necessary for a small spill where all materials can be handled immediately at their respective disposal locations.)

The emphasis of this approach is volume reduction of the debris through incineration, so that the amount requiring landfilling will be small (around 20 percent of the total). Incineration provides a dual benefit; (a) it greatly reduces the possibility for ground and surface-water contamination; and (b) provides energy for steam production that is sold to the University. Without constant attention to debris separation, this goal becomes severely reduced with a resultant increase in the landfilled portion of disposal.

After every effort has been exhausted to recover as much usable oil as possible, there will be an oil/water mixture remaining to be collected, stored and treated. Separation is required before oil can be recovered from this mixture. This can be accomplished following three different options:

(1) the cleanup contractor takes the liquid to storage tank(s), either his own or at an in-state available tank. After a period of time, recoverable oil is skimmed off the top and reprocessed and the remaining

liquid taken to an approved oil-water separator for final clarification.

(2) the State OCS contacts C.H. Sprague Company to see if their separator can handle the liquid. The liquid will either be turned down by Sprague and will have to be handled by options (1) or (3), or it will be run through separators with the recovered oil being reprocessed.

(3) an out-of-state contractor (Recycling Industries, Braintree, Massachusetts; Jet-Line Pollution Control, Stoughton, Massachusetts) accepts the liquid either from the cleanup contractor or through use of their own trucks and takes care of the storage/separation process.

The choice of a particular option is the responsibility of the OSC and will depend upon spill size, cleanup contractor utilized, status of in-state storage and the nature of the oil/water mixture.

Generally, the storage/stockpiling site will have to be used, since the volume of debris will oftentimes exceed the capacity of Lamprey or Turnkey. Laborers and a front-end loader will need to be employed to place the debris in separate cells of combustible, non-combustible and mixed solids. After cleanup has ceased, a 6-mil polyethylene cover should be placed over the site and weighted down with rubber tires to prevent infiltration. Over the ensuing weeks, the OSC will be responsible for staging further separation of the solids and removal to the incinerator and/or landfill. This will require continued communication and coordination with the designated representative at the Lamprey and Turnkey facilities. At a developed, long-term site, more oil separation will be able to be conducted if an inexpensive oil-water separator is constructed as shown in Figure 5; Chapter 2). Recovered oil can be picked up by any New Hampshire Waste Oil Dealer.

If an emergency site is utilized, careful attention to debris removal will be required to protect the liner from puncturing. After all the debris is removed, the site can be returned to its original use. The materials used to construct the emergency site may require incineration if they have become oil-soaked or damaged.

If the C.H. Sprague site is approved for emergency use, then part of the existing diking system can be used along with the hay bales inside to prevent any oil migration out of the stockpiling area into the unused portion of the site.

IMPLEMENTATION RESPONSIBILITIES

Existing State Agency Responsibilities

The disposal of oil-soaked debris is a hybrid situation when it comes to regulatory requirements, since there are no existing statutes that specifically focus on oily debris. At the present time, oily wastes are considered a "special waste" under the State's Solid Waste Regulations. The Bureau of Solid Waste Management has developed guidelines for the disposal of oily debris (Section 1803 of the "Oil and Hazardous Materials Pollution Control Contingency Plan") but there are no specific regulations concerning oily debris.

The spilling of oil and subsequent cleanup is overseen by the Water Supply and Pollution Control Commission (WSPCC) under the provision of New Hampshire's Revised Statutes Annotated 146-A (Supp.). Recovery of cleanup and disposal costs are the responsibility of the New Hampshire Attorney General's Office.

While the WSPCC has responsibility for ensuring cleanup of spill debris, the agency does not have the regulatory power to authorize disposal of oil-soaked debris. Approval for disposal itself involves the authority of the Bureau of Solid Waste Management or the Air Resources Agency, if burned or incinerated.

Incineration of oil-soaked combustibles proposed for the Lamprey Regional Solid Waste Cooperative falls under the overall jurisdiction of the Bureau of Solid Waste Management since it is a solid waste facility. However, the air emissions from the facility fall under the regulations of the Air Resources Agency. Joint jurisdiction presents no overall problem since the incinerator is currently functioning under such a regulatory process.

As pointed out, landfilling of oil-soaked solids falls under the regulatory authority of the BSWM (RSA 149-L). However, WSPCC is responsible for the protection of the State's surface and ground waters and, therefore, is involved in the review and permitting of solid-waste sites. A memorandum of understanding between the two agencies currently exists to enable both agencies to better coordinate their respective activities. It is anticipated that this memorandum will apply to the joint responsibilities involved in the storage/stockpiling site and secure landfill aspects of oil debris disposal.

If oil/water separation facilities were to be developed in-state, or if the C.H. Sprague licensed separator were to be utilized for oil/water separation, then the WSPCC and EPA would be responsible for review and approval of the required discharge permits.

The Office of State Planning is involved in the integration of the overall solid waste management plan and the oil spill debris management plan into the general State planning process. That office is also a possible source of funding through the Coastal Energy Impact Program.

Finally, the other key agencies that become involved in the plan are the Department of Resource and Economic Development and the Department of Public Works and Highways. Some of the recommended emergency storage sites are located on their property and will require their approval before final implementation is possible.

The Role of the Municipalities

This plan affects all the towns in the New Hampshire seacoast and Great Bay areas. Implementation of all aspects of the plan will require their joint coordination, especially in those towns where disposal actually takes place (Durham and Rochester). As experience has shown, it is at the local level where many well-engineered proposals for oil spill debris disposal in other states have been stopped. Involvement of the local governments in the implementation phase will thus be an important component of the plan.

A review of all local regulations revealed that there are no existing ordinances in the coastal region that specifically govern the transportation, storage and disposal of oil spill debris. The Center discussed the local issue with Tom Cooney of the Strafford Regional Planning Commission and he indicated that local approval may be needed for any changes to uses of an existing facility as well as the construction of a new facility.

Development of a long-term storage/stockpiling site would most likely fall under the non-residential site review and require approval by the local planning board of appeals where site development was proposed.

Any modifications to existing industrial uses, such as the incinerator at Lamprey and Turnkey in Rochester, may fall under a non-listed-use for that site and may require approval from the local zoning board.

Finally, local officials are usually responsible for landfill operations in their respective towns. If Turnkey or another landfill site is utilized for an emergency stockpiling site, long-term storage/stockpiling site, and/or ultimate disposal, then the appropriate officials may have to review and approve the proposed modifications to the landfill to accommodate debris disposal.

Recommendations

The recent study by the Strafford Rockingham Regional Council of oil spills in the coastal zone states that:

> "The party responsible for a spill, or his agent; must obtain state approval for final disposal. State statutes are unclear as to which state agency has the authority to grant this approval."

This report recommends that absolute authority for the entire disposal process be granted to one lead agency. Since the Water Supply and Pollution Control Commission presently assumes the basic oversight role for oil spills, the study recommends that the WSPCC take on this lead agency role.

The Center agrees with this position and recommends that the Water Supply and Pollution Control Commission undertake implementation of the recommended management plan. However, new legislation is unnecessary since the various components of disposal fall under existing State statutes. What is needed is coordination between the WSPCC, Bureau of Solid Waste Management and the Air Resources Agency to ensure that all recommended plan elements meet the regulatory requirements under their jurisdictions.

The Office of State Planning could provide overall support acting as an intermediary if any interagency disputes were to arise and as a potential source of funding through the Coastal Energy Impact Fund.

To this end, the Center proposes the following recommendations that will aid in the overall implementation process. They are somewhat general in scope, focusing on specific agency responsibilities. More detailed discussions on certain critical plan elements are presented in the next section along with technical requirements and contact people.

(a) The Water Supply Pollution Control Commission will be responsible, as stipulated in RSA 146-A, for overall coordination of the spill debris management strategy outlined in this chapter.

(b) The Office of State Planning (OSP) should submit the draft plan to all responsible State agencies for their review and comment. Local government officials should be made aware of the specific recommendations presented in this chapter and their comments sought.

(c) The WSPCC should meet with the Department of Resource and Economic Development and the Department of Public Works and Highways and work out an agreement for future use of their respective properties for emergency storage sites.

(d) The WSPCC should work with the Bureau of Solid Waste Management to develop permits for the sites identified for emergency storage.

(e) The Bureau of Solid Waste Management should undertake an assessment of Turnkey Landfill in Rochester relative to its existing and/or planned future ability to safely handle the secure landfill of non-combustible oily debris. This is not anticipated to be a problem since the site development requirement of the new Solid Waste Guidelines (July 1981) closely follow those that are recommended (by the Environmental Protection Agency and this study) for landfilling of oily debris either with refuse or as a "special waste." The Bureau should recommend any necessary facility or operational changes through modification of Turnkey's permit. Any capital costs required by these changes, if they go beyond the normal solid waste regulations, will be the responsibility of the State.

(f) The WSPCC should undertake further negotiations with the Lamprey Regional Operations Committee to develop an agreement on cost-sharing and use of the facility for incineration of oily debris.

(g) The Air Resources Agency, working with WSPCC, the BSWM and Lamprey representatives, should develop a modified permit for the change in emissions that are likely to occur from utilization of the Lamprey facility for debris disposal.

(h) The WSPCC should pursue discussions with C.H. Sprague for possible future use of their separators at the Newington facility for oil/water separation.

(i) The OSP in conjunction with the Bureau of Solid Waste Management and WSPCC should conduct a study for location and construction of a two-acre, long-term storage/stockpiling facility in the study area. This can either be done in-house or by letting out a contract to a qualified firm. The Oil Pollution Control Fund allocates 10 percent for research and could possibly be a source of funding.

(j) The OSP should conduct a public information campaign to educate the local population about the plan and solicit their comments.

(k) The WSPCC should integrate the recommendations and other relevant aspects of this plan into their Contingency Plan as part of Section 1803.

IMPLEMENTING THE RECOMMENDATIONS

The Center has identified and received "over-the-phone" commitments of three sites for emergency storage sites. Also, five other locations have been investigated for possible usage if a spill were to strike the coastline at or near these locations.

The committed sites are located in:

C.H. Sprague diked area, Newington terminal
Public Service Companys' diked area for their #1 tank in Portsmouth
Construction parking lot of Public Service Company's Seabrook plant

The other possible sites are:

Fort Stark, New Castle--parking area
Wallis Sands Beach State Park, Rye parking area
Hampton Beach State Park, Hampton--parking area

Pierce Island, Portsmouth--parking area
Hilton Park, Dover--parking area

These sites are described in detail in Chapter 3. Usage of these sites will require a number of implementation steps. The following steps apply to each site:

(1) The three State park sites are under the ownership of the New Hampshire Department of Resource and Economic Development. The WSPCC should submit the report to that department for its review and consensus on use of its facilities as emergency sites. This will have to take place before any other approvals are sought.

If approval of these sites does not occur, then it will be up to the Water Supply and Pollution Control Commission in conjunction with the Bureau of Solid Waste Management to undertake a site location study for three more sites.

(2) For each site, the WSPCC should contact the respective local boards or officials and request local approval for use of the site as an emergency, oil spill debris stockpiling site. The use of all these sites for this purpose will be a change in the existing approved use at the five back-up sites and the Seabrook site. The C.H. Sprague site and the Public Service sites are currently utilized for oil storage. However, storage of oily debris is a different use and will require a change in the existing use approval. This approval process will also require close cooperation with the various personnel responsible for each site. These contact people are listed in Chapter 3.

(3) The BSWM will need to develop some sort of pre-approval document for each site under authority of the State Solid Waste Law. This is an unusual concept but a necessary one so that the sites can be utilized at a moment's notice. The WSPCC will be responsible for the applications to BSWM for each site.

(4) The WSPCC will need to purchase 3 rolls of 20 ft. by 100 ft. 6-mil polyethylene and 3 rolls of 20 ft. by 100 ft. 30-mil PVC liner and store them for later use. In conjunction with this material purchase, should be the location of sources of hay bales and wood chips for inclusion in the State Contingency Plan. When a spill occurs, the responsible party or the OSC can purchase the necessary bales and sawdust for use at the emergency sites.

(5) Once local and State approval have been accomplished the WSPCC should list each site, its location, and the contact person, in the State Contingency Plan. Also included in the plan should be the recommended guidelines for emergency site location (Appendix C). This will provide guidance to the OSC should the need arise to locate more sites during a catastrophic spill event.

Long-Term Storage/Stockpiling Site

There are a number of approaches to implementing the recommended long-term, storage/stockpiling site. The site can be located on existing State or other public land, located at an existing public or private landfill, or located on privately-owned land, either industrial or agricultural. In all cases, there will be a cost of making the site physically suitable through the use of a clay liner, dikes, and a leachate collection system.

The site development costs can be approached in three ways:

(a) The State utilizes in-house funds and develops the site on its own, on public or private land, recovering monies through future user fees.

(b) The oil industry cost shares with the State or undertakes development of its own site on public or privately-owned lands.

