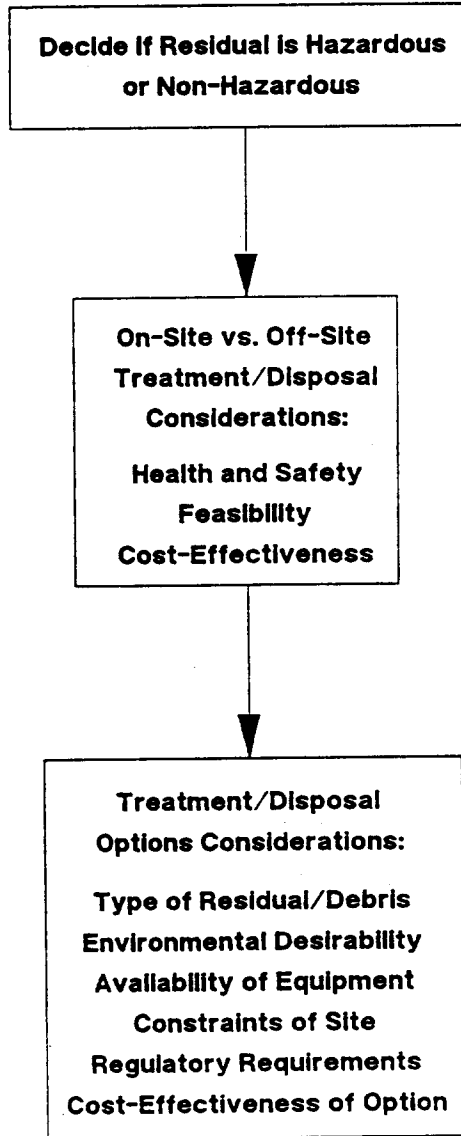


TECHNICAL
PROCEDURAL GUIDANCE

PROPER MANAGEMENT OF SPILL RESIDUALS AND DEBRIS

Proper Management of Spill Residuals and Debris

GUIDANCE SUMMARY-AT-A-GLANCE



Proper Management of Spill Residuals and Debris

GUIDANCE SUMMARY-AT-A-GLANCE

(continued)

EXAMPLES OF HAZARDOUS AND NON-HAZARDOUS SOLID WASTES

Proper management of spill residuals and debris entails ensuring that recovered product, contaminated water, contaminated soil, and other contaminated materials (e.g., sorbents) are handled, stored, transported, treated, and/or disposed of in accordance with all state, local, and federal requirements. The first step is determining if the spill residual is hazardous or non-hazardous solid waste.

Hazardous Solid Waste	Non-Hazardous Solid Waste
<u>HAZARDOUS SOLID WASTE</u>	<u>NON-HAZARDOUS SOLID WASTE</u>
Petroleum contaminated solid debris that is contaminated with:	Contaminated solid debris such as sand, soil, speedy dry, sorbent pads, vegetation, etc., resulting from spills of:
# Waste oil (waste oil is considered hazardous until lab tested and proven otherwise). # Gas (gasoline contaminated debris may be considered a hazardous waste due to the characteristic of ignitability, or if it contains 5ppm or more of lead. As vapors from flammable fuels will dissipate over time, it is recommended that gasoline soaked debris be spread temporarily in a well ventilated location on the property of the spiller until the characteristic of ignitability is eliminated. The debris can then be considered a non-hazardous solid waste to be disposed of properly. This is a temporary action to reduce ignitability and should not be maintained for an extended period of time) or fuel oils that fail a prescribed ignitability test # unknown materials until identified otherwise	# Virgin #2, #4, or #6 fuel oil # Fuel oil tank bottom waste # Diesel fuel # Crude oil # Gasoline Contaminated liquid: # Diesel fuel # #2, #4, #6 oil # Crude oil # Gasoline (gasoline contaminated liquid is considered a hazardous waste until the characteristic of ignitability is diminished. A ground-water sample of 0.25ppm or more will fail an EP toxicity test) # waste oil (if identified as non-hazardous)

(For more information, consult 6 NYCRR Part 371.3 and 371.4)

2.3 Proper Management of Spill Residuals and Debris

Your responsibilities in this respect include seeing that all spill residuals and debris generated during the site investigation and cleanup are managed properly.¹ This is true for both state- and responsible-party-directed spill responses. Proper management of spill residuals and debris entails ensuring that recovered product, contaminated water, contaminated soil, and other contaminated materials (e.g., sorbents) are handled, stored, transported, treated, and/or disposed of in accordance with all state, local, and federal requirements. You need to be familiar, therefore, with all the regulatory requirements regarding treatment and disposal of spill residuals.