(c) The private sector develops a site and recovers its costs through user fees to the State and cleanup contractors.

Alternative (a) seems the most feasible given the existing political climate and the fact that the State is already collecting fees from the oil industry that are earmarked for spill cleanup and disposal purposes. However, the other alternatives still bear further investigation.

It can be argued, however, that the State has accepted the full responsibility of spill debris management under the provisions of RSA 146-A and within the umbrella of the Oil Pollution Control Fund; so a State role in the development of a site is necessary.

Chapter 3 identified three possible sites for the location of the storage/stockpiling area. They are:

(a) C.H. Sprague diked area; Newington
Contact: Wesley Hallowell
C.H. Sprague Company
Portsmouth, N.H.
436-4120

(b) Turnkey Landfill of Rochester, Inc.
Rochester, New Hampshire
Contact: Pat Banfield, Owner
271-3556

(c) New Hampshire Urban Forestry Center
Portsmouth, New Hampshire
Contact: Department of Resource
and Economic Development

These sites are described in detail in Chapter 3. They are all strong candidates for consideration for this purpose. In order to proceed with the development of one of these sites the following will be necessary:

(1) The WSPCC will need to contact the representatives for each site to further discuss the possibility of their use. Discussion will have to focus on leasing arrangements, cost responsibilities, operational requirements and possible future uses of the site.

(2) If agreement can be reached, then the WSPCC will be responsible for conducting an engineering study of each site to determine surface and subsurface geologic and hydro-geologic conditions. This study will ascertain if the sites in question satisfy all the recommended site criteria. If the study has to be conducted through an outside contractor, then funding will be required, probably from the Oil Pollution Control Fund or a CEIP grant.

(3) Once a site has been chosen, permits will be required from the Bureau of Solid Waste Management at the State level, and the local zoning board at the local level. If a discharge to surface waters is necessary due to installation of an oil/water separator, then a permit from the WSPCC and EPA will be necessary. These permits and future maintenance of the site will be the responsibility of the WSPCC.

It is recommended that the C.H. Sprague site in Newington be studied first. It is already partially developed and offers a central location for cleanup operations and is close to the Lamprey incinerator.

Incineration at Lamprey

The Lamprey Regional Solid Waste Cooperative's incinerator at the University of New Hampshire in Durham is the key element of the proposed plan. Discussions have been ongoing with John Dewyea, Project Manager, and the Operations Committee. There is a serious interest in use of the incinerator units for the disposal of oil-soaked combustibles if all the cost-sharing, handling, and permit arrangements can be made.

A meeting was held with the Operations Committee to discuss cost-sharing possibilities. The general feeling of the committee was that incineration of spill debris is a compatible use for the facility, but due to the special handling and other requirements, cost-sharing would be necessary. The meeting resulted in four alternative cost-sharing proposals that the State will have to negotiate after this study ends. They are:

(1) The original proposal to the Office of State Planning by Malcolm Chase in 1980 consisted of the State investing $200,000 for the purchase of a third unit plus a normal tipping fee of $15-$20 per ton. This is similar to the arrangement worked out between the State of Maine and the City of Auburn for use of its incinerator.

(2) Based on the average annual volume of combustibles debris estimated by the Center at 400 tons/year, the State guarantees this volume at a tipping fee of $30-$50/ton each year as an incentive (an annual cost of $12,000-$20,000). This fee would decrease for volume in excess of the annual estimate.

(3) State guarantees an annual retainer fee and pays a higher tipping fee (this is almost the same as (1)).

(4) The State guarantees that an annual percentage of the contingency fund goes to Lamprey. A tipping fee between that proposed in (1) and (2) would be worked out.

The Operations Committee also suggested as an idea for consideration that the Cooperative take care of picking up and transporting the debris from the storage site and charging the state for this plus disposal.

The Operations Committee appeared flexible on the funding issue. Although option 1 with its initial capital investment of $200,000 would be preferred, the Committee is willing to continue discussions on the other options as well as on any other ideas that the State may have.

This type of cooperative effort has recently been accomplished between the State of Maine and the City of Auburn for use of the city's municipal incinerator for disposal of oil-soaked combustibles. The complete text of the final agreement is presented in Appendix E and should be utilized by the State of New Hampshire as a model for the Lamprey situation.

The basic provisions covered in this type of agreement are: period of contract, types of wastes handled, disposal fees, cost-sharing, rules and procedures for use of the facility, idemnity, vehicle requirements, insurance requirements and other detailed liability responsibilities.

The bottom line for this agreement was the ability of the State of Maine to pay for the purchase of one of the facility's units--a capital cost of $500,000--thereby guaranteeing the State's use of the facility at a low tipping fee. Maine has a strong oil pollution control program and a $6,000,000 fund upon which it can draw for expenses of this nature.

This is not the case in New Hampshire. The Lamprey representatives understand this and appear willing to approach the cost-sharing on a more reasonable level. If, however, negotiations do not achieve any agreements, the State has the option of turning to Auburn for use of their facility. This is discussed in the next section.

Discussions with John Dewyea, Project Engineer, and Richard Rugg, Administrator, resulted in a number of technical and handling requirements that would be necessary to utilize their facility for incineration of oil-soaked combustibles. They are:

(a) The facility must meet EPA and State emission standards for units of less than 50 tons/day. This will require test burnings of various wastes and coordination between the Air Resources Agency and Lamprey so that a modified permit can be issued.

(b) The tipping floor drain would need to be plugged and filled with water to prevent oil from entering the sewer. After disposal, the contaminated liquid could be picked up by the cleanup contractor or waste oil dealer for separation.

(c) Approximately one quarter of the tipping floor could be made available for stockpiling wastes being burned depending on the presence of municipal wastes. This would allow for stockpiling of between 100 and 200 cubic yards at a time.

(d) The best time to process oil-soaked combustibles would be between Friday afternoon and Monday. Monday through Thursday the facility is usually handling the municipal waste stream.

(e) There is a possibility that the standby unit could be fired up to handle the debris during the week in an emergency situation. This will require more investigation by Lamprey.

(f) Due to the scheduling problems, a storage/stockpiling site becomes necessary so that incineration can take place as time allows. Since Lamprey's first priority is municipal waste incineration, this means that the State OSC will be responsible for continued contact with Lamprey to adequately stagger delivery of debris to meet their handling requirements.

None of the requirements for use of this facility are insurmountable. They will, however, require careful coordination between the Water Supply and Pollution Control Commission, Lamprey Regional Solid Waste Cooperative, Bureau of Solid Waste Management, and the Air Resources Agency to develop an agreement that is to everybody's satisfaction.

Future contact should be made with the following people:

Malcolm Chase, P.E.
Lamprey Regional Solid Waste Cooperative
c/o Kimball Chase Co., Inc.
40 Bridge Street
Portsmouth, New Hampshire
431-2520

John Dewyea, Project Engineer
Richard Rugg, Administrator
Lamprey Regional Solid Waste Cooperative
One Lamprey Way
Durham, New Hampshire
868-1068

Incineration Out-of-State

Discussions have been held with Robert Bell, City of Auburn, Maine, Public Works Director, and a letter of intent has been sent to the City Manager, Charles Morrison, relative to New Hampshire's possible use of the Auburn incinerator. Mr. Bell saw no apparent problems with the concept as long as the following requirments are met:

(a) The debris meets Maine Department of Environmental Protection approval for incineration at the facility;

(b) The material is bagged in plastic;

(c) Their schedule can handle the volume of debris proposed for incineration.

In general, the facility could handle roughly 10 tons of bagged debris at a time which is about 20 cubic yards or the contents of two 12-yard trucks. The tipping fee would be between $15 and $20 per ton as opposed to the $8.50/ton charged the State of Maine. The lower fee reflects an initial capital investment of $500,000. These fees, as well as other necessary agreements, would have to be arranged by the New Hampshire Water Supply and Pollution Control Commission in conjunction with the City of Auburn and the Maine Department of Environmental Protection.

Future contact should be made with:

Charles Morrison
City Manager
City of Auburn
45 Spring Street
Auburn, Maine 04210
(207) 786-2421

Richard Baker
Department of Environmental Protection
Oil and Hazardous Materials Bureau
State House
Augusta, Maine 04333

(207) 289-2251.

It should be noted that transportation costs are considerable for out-of-state disposal. A 12-yard truck costs approximately $35/hour including the driver (this is for a low bid). Transportation and handling time from New Hampshire to Auburn and back would be about five hours. Disposal of debris, assuming there are six tons in the truck would be $90-$120. Add in transportation, and the total cost would run between $255-$285 or $42-$48 per ton. Therefore, use of Lamprey will be more economical, especially in the long run, and will decrease any chance of oil contamination out-of-state during transportation.

The facility should not be discounted, however, since it could be used as an interim site until arrangements are completed with Lamprey, as backup in the event of an extremely large spill event or as a substitute for the Lamprey facility if arrangements cannot be made to utilize their incinerator. Therefore, the State should continue to negotiate with the City of Auburn and the Maine Department of Environmental Protection.

Landfilling of Non-combustibles

The Center has pursued the out-of-state disposal of non-combustibles consulting with the responsible officials in adjoining states. It is apparent that no state is accepting out-of-state wastes at their secure landfills, at least intentionally. The only secure landfills that currently accept out-of-state solids are SCA Services and CECOS, Inc., both of Model City New York, and Rollins Environmental Services in Bridgeport, New Jersey. Transportation costs to these areas would be prohibitive for solids. Therefore, it is in the State of New Hampshire's best interests to pursue in-state disposal of non-combustible solids.

The Center has discussed this possibility with Pat Banfield, owner of Turnkey Landfill of Rochester, Inc. Turnkey has an existing site of about 65 acres located in sandy loam soils. The facility has handled oily debris in the past, co-disposing with municipal refuse. The materials were soaked with #6 and #2 oils. The facility is in the process of constructing a three-foot clay liner and monitoring wells are in place. A leachate collection system

is being developed to comply with the Bureau of Solid Waste Management's requirements.

Turnkey is presently conducting engineering studies of a 65-acre clay area for future expansion. Subsurface investigations are being conducted.

From initial contact, it appears that the Turnkey facility has the necessary setup to effectively handle landfilling of oily debris. When the clay site is developed, an even more secure facility will result.

The Bureau of Solid Waste Management should pursue the approval of this site for secure landfilling of non-combustible solids. A modified permit would be needed, since the landfill is not authorized to handle oil debris, which is classified as a "special waste" under the State Solid Waste Laws.

Mark Gallup, formerly with the New Hampshire Bureau of Solid Waste Management, suggested that Turnkey and the State could approach the approval process in two ways:

(a) Turnkey could wait until a sizeable spill to prepare the site to handle the debris according to state requirements. This could be written into a permit ahead of time. Preparation time could take up to two months which would require storage for that period. Turnkey could recover expenses through disposal charges to the responsible parties;

(b) The state could pursue a full permit with Turnkey requiring site preparation upon permit approval. Such a process would require state financial assistance to defray capital costs, since the requirement would be the result of implementation of the state plan.

In reviewing the Solid Waste Guidelines, July 1981, prepared by Wehran Engineering Corporation for Gordian Associates, Inc., it is worth noting that the soil, leachate, cover, and drainage guidelines for landfill design are closely related to the design requirements for landfilling of oily debris. The only important guidelines not in the State's are: (a) overburden soils of clay or clay-silt mixtures; (b) a minimum of 10 feet of overburden soils underlie the site; and (c) the overburden soils be saturated to prevent cracking of the underlying clay/silt soils.

The Turnkey existing site does not meet these guidelines, but the proposed new site will as long as the 3-foot clay liner and a leachate collection system are installed. The Bureau of Solid Waste Management should proceed to study the site further working

towards full approval as a secure landfill of "special wastes": oil-soaked, non-combustible solids.

Use of this site for oil spill debris will also require local approval from the City of Rochester since the landfill at present is not approved for this purpose by the city. The WSPCC will have to contact the City for their approval of this site.

Future contact should be made with:

Pat Banfield
Turnkey Landfill of Rochester, Inc.
Rochester, New Hampshire
1-271-3556

In-State Oil/Water Separation

Use of facilities in Massachusetts for oil/water separation will be available for the forseeable future. It is, however, an interim solution and the state should investigate the recommended methods for developing in-state capabilities. These are:

(a) Installation of storage tanks and a 400 gpm separator at the long-term storage site;

(b) Use of C.H. Sprague's existing separator at their Newington terminal.

C.H. Sprague Company's Newington facility has one Wemco separator with a capacity of 200 gallons per minute that might be able to handle oil/water separation after a spill event. Contact was made with George Pennock, C.H. Sprague Environmental Engineer, to discuss this possibility. Mr. Pennock indicated that the company could provide theoretical and technical assistance to the state on the possible use of their separator. He briefly listed some of the technical and other requirements that would need to be met before any use could take place. These are:

(a) The liquid cannot be:
--polar organic in nature
--water soluble oils
--oil that has had dispersants applied

(b) Lab tests would have to be run on the liquids to determine if they are acceptable. Costs would be the responsibility of the State or spiller.