In this section we cover the various requirements that apply to the management of spill residuals and debris -- for both hazardous material spills and petroleum spills. We also provide guidance on how to select management options for oil spill residuals.

1. Residuals from Hazardous Material Spills

Your involvement in a hazardous material spill is generally limited to emergency response activities. After the emergency situation has been alleviated, DEC's Hazardous Waste Remediation Division becomes responsible for any further cleanup that may be necessary. Therefore, you usually will not be involved in the treatment and/or disposal of a hazardous material spill residual after this point. However, there are instances in which emergency response activities will generate a residual that you believe should be at least removed from the scene in order to protect human health and the environment. If effecting such an action can be considered a continuation of your emergency response, you may authorize in this instance actions that would be defined as managing the residuals from a hazardous material spill.

In most cases, the residuals of a hazardous material will be considered hazardous waste, as are some petroleum spill residuals (see below). You must consult the Regional Solid and Hazardous Waste Engineer (RSHWE) whenever you believe that a residual you are dealing with may be considered a hazardous waste. You need to be familiar with the handling, transport, storage, treatment, and disposal requirements concerning hazardous wastes. Follow these guidelines for treating or disposing of a hazardous waste generated in a state-directed cleanup:

- # Pick a contractor qualified to transport and/or receive the hazardous waste (see State Contractor Selection and Call Out for more information).

¹ The term "spill residual" as used here means any recovered product and any debris. The term "debris" does not include recovered product, but refers only to the liquid and/or solid effluents that are produced in the investigation and cleanup of a spill.

NOTES

MANIFESTS AND EPA IDENTIFICATION NUMBERS

A Hazardous Waste Manifest form must accompany every regulated shipment of hazardous waste originating or terminating in New York. No manifest is required to transport less than 100 kilograms (220 pounds) of solid waste or less than 27 gallons of liquid waste. The EPA identification number, which is needed for the manifest, is a 12-digit number assigned to the generator for identification. The number is site-specific and valid for only one address.

OBTAINING PROVISIONAL EPA I.D. NUMBERS (Regional Office)

For any disposal activity which must occur immediately and is not expected to extend past 30 days, obtain a provisional EPA identification number:

1. Fill out a Provisional Number Questionnaire as completely as possible.
2. Call EPA at (212) 264-9880 during office hours, or at (201) 548-8730 during non-office hours.
Note: EPA is reluctant to issue provisional numbers for non-emergency situations when disposal is several weeks after the incident. If EPA will not give you a number, call the Spill Response Section to resolve.
3. Complete and forward the Provisional Number Questionnaire to the Spill Response Section within 10 days whenever a number is issued to DEC as a generator. If you also need a permanent EPA I.D. number (activity to extend past 30 days), indicate you need a permanent EPA I.D. number on the questionnaire. The Central Office will complete the EPA form Notification of Hazardous Waste Activity (EPA Form 8700-12) and send it to EPA.
4. Complete a Hazardous Waste Manifest (EPA Form 8700-22).

OBTAINING PERMANENT EPA I.D. NUMBERS (Regional Office)

If a disposal activity will occur in the future or will extend beyond 30 days, a permanent I.D. number will be required:

1. Fill out a Provisional Number Questionnaire as completely as possible no later than three weeks prior to disposal.
2. Forward the Provisional Number Questionnaire to the Spill Response Section. The Central Office will complete the EPA form Notification of Hazardous Waste Activity (EPA Form 8700-12) and forward it to EPA.
3. The Central Office will obtain a permanent number from EPA and send it to the region.
4. Complete a Hazardous Waste Manifest (EPA Form 8700-22)

NOTES

HAZARDOUS WASTE MANIFEST (EPA FORM 8700-22)

Fill out a hazardous waste manifest (Exhibit 2.3-1). The state signs the manifest form as the generator for manifest purposes only. The manifest, which identifies the type and amount of waste being transported, is designed to track wastes from their point of generation to the ultimate treatment, storage, and disposal facility (TSDF).