(c) Modification of the existing NPDES permit would be necessary if the separators were used for this purpose. Mr. Pennock felt that this was possible.

Future contact should be made with:

George Pennock
Environmental Engineer
C. H. Sprague Company
Portsmouth, New Hampshire
1-431-5131

WHERE DOES THE MONEY COME FROM ?

Cost of Implementation

Determining the overall cost of this plan and subsequent monetary needs is difficult due to the immense number of variables involved. If the State had to develop all the facilities on their own, it would never develop as a program. Fortunately, most, if not all the recommendations may be able to be implemented with no sizable capital outlay. This would depend upon agreements reached between the State of New Hampshire, Lamprey Regional, and Turnkey Landfill. The pivot point, therefore, probably rests on the long-term storage site. The Center's estimate for development of a basic 2-acre site that utilizes a native clay liner is $89,000. If a runoff lagoon, oil/water separator, and oil recovery unit are included, the costs would be around $154,000, not including the price of land. A check with realtors in the area revealed that land prices could range from $20,000/acre in the Portsmouth/Newington area to as little as $500-$1000/acre in the surrounding rural towns. It is the assumption of this study, however, that land will be available at no cost either at Turnkey or some other public/industry-owned parcel.

If a reasonable cost-sharing arrangement can be worked out with Lamprey, such as alternative (b) as previously mentioned, then the total program capital cost might run around $91,400. However, site development costs for Turnkey may be necessary as well as higher cost-sharing for Lamprey, and a higher cost for the storage site concept (the estimates were based on 1979 dollars). It should be noted that all costs will be recoverable over time from user charges.

The estimates provided throughout this study will obviously need more refinement as implementation proceeds and various agreements, permits, etc., are finalized. The costs do provide a guide, however, an implementation bench mark from which to proceed.

Oil Pollution Control Fund

This fund, which is administered by WSPCC and based on a $0.015 per barrel oil import charge, is for the costs associated with implementing RSA 146-A including administrative salaries and expenses. Since the WSPCC is responsible for seeing that oil spill debris is disposed of "in a manner acceptable to the state," the funds could be utilized for implementation costs associated with the recommended debris disposal management plan.

At the present time, the fund has approximately $200,000 available above administrative expenses. Since there are other needs for this fund at present, it cannot be used for the $91,400 estimated for basic implementation costs. As the fund builds, however, monies could be directed from the fund for use in plan implementation. The WSPCC would have to go to the Governor and the Executive Council to request this allotment of funds.

If the implementation was staggered--first a site location study is conducted; then basic development is undertaken (site preparation and construction of dikes and a liner); finally, over time, other recommended support facilities could be added--then perhaps this fund could be used, since it is anticipated that monies will accumulate in the fund over the next decade.

This staggered implementation would break down as follows:

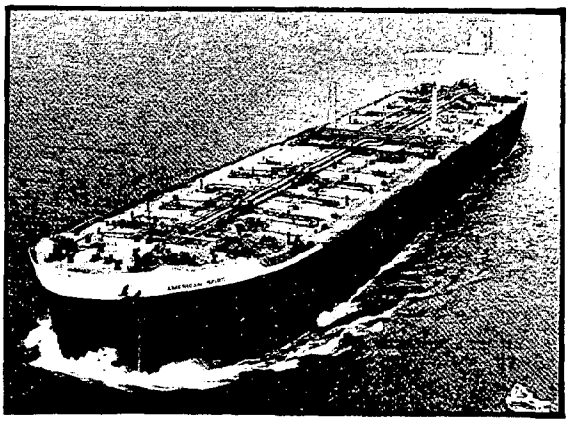
(a)	First year:	
	--purchase of emergency stockpiling materials	$2,400
	--site location study	$15,000
(b)	Second and third year:	
	--site preparation, dike construction and liner	$40,000
(c)	Fourth year or later:	
	--remaining support facilities (API oil recovery unit runoff lagoon, oil/water separator)	$54,000

Coastal Energy Impact Fund

The Coastal Energy Impact Program (CEIP) is a federally assisted program designed to minimize or eliminate the impacts of coastal energy activities. The Office of State Planning is the state agency designated to administer the Fund which is made available to the State under the Coastal Zone Management Act of 1972, as amended.

With respect to the report recommendations, the CEIP Funds can be used for specific design or construction activities, including development of the storage site and purchase of materials for the emergency storage sites.

Due to Federal restrictions, the CEIP Funds cannot be used out of the designated coastal zone. This precludes the use of CEIP monies for any activities at Turnkey in Rochester. The use of CEIP monies for Lamprey is less clear. The Fund cannot be used for cost incentives. It can, however, be used for any required facility changes.



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Appendices

APPENDIX A

APPENDIX A: Oily Waste Storage/Stockpiling Area Site Criteria

The process of locating, designing and constructing an oily waste stockpiling and storage site requires strict adherence to physical site criteria to ensure environmental protection. The following criteria are based on the results of the Center's 1978 Penobscot Bay study for the State of Maine Department of Environmental Protection, Division of Oil Conveyance Services; the 1979 study conducted for Maine DEP by SCS Engineers entitled, "Oily Wastes Management, an Investigation of Alternatives for the State of Maine"; EPA criteria outlined in their oil spill technical manuals (see References); and the professional experience of the staff. These criteria reflect the state-of-the-art. They are presented here for consideration by the State of New Hampshire for future storage/stockpiling site selection. Anyone intending to utilize these criteria should check with the New Hampshire Bureau of Solid Waste Management for the latest regulations in this area.

The most important criteria for site selection are those that protect surface and ground waters. Contamination of surface and ground water by poorly engineered chemical disposal sites and sanitary landfills has raised considerable concern about protection of these valuable resources. In order to develop a storage/stockpiling site that is politically and publicly acceptable, site planning and location must be undertaken in such a way that strict adherence to the following criteria are obtained.

Surficial and Bedrock Geology Site Criteria

Geologic site criteria are the basis of site selection. They have been developed to ensure protection of the fragile ground-water systems and maintain the integrity of aquifers and surface-water resources. The criteria are presented below:

Surficial and Bedrock Geology Criteria for Storage/Stockpiling Site Selection (Source: SCS Engineers)

a. Overburden (soils) will satisfy characteristics of CL, CH, or OH soils as per the Unified Soil Classification System. These soils are clay or clay/silt mixtures which will inhibit migration of fluids.

b. The permeability of the overburden is as near $1x10^{-7}$ cm/sec as possible. This permeability is characteristic of clays and clay/silt mixtures.

c. A minimum of 10 ft. of suitable overburden will underlie the site. This gives a minimum of 100 years of containment by the overburden.

d. The overburden should be saturated, i.e., the water table fairly close to the surface. Although this contradicts present practices, the concept is workable. Consider the nature of clay-rich soils. When dry they crack, increasing the permeability to unacceptable levels.

   Therefore, if the overburden is wet, fracture development will be minimal. Another consideration is the interpretation of a water table in clay and silt deposits. These materials give up very little water to wells and consequently cannot be exploited for that purpose. Slow migration rates further support this decision.

e. The site should not overlie an identified sand and/or gravel aquifer and preferably be no closer than 1,000 ft. laterally from the boundaries of any sand and gravel aquifers.

f. The site will not be located in a regional ground-water recharge area.

g. If possible, it is desirable to locate a site in a regional ground-water discharge area. A ground-water discharge area is characterized by converging ground water flow, i.e., ground water flows to this area from all directions. This effectively isolates the site with respect to ground water contamination. These areas are likely to be underlain by wet soils-another criterion previously discussed.

h. A minimum separation of 500 ft from domestic wells and 1,000 ft for municipal wells from the site will be maintained. This decision is based on the extremely slow rate of migration of ground water in clays and silts ($p = 10^{-7}$ cm/sec). It would take a drop of water, flowing at 0.1 ft per yr, 4,800 yr to travel the 500 ft to the well.

i. A site will not be located on zones of high yield bedrock wells as mapped by the New Hampshire and United States Geological Surveys. The inference here is that these zones represent bedrock which has abnormally high permeability due to fracture development or faulting.

j. The site will maintain a minimum setback of 300 feet from the 100-year floodplain of any classified stream, and a minimum setback of 300 feet from any pond or lake.

k. The exception to Letter j, above, is in the case of a body of water which is used as a source of potable water, in which case a minimum setback of 1,000 ft will be established.

l. The original slope of the land where the site is to be located will range from three to seven percent. This range is selected for stability (clay and silt are too unstable above seven percent to allow economic site development) and also to avoid potential surface runoff problems.

Aquatic Ecosystem Criteria

The geologic site criteria are designed to protect surface waters. Adherance to these criteria will guarantee protection of aquatic ecosystems. Engineering of the site to protect against sedimentation and erosion and to offer treatment of any discharge are

further methods to protect aquatic ecosystems, but they are part of the design rather than site selection process.

Terrestrial Ecosystem Criteria

The storage/stockpiling site should not be located at or adjoining designated critical natural areas. The heavy equipment activities associated with construction and use of the site could seriously disrupt these areas. Where acceptable, the site should be located in areas already developed for industrial or urban use.

Air Quality Criteria

The storage/stockpiling site should be developed such that state and Federal emission standards for hydrocarbons are not exceeded. Existing data from EPA indicates that very little air pollution would be expected from oil evaporation at a storage or land disposal site. For example, a large (24,000 gallon) oil spill would increase the total hydrocarbon air pollution in Los Angeles by only 0.01 percent over a 100-day period, based on 1973 emission rates and a six percent assumed evaporation rate from a landfarming site. Landfarming would have a higher evaporation rate then would occur at a storage site. Therefore, it can be assumed that air quality standards can be met by an engineered storage/stockpile area.

Land Use Criteria

The site should be compatible with surrounding land uses. Local land-use plans, zoning ordinances, etc. as well as state guidelines will provide the necessary guidelines for site selection.

Site Accessibility Criteria

Existing access roads into a proposed site should have all-weather construction. If none exist, the site should be accessible through easily constructed emergency roads.

The site should be as close as possible to the areas of expected debris generation to minimize costs and the amount of oil spilled in transit.

APPENDIX B

APPENDIX B: Oily Wastes Storage/Stockpiling Site Selection Procedure

Proper site selection involves a sequence of steps that reflect the established site criteria, extent of existing physical, cultural and biological data, and the areal needs of the site. The following steps represent a comprehensive methodology that will identify suitable sites. They are not hard and fast rules, and some steps may occur in a sequence other than suggested. It is important that, whatever method is followed, the site chosen should reflect the goals and needs of the oil debris management program.

a. Using best available mapping, establish a base map of the study region. The base map should show the location of existing public and private waste disposal sites, public lands, oil storage facilities, airports, incinerators, railroad rights-of-way, etc.

b. Develop initial screening, acetate overlays that identify:

    1. High yield bedrock zones, geologic faults, aquifer recharge areas, unconsolidated surficial deposits identified as possible aquifers, public and private wells, surface-water reservoirs used for public water supply, and 100-year floodplains

    2. Areas with less than 10 feet of overburden

    3. Location of marine clays

c. Superimpose the overlays developed in Step 2 to screen out those areas that definitely do not meet the established criteria. The composite map will reveal those areas that can be ruled out because they are not underlain by marine clay and/or 10 feet of over-burden, are within 1,000 feet of a mapped fault, are located on or adjoining recharge areas or high-yield bedrock zones, or are within 300 feet of the 100-year floodplain.

d. Select at least 10 sites that warrant field reconnaissance. These sites can be easily determined through the composite overlay and by studying the topography, geology, and surface water features of the site to see if they tentatively meet the required site criteria. Particular attention should be given, if possible, to those areas that appear to satisfy the site criteria and are on publically owned land.

e. Using a qualified team consisting of a geologist, soil scientist, civil engineer, and ecologist/botanist, conduct a field reconnaissance of the preliminary sites to verify the mapped data and to collect field information at the site. In the case of private land, prior permission must be obtained in writing.

   Information that needs to be gathered for each site includes: access, vegetation screening, surface drainage conditions, and proximity to nearby surface waters, soil types, location of seasonal high water, surrounding land use, proximity to nearby wells, and proximity to wetlands and other natural features that warrant consideration in the assessment of environmenal impact.

f. Review the field data and recent aerial photographs that show the regional setting for each site, screen out any sites that are not suitable. This step should narrow down the available sites.

g. Hold a public meeting to inform citizens in the area of the site location and the purpose of a storage/stockpiling site.

h. Conduct a detailed site investigation of the preliminary sites. This investigation will establish the subsurface geology of the site, through boring samples which identify any geologic constraints that would render a site unsuitable. This step should narrow the available sites down to a number which can then be purchased or leased depending upon public acceptance, land availability and cost.