Follow these procedures for filling out the manifest:

1. Fill out the manifest according to procedures outlined in the New York Hazardous Waste Manifest Guidance Manual. For state and federally funded activities, include the following:

Block 3 - Generator will always be:

NYSDEC - Region ____
50 Wolf Road - Room 326
Albany, NY 12233-3510

Block 4 - Telephone number will be 800-457-7362

Block 4-B - Identify spill site by a definitive address

Block 15 - Include spill number

Block 16 - Include "For Manifesting Purposes Only - Tax Exempt"
with your signature

2. Forward Copy 8 (Generator's Copy) to BSPR Central Office and forward "Disposer State's" Copy to the address shown on top of the manifest form.
3. Make sure the TSDF has a Part 373 Permit to accept hazardous waste.

Provisional ID # _____

PROVISIONAL NUMBER QUESTIONNAIRE

1. Name of facility requesting ID Number - NYS Dept of Environmental Conservation -
Region _____
2. Name and telephone number of person making request - Thomas Quinn (518) 457-7469, (518)
457-2462
3. Date of request for provisional number _____
4. Date and time of episode: Date: _____
- Time: _____
5. Projected date all hazardous waste activity will be terminated: _____
6. Location of Episode - Street: _____
- Municipality: _____
- County: _____
7. Legal Owner of Property, and; Legal Owner of Waste (if different):
Name: _____ Name: _____
Address: _____ Address: _____
8. Measures taken to control episode: _____

9. Description of Episode: _____

10. List type and quantity of wastes. Provide amounts in kg or lbs.
11. Name and EPA ID number of transporter: Name: _____
EPA ID Number: _____
12. Name and EPA ID number of treatment, storage and/or disposal facility:
Name: _____
EPA ID Number of TSD facility (if known): _____
13. Provide all provisional numbers previously assigned (If any).
14. Do you wish to obtain a permanent EPA ID Number? YES NO
Note: Obtain a permanent EPA ID number if a disposal activity will occur in the future or will extend beyond 30 days. If the activity does not occur during the 30 days, a permanent number must be requested. EPA does not issue two provisional numbers for the same site.
15. Comments: - Spill Number _____

16. Signature: _____ Date: _____

For disposal activity which must occur *immediately*, obtain a provisional EPA identification number directly from EPA. If EPA refuses to issue a number, contact the Central Office during business hours. Complete and forward this questionnaire to the Spill Response Section within 10 days after obtaining the provisional number. If you also need a *permanent* EPA I.D. number (activity to extend past 30 days) indicate it on this questionnaire. The Central Office will complete EPA form Notification of Regulated Waste Activity (EPA Form 8700-12) and send it to EPA.

Exhibit 2.3-1

Hazardous Waste Manifest



STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
HAZARDOUS WASTE MANIFEST
P.O. Box 12820, Albany, New York 12212

Form Approved. OMB No. 2050-0039. Expires 9-30-88

Please print or type.

In case of emergency or spill immediately call the National Response Center (800) 424-9302 and the N.Y. Department of Transportation (518) 457-7362.

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA No.	Manifest Document No.	2. Page 1 of	Information in the shaded areas is not required by Federal Law.
3. Generator's Name and Mailing Address				A. State Manifest Document No. NY A 851134 5	
4. Generator's Phone ()				B. Generator's ID	
5. Transporter 1 (Company Name)		6. US EPA ID Number		C. State Transporter's ID	
7. Transporter 2 (Company Name)		8. US EPA ID Number		D. Transporter's Phone ()	
9. Designated Facility Name and Site Address		10. US EPA ID Number		E. State Transporter's ID	
				F. Transporter's Phone ()	
				G. State Facility's ID	
				H. Facility's Phone	
11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)			12. Containers	13. Total Quantity	14. Unit Wt/Vol
			No.	Type	Waste No.
a.					
b.					
c.					
d.					
J. Additional Descriptions for Materials Listed Above				K. Handling Codes for Wastes Listed Above	
15. Special Handling Instructions and Additional Information					
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations. If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.					
Printed/Typed Name			Signature		Mo. Day Year
17. Transporter 1 (Acknowledgement of Receipt of Materials)					
Printed/Typed Name			Signature		Mo. Day Year
18. Transporter 2 (Acknowledgement or Receipt of Materials)					
Printed/Typed Name			Signature		Mo. Day Year
19. Discrepancy Indication Space					
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.					
Printed/Typed Name			Signature		Mo. Day Year