APPENDIX C

APPENDIX C: Guidelines for the Location of Emergency Stockpiling Sites

In recognition of the fact that there is a need to develop the capability of locating emergency sites for the stockpiling of oil-soaked debris, the Center has developed a set of guidelines to aid in site location. It is anticipated that these sites will be predesignated and approved by the state so that they can be made readily available in a spill emergency. These guidelines can also be used to locate an emergency site during a spill event. They provide basic considerations of a site that will minimize any possible environmental contamination. These guidelines are the recommendations of the Center. Anyone who intends to utilize these guidelines should check with the New Hampshire Bureau of Solid Waste Management to determine the latest regulations and guidelines.

Site Location Guidelines

(a) Sites should be located in areas with a minimum of 10 feet of overburden soils that are clay, silty clay or fine sandy loams. These soils inhibit migration of fluids. To locate these soils refer to the Soil Conservation Service soil surveys for Rockingham and Strafford Counties. The soil types most acceptable for locating storage sites are:

Be--Biddeford silty clay loam
Bg--Belgarde silt loam
Bz--Buxton silt loam

Ea--Elmwood fine sandy loam
Sc--Scantic silt loam
Su--Suffield silt loam
Sw--Swanton fine sandy loam
Wm--Whately fine sandy loam

(b) Avoid location of sites in a ground water recharge or discharge area. Check the following sources for information concerning ground water resources:

Ground Water Assessment, Maine Report-Southeastern New Hampshire Water Resources Study., U.S. Army Corps of Engineers, March 1981.

Availability of Ground Water in the Piscataqua and other Coastal River Basins of Southeastern New Hampshire. U.S. Geological Survey Water Resources Investigation 77-70.

New Hampshire Coastal Zone Study map entitled: Areas of Particular Concern.

(c) Do not locate the site in an obvious coastal or riverine floodplain zone. Check local HUD Flood Insurance studies for location of major floodways and/or consult with a competent hydrologist when locating sites. Wetlands (tidal and coastal) are to be avoided as well.

(d) Make sure that a site does not adjoin or drain into the watershed of a waterfowl conservation, wildlife management, and/or critical resource area as defined in the State Oil Spill Contingency Plan (308, Pages 66-74). Define watersheds on U.S. Geological Quad Sheets for the Coastal Region.

(e) Sites should be located by 500 feet from domestic wells and 1000 feet from municipal wells.

(f) Choose sites on topography with a slope of between zero and seven percent.

(g) The site should be compatible with surrounding land use.

(h) The site should preferably be located on a paved parking lot in industrial areas, when the proceeding guidelines can be met. The pavement adds a secondary protection beyond the polyethylene liner utilized in constructing the site. Another choice would be an existing diked area located at one of the terminals.

(i) The site should be at least 1000 feet from any public water supply (refer to State Contingency Plan, 306.1,2 pages 47-61 for location of public water supplies).

(j) Do not locate the site adjacent to ravines, gullies, sides of hills or other areas where surface runoff could be a problem.

(k) Locate sites within the areas of potential spill cleanup operations and near access to major primary and secondary road systems.

Site Construction and Operation

(a) The site should be constructed following Figure 2.

(b) Temporary oil/water separators can be constructed from 55-gallon drums to aid in further volume reduction at the site. Figure 9 shows a typical drum. Oil/water mixtures are entered at the top and allowed to settle. The water can then be drained off through the bottom drain valve and the oil removed for reuse by a waste oil dealer.

(c) All debris should be carefully dumped into the site to avoid puncturing the liner.

(d) Debris removal can be undertaken by hand or by using a front-end loader. The loader would remove debris from one end, rolling up the liner as it proceeded and resetting the hay bale dikes.

APPENDIX D

TREATMENT, STORAGE, AND DISPOSAL FACILITIES (TSDF) AVAILABLE TO CONNECTICUT INDUSTRIES, 1981.

Source: State of Connecticut, Department of Environmental Protection, Hartford, Connecticut.

1) The appearance of a facility on this list is not a recommendation to use, or an approval of, the facility. This list is subject to change without notification.

2) The descriptions given under the headings "TYPE OF TREATMENT" and "TYPE OF WASTE ACCEPTED" are general and brief. Therefore, we suggest that you contact a facility directly for more detailed information about the services they offer and the wastes they will accept, if you are considering "disposal" of a particular waste.

3) Under the heading "CONNECTICUT LICENSED HAULER":

   a) No = Not licensed by the State of Connecticut to transport hazardous wastes within Connecticut during the current licensing period.

   b) Yes = Licensed by the State of Connecticut to transport hazardous wastes within Connecticut during the current licensing period.

   c) The current licensing period ends _____.

4) The current permit status of a facility should be ascertained by contacting the appropriate State Authority prior to using a facility. See attached sheet for State Authorities.

Phone:

State Office Building, Hartford, Connecticut 06115

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STATE AUTHORITIES

CONNECTICUT:
Hazardous Materials Management Unit
Dept. of Environmental Protection
State Office Building
165 Capitol Avenue
Hartford, CT 06115
(203) 566-4869

NEW JERSEY:
Dept. of Environmental Protection
32 East Hanover Street
Trenton, NJ 08625
(609) 292-6847

NEW YORK:
Hazardous Waste Bureau
Dept. of Environmental Conservation
Room 401
50 Wolf Road
Albany, NY 12233
(518) 457-3254

MASSACHUSETTS:
Water Resources Commission
Div. of Water Pollution Control
110 Tremont Street
Boston, MA 02108
(617) 727-3855

PENNSYLVANIA
Commonwealth of Pennsylvania
Dept. of Environmental Services
P.O. Box 2063
Harrisburg, PA 17120
(717) 787-8184

TREATMENT, STORAGE, AND DISPOSAL FACILITIES (TSDF) AVAILABLE TO CONNECTICUT INDUSTRIES

FACILITY	TYPE OF TREATMENT	TYPE OF WASTE ACCEPTED	CONNECTICUT LICENSED HAULER
CONNECTICUT			
Environmental Waste Removal, Inc. 130 Freight Street Waterbury, CT 06702 (203) 755-2283	Demulsification of Soluble Oils, Acid and Caustic Neutralization, Heavy Metal Precipitation, Cyanide Destruction	Waste Oils, Soluble Oils Spent Acids and Caustics, Various Plating Wastes, Cyanides	Yes
Liqwacon Old Waterbury Road Thomaston, CT 06787 (203) 283-8235	Acid and Caustic Neutralization, Cyanide Destruction, Liquid-Solid Separation	Acids, Caustics, Cyanides, Heavy Metals in Solution, Sludges with Heavy Metals	Yes
Solvents Recovery Service of New England, Inc. Lazy Lane Southington, CT 06489 (203) 621-6791	Distillation and Fractionation	Waste Solvents	Yes
Hitchcock Gas Engine Co. 40 California Street Bridgeport, CT 06608 (203) 334-2161	Heat Treatment, Ultra-filtration, Disposal	Water Soluble Oil, Waste Fuel, Crankcase and Lubricating Oil	Yes
Safety - Kleen 24 Brixton Street West Hartford, CT 06110 (203) 522-4222	Recovery and Reuse	Degreasing Solvents	Yes
Wyatt, Inc. 900 Chapel Street New Haven, CT 06507 (203) 787-2175	Recovery and Disposal	Fuel Oil and Fuel Oil Sludge	Yes
City of Torrington Box 1277 Torrington, CT 06790 (203) 489-2277	Filtration and Disposal	Waste Fuel, Crankcase and Lubricating Oil	Yes
Connecticut Treatment Corp. 51 Broderick Road Bristol, CT 06010 583-8917	Recovery of water soluble oils, Acid and Caustic Neutralization, Heavy Metal Precipitation, Cyanide Destruction	Soluble Oils, Spent Acids and Caustics, Various Plating Wastes, Cyanides	Yes

FACILITY	TYPE OF TREATMENT	TYPE OF WASTE ACCEPTED	CONNECTICUT LICENSED HAULER
NEW JERSEY			
Advanced Environmental Technology Corp. The Dayton Building 520 Speedwell Avenue Morris Plains, NJ 07950 (201) 539-7111	Transfer, Storage	Packed Laboratory Chemicals, Solvents, Pesticides, Acids, Alkalis, Dyes, Pigment Solutions, Oils	Yes
Browning-Ferris Industries, Inc. 714 Division Street Elizabeth, NJ 07207 (201) 352-2222	Transfer, Storage	Flammable Solids, Paints, Pigment, Oil, Solvents, Flammable Liquids	Yes
Earthline Co. Div. of SCA Services 100 Lister Avenue Newark, NJ 07105 (201) 465-9100	Organic Reclamation, Neutralization, Detoxification (reduction-oxidation)	Organic Aqueous Waste, Solvents, Acids, Alkalis, Cyanides, Heavy Metal Waste	Yes
Inland Chemical Co. 600 Doremus Avenue Newark, NJ 07102 (201) 589-4085	Reclamation, Recovery	Solvents, Organic Liquids, Aqueous-Organic Emulsions, Lacquer, Paint, Pigment Residues	No
Marisol, Inc. 125 Factory Lane Middlesex, NJ 08846 (201) 469-5100	Transfer, Blending, Reprocessor, Reclamation, Recovery	Oils, Emulsions, Solvents, Paint, Pigment Residues Flammable and Non-flammable Liquids, Flammable Organic Liquids	No
Perk Chemical Co., Inc. 217 South First Street Elizabeth, NJ 07206 (203) 355-5800	Transfer, Storage, Reprocessor, Reclamation, Recovery	Oils, Solvents, Acids, Alkalis, Flammable and Non-flammable Organic Liquids	Yes
Rollins Environmental Services P.O. Box 331 Bridgeport, NJ 08014 (609) 467-3100	Incineration, Chemical Treatment, Recovery, Reclamation, Transfer, Storage, Disposal	Sludges, Contaminated Residues, Spill Debris, Slurries, Semi-Solids Heavy Metal Slurries	Yes
Solvents Recovery Service of New Jersey, Inc. 1200 Sylvan Street Linden, NJ 07036 (201) 925-8600	Transfer, Storage, Reprocessor, Reclamation	Oils, Emulsions, Solvents, Acid and Alkali Solutions, Flammable and Non-flammable Liquids, Paint, Pigment Residues	(see Solvents Recovery of New England, Inc. in Connecticut)
Modern Transportation Co. 75 Jacobs Avenue South Kearny, NJ 07032 (201) 589-0277	Neutralization and Reprocessing	Acids, Caustics Industrial Waste Water, Waste Oil	Yes

FACILITY	TYPE OF TREATMENT	TYPE OF WASTE ACCEPTED	CONNECTICUT LICENSED HAULER
NEW YORK			
CECOS International, Inc. (formerly Newco Chemical Waste Systems, Inc.) P.O. Box 619 Niagara Falls, NY 14302 (716) 731-3281	Reclamation, Detoxification, Secure Landfill Neutralization	All Wastes, except Shock Sensitive and Radioactive Wastes, including DDT Powder, Lab Wastes, PCB Solids (including Capacitors, and Drained Transformers), Pesticides, Paint Sludges	Yes
Chemical Waste Disposal Corporation 42-19 19th Avenue Astoria, NY 11105 (212) 274-3339	Reclamation, Transfer, Neutralization	Laboratory Chemicals, Acids and Caustics, Solvents	Yes
Frontier Chemical Waste Process, Inc. 4626 Royal Avenue Niagara Falls, NY 14303 (716) 285-8208	Oxidation-Reduction, Neutralization, Physical Separation, Distillation	Organic and Inorganic Chemical Aqueous Liquids, Cyanide, Plating Wastes and Sludges, Oils, Solvents, Lacquers	Yes
Howard & Bowen 631 Colfax Street Rochester, NY 14606 (716) 254-6210	Reclamation	Waste Film, Sludges Containing Silver	No
Leo-Ronel, Inc. 272 Buffalo Avenue Freeport, NY 11520 (516) 868-8800	Neutralization	Liquids with Heavy Metals, Acids and Alkalis	No
SCA Services P.O. Box 200 1135 Balmer Road Model City, NY 14107 (716) 754-8231	Neutralization, Detoxification, Recovery, Secure Landfill	Acids and Caustics, Cyanide, Heavy Metals in Solution, Solvents, Paint Sludges, Pesticides, Oils, Waste Lab Chemicals	Yes
Radiac Research Corp. 261 Kent Avenue Brooklyn, NY 11211 (212) 963-2233	Transfer, Storage	All Classes of Hazardous Materials, including Radioactive and Explosive Wastes	Yes
PENNSYLVANIA			
IU CONVERSION SYSTEMS, INC. 115 Gibraltar Road Horsham, PA 19044 (215) 441-5924	Stabilization, Microencapsulation	Sludge	No

FACILITY	TYPE OF TREATMENT	TYPE OF WASTE ACCEPTED	CONNECTICUT LICENSED HAULER
MASSACHUSETTS			
Lewis Chemical Corp. 12 Fairmont Court Hyde Park, MA 02136 (617) 361-3410	Transfer, Storage	Organic and Inorganic Chemicals, Cyanide and Plating Waste, Solids and Sludges	No
Recycling Industries, Inc. 385 Quincy Avenue Braintree, MA 02184 (617) 848-0612	Reclamation, Neutralization, Transfer, Storage	Oils, Solvents, Organic and Inorganic Chemicals, Cyanide, Plating Wastes Solids and Sludges, Pesticides	Yes
Re-Solve, Inc. P.O. Box 1842 47 Slade Street Fall River, MA 01752 (617) 995-9811	Transfer, Storage, Reclamation	Oils, Solvents, Organic and Inorganic Chemicals, Cyanide and Plating Wastes, Solids and Sludges	Yes
Suffolk Services, Inc. 98 Taylor Street Boston, MA 02122 (617) 825-9044	Transfer, Storage	Aqueous Organics and Inorganics, Pesticides, Solids, Outdated Laboratory Chemicals, Acids, and Alkalis	Yes
Cyn Oil Corporation 1771 Washington Street Stoughton, MA 02072 (617) 344-0265	Filtration and Disposal	Water Soluble Oil Crankcase and Lubricating Oil	Yes
Cannons Engineering Corp. 350 Main Street West Yarmouth, MA 02673 (617) 697-3344	Transfer, Storage	Oil, Solvents, Lacquer, Organic Chemical Liquids	Yes
Eastern Chemical Specialties, Inc. P.O. Box 643 Worchester, MA 01613 (617) 752-2891	Transfer, Storage, Reclamation	Oils, Solvents	No
Geochem, Inc. 263 Howard Street Lowell, MA 01852 (617) 459-9302	Transfer, Storage, Reclamation	Oils, Solvents, Organic and Inorganic Chemicals, Cyanide and Plating Wastes, Solvents	No
Interex Corporation 3 Struthmore Road Natick, MA 01760 (617) 237-6650	Transfer, Storage	Organic and Inorganic Chemicals, Cyanide and Plating Waste, Solids and Sludges, Reactive Materials, Pesticides, PCB Solids	Yes

APPENDIX E

AGREEMENT BETWEEN THE STATE OF MAINE AND THE CITY OF AUBURN, MAINE

This contract is made as of this 11th day of March , 1980, by and between the City of Auburn, Maine, a municipal corporation organized and existing under the laws of the State of Maine (hereinafter called "Auburn"), and the Board of Environmental Protection (hereinafter called "Board").

The parties to this contract, in consideration of the mutual covenants and stipulations set out herein, agree as follows:

1. Disposal of Oily Waste:

A. Auburn shall maintain in good operating condition a solid waste disposal facility to dispose of combustible oily waste, however and wherever generated, [redacted] beginning from the date of final acceptance of the Auburn Solid Waste Energy Recovery Facility by the City of Auburn. Such combustible oily waste shall be disposed of as provided for in the rules and procedures to be enacted by Auburn in accordance with the provisions of this contract.

B. The parties agree to discuss the feasibility of the disposal of other types of combustible materials at the Facility. Such discussions will include, among other things, the compatability of the Facility's combustion equipment to the combustible materials and the disposal fee for such materials. Provided, however, that nothing herein contained shall create an obligation on the part of either party to enter into any agreement for the disposal of such other types of combustible materials.

2. Definitions:

A. Combustible oily wastes means oil; petroleum products and their by-products of any kind and in any form including but not limited to petroleum, fuel oil, sludge, oil refuse, oil mixed with other wastes, crude oils and all other liquid hydrocarbons regardless of specific gravity; oil spill debris including floating organic materials such as seaweed, driftwood or flotsam; land vegetation; naturally occurring non-biodegradable materials; manufactured products used to clean up or contain oil spills. Except as defined in the previous sentence, "combustible oily wastes" does not include hazardous wastes (as listed by name by the Board), or other types of materials, which would cause damage to the Facility or its personnel and prevent Auburn from fulfilling its obligations under this contract.

B. Facility means the Auburn Waste Energy Recovery Facility and bypass/ash residue landfill.

C. Ton means 2,000 pounds.

D. State means the State of Maine, its officers, agents, and employees.

E. Board means the Board of Environmental Protection, including its successors.

F. Auburn means City of Auburn, its officers, agents, employees, and includes the Facility's operator and operator's officers, agents, and employees.

3. [redacted] Weighing; Costs:

A. Board agrees to pay Auburn a disposal fee of no more than eight dollars per ton for the disposal of combustible oily wastes.

B. All combustible oily waste shall be weighed at the Facility to determine the amount of the disposal fee.

C. [redacted]. Payment of said money shall be as follows: (1) within 60 days of the execution of this Agreement, Board shall pay Auburn 90% of the total amount due, or a total of $507,000.00; and (2) within 60 days of the acceptance of the completed Facility by Auburn, Board shall pay Auburn the remaining 10% of the total amount due, or a total of $56,400.00. [redacted].

4. Rules and Procedures for Facility:

A. The Auburn Facility shall be governed, controlled and administered solely by the Auburn City Council and the City Manager of Auburn in accordance with the terms of this contract and all rules and procedures enacted by the Auburn.

B. Auburn shall promulgate reasonable rules and procedures for the use and operation of the Facility. No later than thirty days prior to the enactment of said rules and procedures, and any amendments thereto, Auburn shall submit to Board a written copy of any proposed rules and procedures for the purpose of enabling Board to submit written comments on said rules and procedures.

C. The parties agree to be bound by said rules and procedures, together with any amendments therefor, as if they were originally made part of this Contract, provided however that all such rules and procedures shall be reasonable and shall not prevent either party from fulfilling its obligations under this contract.

D. A certified copy of said rules and procedures together with any amendments thereto shall be on file and available for public inspection at the office of the City Clerk for the City of Auburn. Also, a certifed copy of said rules and procedures together with any amendments thereto shall be sent by registered or certified mail, with restricted delivery and return receipt requested, to the Chairman of the Board.

E. Such rules shall ensure a delivery schedule and rate of disposal for all of the State's combustible oily waste within 365 days from the date the State has custody of said combustible oily waste.

5. Indemnity: Auburn agrees to indemnify, defend and save harmless the State, its officers, agents, and employees from any and all claims and losses accruing or resulting to any person, firm, or corporation who may be injured or damaged by Auburn in the performance of this contract.

Board agrees to indemnify, defend and save harmless Auburn, its officers, agents and employees from any and all claims and losses accruing or resulting to any person, firm or corporation who may be injured or damaged by the Board in performance of this contract.

6. Vehicles; Insurance: Vehicles used by collectors and haulers shall be standard 6- to 10-wheeled dump trucks of 10-yard-maximum capacity dump body. [redacted]s.

Board shall also require all collectors and haulers which it may license or engage to collect the State's combustible oily waste,

except those collectors and haulers who are State employees, to obtain and maintain property damage and personal liability insurance in an amount of no less than $300,000.00 and to promptly provide Auburn with a certificate of such insurance with a thirty day cancellation notice to the City of Auburn.

7. Expenses of Facility: All decisions and determinations as to operating budgets, wages and salaries, equipment and supply purchases and any and all other operating expenses of the Auburn Facility not otherwise covered by this contract shall be solely within the discretion of the Auburn City Council and City Manager.

8. Property of Auburn: All land, buildings and equipment and any and all other property before, now or hereafter acquired by Auburn to establish, operate and maintain the Auburn Facility shall be solely the property of Auburn, and Board shall not by virtue of this contract have or acquire any proprietary rights, title or interests therein. Board shall not, by virtue of this contract, obtain, acquire, or succeed to any rights or entitlements other than those expressly set out and provided for herein.

9. Meeting of Parties: During the calendar year of 1999, representatives of Auburn and Board shall meet to determine the feasibility of continuing this contract beyond its expiration date. If it is mutually determined at that time that the Auburn facility is still a feasible system for the disposal of combustible oily wastes, Board shall have the option to renew this contract for an additional ten years on terms to be negotiated by the parties. Should it be determined that a different system is more feasible at the end of

this contract, then Board shall be given the right to participate in the new system upon terms and conditions to be agreed upon by the parties.

10. Assignment: Neither party shall sublet, sell, transfer, assign, or otherwise dispose of any portion thereof, or of its right, title, or interest therein, without written consent of the other party; provided, however, that nothing herein contained shall prohibit or restrict Auburn from employing the person, firm or corporation of its choice to operate the facility ("operator"). Such employment by Auburn of its operator shall not release either party of its liability under this contract.

11. Applicable Law: The parties agree to comply with all applicable federal, state, and local laws and regulations which are either now in effect or hereafter enacted and, if necessary, to execute and deliver any amendment to this contract in order to meet any such new law or regulation.

12. Contingency: This contract is contingent upon the completion and acceptance by Auburn of the Auburn Solid Waste Energy Recovery Facility as more particularly described in the City of Auburn's request for proposal for the Auburn Solid Waste Energy Recovery Project, dated December 1st, 1977. In the event that said Facility is not completed and accepted by the City of Auburn, this contract shall be void and of no effect, and Auburn shall refund all money paid by the Board pursuant to paragraph 3 of this contract, together with interest at the legal rate from the date Auburn gives notice to Consumat Systems, Inc. or Global Development Engineering, Inc. that Auburn does not accept the Facility.

Auburn shall submit to the Board written progress reports on or before January 1, April 1, July 1, and October 1 of each year until completion and acceptance of said Facility by Auburn. In the event that Auburn has a cause of action alleging negligence or breach of contract against any contractor, subcontractor, architect, engineer, or manufacturer of any equipment for recovery of any funds advanced to Auburn by the Board, the Board shall be permitted by Auburn to the extent legally possible to intervene in said cause of action on behalf of the Board and on behalf of Auburn to recover any amounts which may be awarded as actual damages; said recovery shall reduce any amount which Auburn is obligated to refund the Board pursuant to the first paragraph of paragraph 12 of this contract.

13. Equal Employment Opportunity: During the performance of this contract, Auburn agrees as follows:

A. Auburn will not discriminate against any employee or applicant for employment relating to this agreement because of race, color, religious creed, sex, national origin, ancestry, age or physical handicap, unless related to a bona fide occupational qualification. Auburn will take affirmative action to insure that applicants are employed and employees are treated during employment without regard to their race, color, religion, sex, age or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotions, or transfers; recruitment or recruitment advertising; layoffs or terminations; rates of pay or other forms of compensation; and selection for training including apprenticeship. Auburn agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

B. Auburn will, in all solicitations or advertising for employees placed by or on behalf of Auburn relating to this agreement, state that all qualified applicants will receive consideration for employment without regard to race, color, religious creed, sex, national origin, ancestry, age, or physical handicap.

C. Auburn will send to each labor union or representative of the workers with which he has a collective or bargaining agreement, or other contract or understanding, whereby he is furnished with labor for the performance of this contract, a notice, to be provided by the contracting department or agency, advising the said labor union or workers' representative of Auburn's commitment under this section and shall post copies of the notice in conspicuous places available to employees and to applicants for employment.

D. Auburn will cause the foregoing provisions to be inserted in any subcontracts for any work covered by this agreement so that such provisions shall be binding upon each subcontractor, provided that the foregoing provisions shall not apply to contracts or subcontracts for standard commercial supplies or raw materials. Auburn, or any subcontractor holding a contract directly under Auburn, shall to the maximum feasible, list all suitable employment openings with the Maine Employment Security Commission. This provision shall not apply to employment openings which Auburn, or any subcontractor holding a contract under Auburn, proposes to fill from within its own organization. Listing of such openings with the Employment Service Division of the Maine Employment Security Commission shall involve only the normal obligations which attach to such listings.

14. Employment and Personnel: Auburn shall not engage on a full-time, part-time or other basis during the period of this contract, any professional of technical personnel who are or have been at any time during the period of this contract in the employ of any State Department or Agency, except regularly retired employees, without written consent of the public employer of such person. Further, Auburn shall not engage on this project on a full-time, part-time or other basis during the period of this contract any retired employee of the Department who has not been retired for at least one year, without the written consent of the Contract Review Committee.

15. State Employees Not to Benefit: No individual employed by the State at the time this contract is executed or any time thereafter shall be admitted to any share or part of this contract or to any benefit that may arise therefrom directly or indirectly due to his employment by or financial interest in Auburn or any affiliate of Auburn. This provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

16. Warranty: Auburn warrants that it has not employed or written any company or person, other than a bona fide employee working solely for Auburn to solicit or secure this contract, and that it has not paid, or agreed to pay any company or person, other than a bona fide employee working solely for Auburn any fee, commission, percentage, brokerage fee, gifts, or any other consideration, contingent upon, or resulting from the award for making this contract. For breach or violation of this warranty, the Board shall have the right to annul this contract without liability or, in its discretion to deduct from the contract price or consideration, or otherwise recover the full amount of such fee, commission, percentage, brokerage fee, gifts, or contingent fee.