NYA851134 5

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

COPY 1 - Disposer State - Mailed by TSD Facility

NOTES

The BSPR Central Office has the responsibility of making sure the waste shipment arrives at the designated TSDF and that the state receives a return copy of the manifest.

2. Residuals from Petroleum Spills (Hazardous or Non-Hazardous Wastes)

How you treat and dispose of oil spill residuals depends on the type of residual generated during spill response. Petroleum spill residuals may qualify as hazardous wastes under state regulations, as described below, or may be specifically listed as hazardous waste. Most petroleum spill residuals, however, are non-hazardous wastes and are exempt from the special handling requirements for hazardous wastes.

BSPR has specifically designated certain oil spill residuals as hazardous or non-hazardous. For a petroleum spill residual waste to qualify as a hazardous waste, it must, by definition, first qualify as a solid waste. According to 6 NYCRR Part 371 (see Appendix Q), the term "solid waste" is defined as follows:

- # Any discarded material not excluded under 371 (e). Examples of materials that are excluded are industrial wastewater discharges; irrigation return flows; radioactive materials; and domestic sewage and any mixture of domestic sewage and other wastes that pass through a sewer system to a publicly owned treatment works (POTW);
- # Discarded material that is abandoned, recycled, or considered inherently waste-like;
- # Wastes that are abandoned by being disposed of; burned or incinerated; accumulated, stored, or treated (but not recycled) before or in lieu of being abandoned by being disposed of or burned or incinerated;
- # Wastes that are recycled; and
- # Inherently waste-like materials.

To qualify as a "hazardous waste," a solid waste must meet at least one of the following criteria:

- # The waste is not excluded under 371.1 (e)(2). Examples of these exclusions are household waste, fly ash waste, and flue gas emission control waste. A complete list of these exclusions can be found in the appendix.

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- # The waste exhibits the characteristics of ignitability,² corrosivity, reactivity, or EP toxicity; is listed as a hazardous waste in Section 371.4; or is a mixture of solid waste and a listed hazardous waste.

3. On-Site Versus Off-Site Treatment/Disposal of Petroleum Spill Residuals

Whether you treat and/or dispose of petroleum spill residuals on site or off site depends on various factors that make one option more preferable than another. Exhibit 2.3-2 lists several possible reasons for choosing on-site treatment and/or disposal of residuals or off-site treatment and/or disposal. In general, the principal factors to consider include the following:

- # **HEALTH AND SAFETY:** It may pose a greater danger to public health and safety to remove and transport the residual off site than to treat or dispose of it on site.
- # **FEASIBILITY:** At certain spill sites, there may be only one feasible on-site or off-site treatment or disposal option, or none. Examples of the latter would include sites where there are no sewers or positive drainage for disposal of effluent, or where a local wastewater treatment plant or sanitary landfill refuses to accept the residual material. Alternatively, the contaminated material may not be accessible for removal off site (e.g., contaminated soil under a building); therefore the material would have to be treated or disposed of on site.
- # **COST-EFFECTIVENESS:** Removing and transporting wastes to an off-site treatment/disposal facility may not be cost-effective, especially when there are large quantities of contaminated material to handle and/or the off-site facility is located at a considerable distance from the site. Treating and/or disposing of the residuals on site may also not be cost-effective if the volume is small and the cost of the necessary equipment or facility is high.

² When you must determine whether a waste is "ignitable," be aware that (1) there is no known acceptable field test for ignitability for liquids (laboratory tests are available as defined in 6 NYCRR Part 371.3(b)(1)(i)), and (2) there is no known acceptable (field or lab) test for the ignitability of "non-liquids" such as gasoline-soaked debris, including soils.