17. Interpretation and Performance: This contract shall be governed by the laws of the State of Maine as to interpretation and performance.

18. Invoices and Payments: Payment of any disposal fees incurred by the Board shall be made by the Board within 30 days after receipt of an approved itemized invoice submitted by Auburn upon its usual billing forms or business letterhead.

19. Independent Capacity: The parties hereto agree that Auburn, and any agents and employees of Auburn, in the performance of this contract shall act in an independent capacity and not as officers or employees or agents of the State or Board.

20. Contract Administrator: All invoices, progress reports, correspondence, and related submissions from Auburn shall be directed to:

Name: Marc Guerin
Title: Director, Division of Oil Conveyance Services
Address: Bureau of Water Quality Control
Augusta, Maine;

who is designated as the Contract Administrator on behalf of the Board for this contract. The Board may designate another person as Contract Administrator after reasonable notice to Auburn.

21. Department's Representative: The Contract Administrator shall be the Department's representative during the period of this contract. He has authority to stop the work if necessary to ensure its proper execution. He shall certify to the Board when payments under the contract are due and the amounts to be paid. He shall make decisions on all claims of the Contractor, subject to the approval of the Head of the Department.

22. Access to Records: Auburn shall maintain all books, documents, plans, working papers, payrolls, papers, accounting records, and all other evidence pertaining to costs incurred under this contract and to make such materials available at its offices at all reasonable times during the period of this contract and for three years from the date of the expiration of this contract, for inspection by the Board or any authorized representative of the State of Maine and copies thereof shall be furnished, if requested, to the Board at the expense of the Board.

23. Termination: The performance of work under the contract may be terminated by the Department in whole, or, from time to time, in part whenever for any reason the Contract Administrator shall determine that such termination is in the best interest of the Board. Any such termination shall be effected by delivery to Auburn of a Notice of Termination specifying the extent to which performance of the work under the contract is terminated and the date on which such termination becomes effective. The contract shall be equitably adjusted to compensate for such termination and the contract modified accordingly.

24. This contract is subject to the approval of the Maine Attorney General's office, the Contract Review Committee and the State Controller before it can be considered as a valid document which can be executed.

25. Entire Agreement: This contract contains the entire agreement of the parties, and neither party shall be bound by any statement or representation not contained herein.

IN WITNESS WHEREOF, the City of Auburn has caused this instrument to be signed, sealed, acknowledged and delivered by Charles A. Morri **its** City/Manager, **thereunto duly authorized; and Board of Environmental Protection has caused this instrument to be signed, sealed, acknowledged and delivered by** Henry Warren, **its** Chairman **thereunto duly authorized; this day and year first above written.**

CITY OF AUBURN

Witness

BY: Charles A. Morrison
Its City Manager

BOARD OF ENVIRONMENTAL PROTECTION

Witness: Linda D. Pottle Notary Public

BY: Henry Warren
Its Chairman

STATE OF MAINE,

Androscoggin, ss: March 5, 1980

Personally appeared the above-named Charles A. Morrison and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said City of Auburn.

Approved as to Form:

March 11, 1980

Assistant Attorney General

Before me,

Justice of the Peace/Notary Public/
Attorney at Law

912947

State of Maine,
Kennebec, ss: March 11 19 80

Personally appeared the above-named Henry E. Warren and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said Board of Environmental Protection.

Before me,

Linda W. Robb
~~Justice of the Peace~~/Notary Public/
~~Attorney at Law~~

APPROVED
CONTRACT REVIEW COMMITTEE
DATE: 4-29-80
Stuart LaCroix
CHAIRMAN

REGISTERED
$64,000
STATE CONTROLLER

4-30-80
JS

APPENDIX F

Appendix F: Survey of Spill Debris Disposal Strategies in New England

Connecticut

Waste oil or oil spill debris is not presently considered a hazardous waste in Connecticut, but the state's definition of hazardous waste is currently being revised (there is an attempt to have the 140°F flash point adopted as a criteria). The state also does not have a policy on the concentration of heavy metals in oily waste debris which determines if it is hazardous. Whether Federal RCRA regulations will be adopted was not known. The transport and disposal of oily wastes in Connecticut does require manifests even though oily wastes are not considered as hazardous.

All spills must be reported to the state and must be cleaned up by the spiller or representative. If the spiller does not clean up, the state can, by using money from a designated general fund account. The state can then proceed, in court, to recover any monies expended for clean up.

Connecticut takes an integrated approach to spills of oil and chemicals by using a common state authority for response and disposal. The state has a designated six-man emergency cleanup unit to respond to the 750 to 1200 spills that are reported each year. The volume spilled in Connecticut each year averages in excess of several hundred thousand gallons. There have been no major oil spills in Connecticut in recent history.

The state policy for spills is rapid containment. Most oil is recovered by vacuuming and then recycled. Oil recovered from small volume spills is sometimes landfilled. There is no specific licensing system for landfills that handle spill debris. However, there is a list of sites which can accept small amounts of oily wastes by permit. Permits must be obtained on a case-by-case basis. The state also has incinerator facilities, all of which are run by municipalities. Incinerators are not specially licensed for spill debris. Any unit capable of burning bulky wastes can be used. Wet wastes, such as seaweed and grasses, are dried and then mixed with dry trash to increase the BTU content before being burned in a bulky waste incinerator. The state DEP is now preparing regulations on the burning of recovered oil to prevent pollution, especially from heavy metals. There are no regulations specifically prohibiting municipalities from accepting spill debris from out-of-state. Therefore, New Hampshire could conceivably use these facilities.

Connecticut does not currently have the ability to dispose of large amounts of spill wastes. There are no facilities which recycle oil in Connecticut so wastes are sent to other states for treatment. Their position is to encourage private industry to develop the necessary facilities.

Summary of Connecticut

Connecticut has some incinerators owned by municipalities that could possibly be used by New Hampshire for burning spill debris. Also, small amounts of spill debris could possibly be landfilled in Connecticut on a case-by-case basis. However, it is unlikely, due to financial and practical considerations, that Connecticut will help New Hampshire's strategy to any great degree. Also, as will be discussed later, oil spill debris is considered hazardous in Massachusetts. Thus, travel through Massachusetts which necessitates manifest and licensed hazardous waste transporters, would make the cost of transporting wastes to Connecticut very expensive.

Rhode Island

In Rhode Island all spills must be reported to the state and be cleaned up by the spiller or a representative. If the spiller does not clean up, a contractor is hired using monies from a state fund and the spiller is billed. If the spiller is not known or does not reimburse the state, the state then relies on the EPA 311 fund.

In Rhode Island, oily wastes are considered hazardous unless proven otherwise, i.e., do not fall under RCRA definition of hazardous by having flash points lower than 140°F or high heavy metal contents. The burden of proof is on the spiller.

Landfills within the state cannot accept hazardous oily wastes. However, if it is demonstrated that the wastes do not fall under RCRA criteria, oily wastes may be disposed of at separate areas within landfills. A state landfill was approved for spill debris disposal, but it has recently been designated for industrial development precluding it from this use. A private landfill in Cranston, Rhode Island, owned by the Capuano Brothers, can accept non-hazardous oily wastes if approved by the state. This landfill is the only site in Rhode Island presently accepting oily wastes.

The Solid Waste Bureau is involved with debris disposal when it is not hazardous. This Bureau has authorized disposal of debris from Massachusetts on a case-by-case basis at the Capuano site and might make similar arrangements with New Hampshire should there be a spill.

There are no waste oil recovery facilities or refineries in Rhode Island so most liquids go to the New York-New Jersey area. There are also no licensed incinerators in Rhode Island for spill debris disposal. There are several waste oil dealers which operate in Rhode Island which could possibly temporarily store liquid oily wastes should New Hampshire have a spill.

Summary of Rhode Island

The best possibility for cooperation between New Hampshire and Rhode Island appears to be limited to disposal of non-hazardous debris on a case-by-case basis at licensed landfills such as the one in Cranston. There is no possibility of assistance from Rhode Island on treatment of waste liquids or combustibles (other than landfilling). There is some possibility that waste oil dealers could assist with temporary storage of oily liquids. Again, since Massachusetts currently defines oily wastes as hazardous, wastes transported through the state must be manifested and transported by licensed carriers. This will have a tendency to keep the costs of transporting wastes to Rhode Island high.

Rhode Island realizes that they do not have the capability to deal with a large quantity of wastes and seems interested in solving the problem. In recognition of their lack of facilities, Rhode Island has designated several beach areas as temporary storage areas. The Department of Health has authority to dike or cover these temporary storage areas to prevent further contamination

while making arrangements for the final disposal of oily wastes.

Vermont

Unlike the other five New England states, Vermont has no coastal zone but is concerned with the possibility of large spills in Lake Champlain as well as in its numerous smaller lakes and rivers.

All spills must be reported to the state and must be cleaned up by the spiller or a representative. If the spiller does not clean up, the state has a small contingency fund. It also relies on the Coast Guard or EPA 311 Fund to provide necessary clean-up monies.

Waste oil and spill debris are considered to be hazardous waste in Vermont. Therefore, these materials must be disposed of at a fully licensed hazardous waste facility either in or out-of-state. There are no licensed facilities, incinerators or water treatment plants, in Vermont. Very small quantities of spill debris (less than a few cubic yards at a time) have been landfilled on a case-by-case basis. All other debris is presently being stored or stockpiled pending an approved disposal option.

The New England Marine Company of Burlington has a site designated for landfarming which is pending approval. Public sentiment is against the operation primarily since oily wastes are defined as hazardous in Vermont and the town voted against it last year. New England Marine is still attempting to obtain approval.

The state Office of Environmental Engineering/Hazardous Wastes Section is proposing that the state consider a new landfarming technique to solve its oily waste management problem. This technique involves using calcium hydroxide and a proprietary ingredient to speed up the landfarming process. It can be used at existing landfills, yields a reusable material (for example, it can be used as sub-base material in roadbeds), and appears to be cost effective.

Vermont expressed interest in the possibility of using a New Hampshire site should New Hampshire take steps to seek approval of one.

Summary of Vermont

Since all spill debris is considered hazardous and there are no approved spill debris disposal sites or facilities in Vermont, the possibility of a viable relationship with New Hampshire is remote.

It would appear that Vermont would favor the regional concept for large volume debris disposal. But, in light of the fact that spill debris is considered a hazardous waste in Vermont, the persons with whom we spoke led us to believe that it would be easier to accomplish the goal in a state where spill debris is not considered to be a hazardous waste.

Massachusetts

In Massachusetts all spills must be reported to the state and must be cleaned up by the spiller or a representative. Many of the large oil companies have the money and capability to respond to their spills. If the spiller cannot or does not clean up, the Coast Guard will respond to the spill using monies from the Federal 311 K fund. The spiller is expected to reimburse the Coast Guard, but non-payment is often the case. The state also has a fund for cleanup, but it is not often used. The state may agree to have a more active role in cleanup operations.

Massachusetts relies heavily on the Coast Guard to oversee clean up of coastal spills. Massachusetts generally attends to inland spills and has a small general fund account from which "mystery" spills can be cleaned up until EPA arrives on the scene. The responsible party, when known, is liable to the state for all costs incurred by the state for the investigation and those incurred during containment and removal operations. All damaged areas must be restored to their original condition. Damages to natural and recreational resources are the responsibility of the spiller as well as damages to persons and personal property.

Waste oils, contaminated water, and solid spill debris are considered to be hazardous wastes in Massachusetts. These wastes must therefore be disposed of at licensed hazardous waste facilities. Any materials coming into the state of Massachusetts must be fully manifested and transported by a licensed hauler which increases the cost.

There are several licensed oil-water separators owned by private companies in Massachusetts. There are also several waste oil dealers operating in Massachusetts which may assist in temporary liquid storage. There are no licensed incinerators for burning spill debris or any licensed landfills for debris disposal in Massachusetts. However, there are many communities located

primarily on Cape Cod, that have small approved temporary storage sites for spill debris.

There are a few private companies seeking approval of hazardous waste disposal facilities. One company, SRS, Inc., wants to build a hazardous waste recycling plant in Haverhill, Massachusetts. The plant is designed primarily to accept solvents, but would also accept oil. It is in the preliminary stages of approval. Another company, IT Corporation, is looking for a location for a 100 million dollar, incineration, recycling, landfilling facility. The project has received preliminary approval (feasible and deserving decision). The approval process will take a minimum of 12 months and, if approved, construction will take several years. These proposed facilities are designed primarily to handle wastes generated in Massachusetts but may accept out-of-state wastes as well. New Hampshire should look into this possibility if the facility is approved.

Summary of Massachusetts

Massachusetts has the capabilities for the reprocessing and recycling of some oily liquids that might be generated in New Hampshire. There are no restrictions on bringing out-of-state spill liquids to approved, licensed separators in Massachusetts. Aside from liquids, there does not appear to be much capability in Massachusetts for disposal of spill wastes since there are no landfills or rotary incinerators now accepting oily wastes.

Some new development of facilities in Massachusetts is planned at this time but none of the projects have reached a stage where they are likely to be approved within the next three or four years. New Hampshire should keep in contact with the Bureau of Solid Waste on a routine basis to keep up with the progress being made by private companies in Massachusetts. There are no plans being made by the state at this time to develop their own capability for debris disposal.

Maine

Maine operates its spill control program under a law enacted in 1970 entitled the Coastal Conveyance Act. The law requires that all spills be reported to the state and that the spiller or a representative be responsible for cleanup and restoration of damages. Maine has a six million dollar oil spill contingency fund for responding to spills. This is collected through as assessment on oil transferred from ships on a per barrel basis at

the larger Maine terminals. Maine has an aggressive spill control program entirely financed from this fund. Oil spill and chemical spill response is integrated into the same agency. Maine experiences between 300 to 400 spills annually and normally several hundred thousand gallons are spilled each year.

Waste oils and spill debris are not considered hazardous wastes in Maine. These materials are not considered solid wastes either and, instead, fall into a broad category called "special" wastes. The term "special" connotes a waste that is rather innocuous but needing proper management. Persons engaged in transporting these wastes need no special licenses or permits.

Small amounts of non-combustible debris may be disposed of on a case-by-case basis with the approval of the state solid waste officials, usually by the landspreading technique on dirt parking lots or at sanitary landfills.

Combustible debris can be handled by either the Town of Windham municipal incinerator or the City of Auburn incinerator. Both these facilities are specifically licensed to burn spill debris. Windham can take relatively small amounts on a case-by-case basis with written approval of the DEP staff. This insures that the source of the debris is documented so that unknown wastes are not involved.

The City of Auburn has a new facility with four units capable of burning 200 tons of combustible bulky wastes each day. This facility encourages the burning of spill debris and has virtually eliminated the problem of combustible spill debris disposal in Maine. To date, out-of-state wastes are not prohibited at either of these facilities.

Currently, there are no licensed oil-water separators in Maine for spill liquids even though there have been several attempts in the private sector to obtain approval for separators. Most attempts to obtain permits to treat and discharge this water have failed due to local opposition, inaccessibility to properly classified water bodies and/or financial limitations. Therefore, oil and water wastes are sent to Massachusetts for processing. Again, since oily wastes are considered hazardous in Massachusetts, wastes transported to Massachusetts must be manifested and carried by licensed vehicles. There are several waste oil dealers in Maine which could help with the temporary storage of liquid wastes.

Over the past three years, Maine has been attempting to develop and implement a statewide strategy to dispose of spill debris using a staging area, processing and/or recycling strategy. This three-year project has been quite expensive thus far but has

solved some of the problems and could solve all the problems should local opposition give way to approval of the state's strategy. To date, the entire project has been financed entirely from the state fund. If the multi-million dollar facilities are ultimately approved and constructed, at least $500,000 will have to be granted to the project from the Federal government through a Coastal Energy Impact Program Grant.

The basic concept behind the Maine strategy is as follows: Pre-site staging areas or temporary storage sites for spill debris are needed and should be designed to handle wastes from the largest expected event. In areas away from large size tanker traffic, it is estimated that disposal sites would have to handle 5,000 cubic yards of solids. In areas with high tanker traffic, disposal sites should be designed to handle an estimated 25,000 cubic yards of solid wastes. Liquid storage facilities are not needed due to the availability of existing tank storage either in mobile mode (tank trucks) or waste oil dealers.

In Maine, one small site, designed for the temporary storage of 5,000 cubic yards and to be located at the Bangor International Airport on the property of the City of Bangor, is in the final approval process. Three such sites were originally envisioned to serve the less populated areas of the state. Two have been dropped at this time due to unavailability of land. They may be pursued later depending upon the outcome of the Bangor project.

Another larger facility, to be located on land in the City of South Portland, is also proposed. This site would also be designed not only for temporary storage but also for sorting spill debris.

In conjunction, these four facilities would safely store spill debris in an emergency until it could later be taken to the sorting area. Activities such as mixing small amounts of heavily saturated soil with large amounts of dry uncontaminated earth can easily be accomplished given such a sorting/staging area. At the sorting area, combustibles would be separated from non-combustibles and non-combustibles would be "sized" for recycling as asphalt production items, roadbed fill, or sanitary landfill cover. Once combustibles are sorted out, they can be incinerated by the Windham or Auburn facilities. Since the City of Auburn received a grant of $500,000 from the State Oil Pollution Fund, access to the incinerator by the state is guaranteed for at least the next 30 years regardless of the volume involved.

The best feature of the South Portland facility, aside from being an area where waste materials can be sorted into useful items, is that it is always ready for temporary storage of a relatviely large volume of debris. Maine has experienced large spills three times in the past 25 years.

Technical considerations and some of the problems in obtaining local approval associated with the search for sites in Maine are given in a report entitled "Oily Wastes Management, an Investigation of Alternatives for the State of Maine" prepared for the State of Maine Department of Environmental Protection by SCS Engineers, Augusta, Maine (1979-1980).

The question of whether the Maine site can be used for disposal or management of out-of-state wastes is open at this time. The South Portland project has been shelved for the near future. If Federal money is to be used on the project, then it would appear to be unconstitutional to deny access to the facility to any state. However, this issue is a well-debated subject and has not been entirely resolved at this time. Most likely it will remain unresolved until a vote on the permit at the local level is finalized.

Summary of Maine

Maine is attempting to implement a statewide strategy for debris disposal, relying heavily on temporary storage with incineration and landspreading for ultimate disposal.

It is the Center's opinion and recommendation at this time not to officially approach the Maine DEP with questions regarding the availability to New Hampshire of the proposed sorting facility in South Portland out of fear that this could jeopardize its chance for approval. It would be better to wait and see how the question is dealt with by the communities involved. If it is obvious that out-of-state wastes will be allowed, on a limited basis, than New Hampshire could openly seek use of the site with some financial assistance to secure the deal. This would not be a deceitful approach as it would insure that people at the local level would be aware of New Hampshire's intent. A financial offering would lessen the cost burden for Maine and the community. It would also have the advantage of being perceived as a political move toward more regional solutions of the disposal problems faced by New England. The other option is to use the facility with the approval of officials on a case-by-case basis.

New Hampshire could consider contacting the Town of Windham and/or the City of Auburn at this time about burning combustible waste from New Hampshire.

OBSERVATION

From the above discussions of the various state approaches, it can be seen that regional solutions appear to be the most feasible although virtually no attempts have been made to do so. Most states feel that it is mainly the industries' responsibility to solve the problem. The complexity of the approval process, however, discourages proposal of new disposal projects.

If every state cooperates, there is definitely the capability within New England to manage a great deal of debris. With state approval, Rhode Island could handle some solids at a private landfill. Maine has incinerators which could accept combustible wastes and Massachusetts has the ability to process oily water. Therefore, facilities are available to deal with oily wastes. With cooperation, New Hampshire might be able to solve its oily waste problem without much financial investment.

APPENDIX G

CORRESPONDENCE BETWEEN THE STATE OF NEW HAMPSHIRE AND THE LAMPREY REGIONAL SOLID WASTE COOPERATIVE

RECEIVED AUG 1 3 1981

Lamprey Regional Solid Waste Cooperative
c/o Town Offices 13-15 Newmarket Road Durham, N.H. 03824
603-868-1068

Cooperating Towns:
Barrington
Durham — UNH
Epping
Greenland
Lee
Madbury
Newfields
Newington
Newmarket
Northwood
Rollinsford
Stratham

August 11, 1981

Mr. Steve Tibbetts
c/o Center for Natural Areas
P.O. Box 98
South Gardiner, ME 04359

Dear Steve,

To follow up our telephone conversation yesterday, I am enclosing the following letters for your review and use:

1/25/80 - Malcolm Chase to Ronald Poltak
1/28/80 - Malcolm Chase to Tom Sweeney
5/5/80 - Malcolm Chase to Ronald Poltak
5/12/80 - Ronald Poltak to Malcolm Chase

Since the dialogue of these letters, the construction of our facility has been completed as summarized in Mr. Chase's letter of January 25, 1980 with the exception of the additional 30' x 40' storage area. The facility operates with two incinerators and one boiler on full time and one incinerator and boiler on stand-by.

On one occasion last fall, we accepted some oil spill waste on a trial basis. Although some additional and special handling was needed, the acutal burning of the waste seemed to have no adverse affect on our plant.

Although the Durham Point facility is listed as a possible storage site, the Cooperative includes a total of 13 towns in the seacoast area (see map enclosed), and there may well be other sites within our bounds entirely suitable and with ample area to facilitate interim storage.

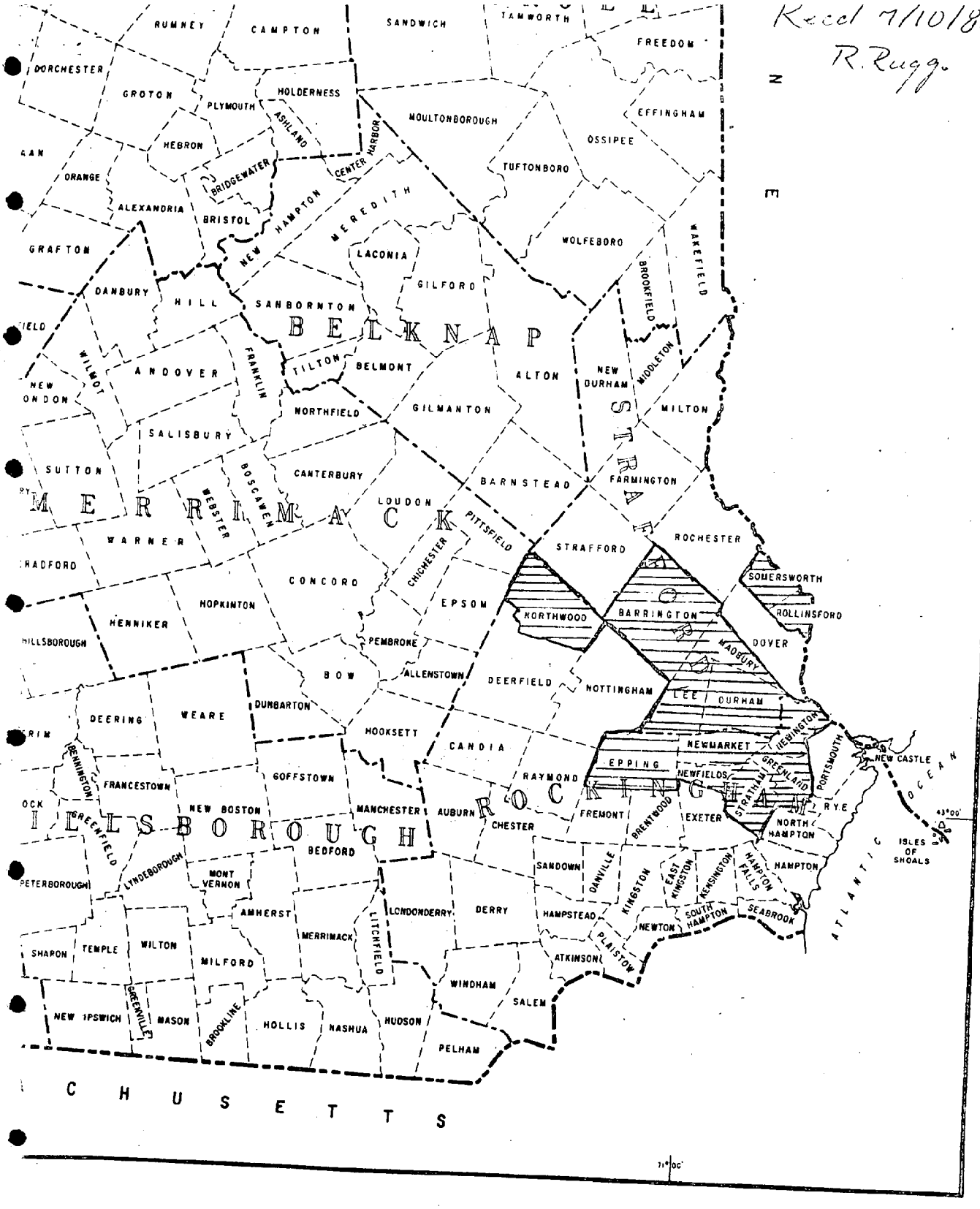
As you can see, Mr. Chase has done much of the groundwork for setting up the Lamprey Cooperative as a feasible alternative for the disposal of New Hampshire's oil spill waste. The Lamprey Cooperative is still very much interested in pursuing this effort so if we may be of further assistance please do not hesitate to call either myself at 868-1068 or Mr. Chase at his Portsmouth office; 431-2520.

Very Truly Yours,

John H. Dewyea
Project Engineer

JHD:psm
Enclosures
cc: Malcolm J. Chase
Ronald E. Poltak

Recd 7/10/81 from R. Rugg.



Lamprey Regional Solid Waste Cooperative

c/o Town Offices 13-15 Newmarket Road Durham N.H. 03824

603-868-1068

Cooperating Towns:
Barrington
Durham - UNH
Epping
Greenland
Lee
Madbury
Newfields
Nevington
Newmarket
Northwood
Rollinsford
Stratham

January 25, 1980

Mr. Ronald F. Poltak
Director
OFFICE OF COMPREHENSIVE PLANNING
2½ Beacon Street
Concord, N.H. 03301

Dear Mr. Poltak:

This letter, written as a follow-up to my meeting with Mr. Chittum of your staff on Tuesday, January 22, is intended to express the interest of the Lamprey Regional Solid Waste Cooperative in undertaking a cooperative effort with the State of New Hampshire in the disposal of oil spill waste. As discussed with Mr. Chittum, it is our belief that we have all the requirements to handle on a long range basis, the storage and incineration of waste and other contaminated materials resulting from accidental oil spills. In order for you and your staff to understand the scope of our project, and its status, it would seem appropriate to develop some of the history of our refuse disposal program in Durham.

The University of New Hampshire and the Town of Durham have jointly owned and operated a solid waste incinerator for nearly ten years. While the unit is definitely a prototype of a good incinerator facility and has worked well, we were only able to construct and install one two-ton-per-hour burning unit when it was initially constructed rather than two such units which were designed and proposed for the initial installation. This second unit would have provided the backup needed to maintain positive operation at all times.

Because of its concern for lack of backup, the joint Town-UNH Incinerator Committee, which sets the policy for the operation of our incinerator, felt that it was necessary to make long-range plans for our future operations. To this end, the Committee engaged a consultant in 1976 to evaluate our present operation and develop alternate plans for the future to include consideration of the construction of a second plant at the University, where heat recovery would be possible and, further, to give consideration to permitting those adjoining towns who had indicated an interest in utilizing our present incinerator to join with us in a limited regional cooperative program of solid waste disposal. Their interest in joining with us had been engendered in part by the State moratorium which has been placed on many of them to cease certain types of landfills and burning.

The report produced by our consultants indicated quite clearly, at least in the preliminary investigations, that a second plant could be utilized at the University to produce steam, and could reduce by almost half the University and Town's cost for solid waste disposal. A requisite of this program was the inclusion of the solid waste from our neighboring towns to attain a total solid waste fuel of approximately 20,000 tons per year.

Because of the apparent benefits to be derived from the foregoing programs, the nine cooperating towns, at their 1977 Town Meetings, with two additional towns joining in 1978, authorized their Selectment to enter into cooperative agreements with the Town of Durham and the University, and further, appropriated a proportionate share of the estimated $20,000 required to proceed with a detailed feasibility study for the construction and operation of a joint solid waste and heat recovery unit. This detailed study confirmed that the construction of three, 36-ton-per-day units adjacent to the UNH steam plant offers the very best cost benefits in reducing the cost of a portion of the heating requirements of the University and in the definite halving of the cost of our present solid waste disposal program. All cooperating towns, through the Policy Committee which has been established to oversee the program, unanimously endorsed this proposal at their 1978 Town Meetings, and approved their proportionate share of the estimated cost of the project.

The Cooperative, through its Operations Committee, engaged an engineering firm to design the incinerator system in August of 1978. The plans and specifications for this incinerator facility provided for the above noted three 36-ton-per-day refuse fired modular incinerator units to include primary chambers, incinerator secondary chambers, auxiliary fuel system, heat recovery boilers, breechings and stacks for each incinerator, control panels, boiler controls, boiler soot blowers, equipment structures, refuse feed system, automatic wet residue system, and all accessories and appurtenances required for a complete and operating system. Our specifications include the requirements that each incinerator meet all federal and state emissions standards. A complete set of these documents was furnished to Mr. Lunderville, Director of the New Hampshire Air Pollution Division of the New Hampshire Department of Health on April 5, 1979.

Our designs incorporated sufficient capacity based on estimated waste presently generated by the twelve cooperating communities (see letterhead) and in the foreseeable future, such that one thirty-six-ton incinerator and one boiler would give us a complete backup system for use in normal maintenance operation and for emergencies. Although we felt, when the construction estimates were made in late '77 and early '78, that sufficient funds would be available, the increased capacity of the systems, the larger building required to house them, coupled with unanticipated

foundation problems at the site, and the universal increased costs due to inflation and other causes encountered at the time of bidding, has resulted in total planned project costs in excess of available funds. This has necessitated, with the cooperation of the two major contractors, Consumat Systems of Richmond, Virginia (Energy Systems), and Griffin Construction Company of Portsmouth, New Hampshire (Site Development), the staging of the construction by delaying, in general the backup elements, until additional funds are made available. With the initial break-in period for the incinerators scheduled for late May and early June, and regular operations for July, it is essential for efficient full completion of the project, to secure additional funding at the earliest possible date. All of the foundation work is presently nearing completion. The setting of the major incinerator components began yesterday, and the building erection will follow shortly early in February. We are essentially on the schedule we set for ourselves two years ago.

It is our hope, therefore, that through funds available through your agency, that we can work out a joint program, whereby the Cooperative will store, incinerate, and dispose of residue of oil spill waste materials. For preliminary consideration, I have outlined the following tentative procedures for handling and disposal of the wastes:

1. Emergency Storage. Once the new facility on the campus is in operation, the existing UNH/Durham incinerator will be mothballed. This will release the present covered storage building, with a capacity of 100 tons, to accommodate the oil spill waste. There is unlimited space at our present location for safe storage of waste materials, until they can be moved either under cover or to the incinerator plant.

2. Transitional Storage. Waste material will be moved by appropriate vehicles from the present incinerator storage site to the tipping floor of the new plant in programmed quantities determined for efficient incineration with the normal waste stream. Should additional storage space be required, a long range plan building addition, approximately 30' x 40', can be added to the new building.

3. Incinerator Capacity. We will have available, under present estimates, for the handling of additional waste generated, one stand-by 36-ton-per-day incinerator, which we feel can adequately handle the additional waste resulting from oil spill clean-ups. Our incinerators are so designed that waste fuel moves very slowly through the length of the chamber, (8 to 12 hours), such that appropriate heat and time of burning required for oil wastes, can be met, and with the sophisticated afterburner system, will meet air emission control requirements.

4. Energy System. The plant is so designed that efficient operation is best obtained in the production of energy (steam), that when three incinerators are in operation, the second boiler is almost essential, and should be installed concurrently with all other planned elements of the refuse-to-energy system.

5. Scale System. Our plan calls for the installation of a scale system with print-out records for all deliveries of waste. This has been delayed until additional funds are made available. The weighing at the site is one of the key elements in maintaining accurate records of material delivered and processed for budgeting and reimbursement to the Cooperative by the towns and the sale of steam to the University.

The costs of the items which we envision would accommodate the additional tonnage from oil spill wastes are included in our bids as follows:

1. Energy System - One complete energy system, consisting of a boiler, cyclone blower, gas manifold, and appurtenances, manufactured and installed $193,531.00

2. Incinerator - One complete, 36-ton-per-day incinerator, manufactured and installed $218,440.00

3. Scale System - One complete truck scale system, with automatic recording and read-out devices $ 30,000.00

4. Additional Storage - If required, an extension for additional interim storage at the plant, 30' x 40', (1,200 sq. ft.) can be added, estimated cost (not in bid) $ 36,000.00

For discussion purposes, we would be willing to consider an agreement with the State of New Hampshire whereby the Cooperative, over the entire life of the project (15 years, with extendable clauses) or any portion thereof, would contract for the storage and disposal of oil spill wastes. Based on an agreed-on reasonable allocation of capital costs towards the project construction and a per-ton charge for storage, transportation and disposal of the wastes, it would seem that a safe, efficient, and economical plan for such waste disposal could be jointly developed.

I would be more than pleased to meet with you and your staff at the earliest possible moment to review the possibility of an agreement for waste disposal. Your favorable consideration will be most appreciated.

Very truly yours,

Malcolm J. Chase, P.E.
Chairman

MJC/amk
cc: Mark Chittum

Lamprey Regional Solid Waste Cooperative

c/o Town Offices 13-15 Newmarket Road Durham N.H. 03824

603-868-1068

Cooperating Towns:
Barrington
Durham - UNH
Epping
Greenland
Lee
Madbury
Newfields
Newington
Newmarket
Northwood
Rollinsford
Strafham

January 28, 1980

Mr. Thomas Sweeney
Department of Health
State of New Hampshire
Hazen Drive
Concord, N.H. 03301

Dear Mr. Sweeney:

I am enclosing a copy of my letter to Mr. Poltak relative to making funds available for the handling of oil spill wastes. The letter is a follow-up to an earlier conversation between Mr. Cooney of the Strafford Regional Planning Commission, George Olson and Mark Chittum.

I would appreciate anything you might do in your planning to assist the Cooperative in gaining additional funding. As you know, the twelve towns have committed themselves with their own money and their own time and effort to make a program work and, as yet, we have had no assistance from anyone, despite the fact that communities all around us seem to be getting federal grants or other funds to encourage them to go ahead with mandated programs.

Please let me know if there is anything I should do in expediting the allocation of funds which, we understand, are presently available.

Very truly yours,

Malcolm J. Chase, P.E.
Chairman

MJC/amk
Encl

F.1 – Oil Spill
Lamprey

Lamprey Regional Solid Waste Cooperative

c/o Town Offices 13-15 Newmarket Road Durham N.H. 03824
603-868-1068

Cooperating Towns:
Barrington
Durham - UNH
Epping
Greenland
Lee
Madbury
Newfields
Newington
Newmarket
Northwood
Rollinsford
Stratham

May 5, 1980

Mr. Ronald F. Poltak, Director
Office of Comprehensive Planning
2½ Beacon St.
Concord, N. H. 03301

Dear Mr. Poltak;

As you may know, our new plant construction is proceeding essentially on schedule toward an operating date of July of this year. Simultaneously with the actual construction work we are developing our operating schedule to include personnel, transportation equipment and collection and delivery of refuse and removal and disposal of the ash residue. With this necessary planning going on, it would be extremely helpful to us to know if there's serious consideration given to your utilization of our plant to handle and dispose of oil spill waste.

As discussed in our letter of January 25, 1980, we feel quite comfortable in our ability to assimilate this special type of incineration as a cooperative effort with the State of New Hampshire. As of this past week we have successfully incinerated the most recent oil spill debris at our plant and all of our operating personnnel and administrative people who will be involved in the new plant feel that we can dispose of oil spill waste economically and efficiently.

The Directors of the Cooperative are concerned that we have not heard from your office as to the possibility of working out an agreement with the State for oil spill waste disposal. We would hope that the State plan would include incineration at our plant which would be the first of its kind placed in operation in the State of New Hampshire, possibly the only one which would be associated with a State funded facility such as the University of New Hampshire.

As a point of clarification, the listing of costs in our January 25 letter was simply for informational purposes and to enable you to evaluate some reasonable allocation of capital costs toward a long range program for waste disposal.

We would like very much to have the opportunity to work with your office and the office of the Division of Solid Waste toward a favorable consideration of our suggested program.

Very Truly Yours,

Malcolm J. Chase

Malcolm J. Chase, P.E.

MJC/ajm
cc: Tom Sweeney

OFFICE OF STATE PLANNING
STATE OF NEW HAMPSHIRE
2 BEACON STREET — CONCORD 03301
TELEPHONE 603-271-2155

May 12, 1980

Mr. Malcolm J. Chase
Chairman
Lamprey Regional Solid Waste
Cooperative
c/o Town Offices
13-15 Newmarket Road
Durham, New Hampshire 03824

Dear Mr. Chase:

This is with reference to the offer you presented some time ago for the use of the Lamprey Cooperative's incinerator for the disposal of combustible oily material. The Cooperative was particularly interested in receiving a capital grant under the CEIP program in return for the provision of the facilities.

Following your request, we contacted the Federal authorities and determined that such a request would not be funded because the facilities had previously been installed. Since that initial determination, we have continued to press this issue and have reached a more favorable position.

We have proposed that the New Hampshire Bureau of Solid Waste Management review the options for the disposal of oily debris on the coast. This feasibility study would look at the facilities available both in Maine and at Durham, as well as any other equally reasonable option. Should this effort indicate that the Durham facility is the most feasible, both economically and environmentally, it would be identified as the disposal facility within New Hampshire's plan.

On this basis, we probably would be able to provide capital grant funds to the Cooperative under an agreement for disposal of oily debris.

This looks like a step closer to a reasonable solution.

Sincerely,

Ronald Poltak
Director

RP:am