Exhibit 2.3-2

On-Site Versus Off-Site Treatment and Disposal

Reasons to Treat/Dispose On-Site	Reasons To Treat/Dispose Off-Site
# Less danger to health and safety with explosive/highly toxic material	# Treating on site may not be cost-effective because of costs of equipment, facilities, etc.
# Transporting, treating, disposing of wastes may not be cost-effective	# Insufficient space on site
# There are large quantities of contaminated debris or unpumpable sludges	# Specialized equipment, or other special materials, is needed
# No permitted treatment/disposal facility close by	# Permitted treatment/disposal facility close by
# No off-site method available	# Regulatory constraints
# There are resources and space available on site	
# No secondary hazards are created	

NOTES

4. General Guidelines for Proper Management of Spill Residuals

Follow these general guidelines and procedures to ensure proper management of spill residuals:

- # Minimize residual volume as much as possible to reduce hazard and cost.
- # If you decide to treat residuals on site, create discrete operating areas for treatment and storage of wastes. Make sure to separate all reactive, corrosive, explosive, flammable, and incompatible wastes.
- # Determine whether a material is a hazardous waste (ignitable, corrosive, reactive, or toxic) as defined in 6 NYCRR Section 371.3 and 40 CFR Section 261. Wastes which are non-hazardous are defined as industrial solid waste and may be either treated on site or disposed of at a sanitary landfill designated by the Regional Hazardous and Solid Waste Engineer, provided the facility will accept the material. Petroleum-soaked soil may be temporarily stored on site if it is placed on, and covered by, plastic sheeting to prevent further contamination.
- # If contaminated residuals are going to be transported off-site for treatment and disposal, on-site pretreatment may still be required to make the residuals acceptable for transport or to meet requirements of an incineration or disposal facility. Transporters should be aware of DOT regulations which define and classify commodities according to the hazards which are present during transportation and specify the labels, identification numbers, markings, placards or segregation and separation requirements for hazardous materials. 17 NYCRR Part 507 and Title 49 of the Code of Federal Regulations include the requirements for transporting hazardous materials. In addition manifests and/or a part 364 permit may be required. (See Section 3.2 Transport and Storage Vessels and Appendix R for additional information).
- # Make sure that the different residuals are compatible when they are consolidated for transport or treatment to avoid reactions that result in excessive heat, fire, and/or explosive conditions.
- # Do not store a residual that gives off flammable vapors in a poorly ventilated container (e.g., dumpsters), as an explosive condition may be created.
- # Comply with all permit requirements. Familiarize yourself with the permit requirements that apply to the handling, transport, and disposal of spill residuals. Exhibit 2.3-3

Exhibit 2.3-3

**Permits Applicable to Treatment, Handling, and Disposal
of Spill Residuals**

Permit	Required for:
Part 364	Transportation of regulated solid waste.
Part 360	Facilities accepting contaminated industrial solid waste not burned as fuel.
Manifest	Transportation of all hazardous waste to a TSDF (treatment, storage, disposal facility).*
Part 373	TSDFs accepting hazardous waste.
SPDES (State Pollutant Discharge Elimination System)	Discharge of pollutants into state waters.
Air Pollution	Discharge of pollutants into air.

Once the spill residual has been determined to be hazardous or non-hazardous solid waste, the next step is to comply with the permit requirements that apply to the transport and disposal of spill residuals.

Permits Required for Transport Depending on Amount and Type of Waste

<100 kg of non-acute hazardous waste < 1 kg of acute hazardous waste } <500 lbs of non-hazardous waste	No manifest & no Part 364 needed
≥100 kg of non-acute hazardous waste ≥ 1 kg of acute hazardous waste }	Manifest & Part 364 needed
≥500 lbs of non-hazardous waste }	Part 364 needed

NOTES

lists the permits you may need for treating, disposing of, or transporting spill residuals.

5. Available Treatment/Disposal Options for Petroleum Spill Residuals

After you've decided whether to treat and/or dispose of petroleum spill residuals on site or off site, select one, or a combination of, specific treatment and/or disposal options. Consider the following factors:

- # Environmental desirability of different spill residual management options (see Exhibit 2.3-4 for preferred hierarchy ranking of options);
- # Type of spill residual (e.g., hazardous or non-hazardous);
- # Cost-effectiveness of available options;
- # Availability of equipment;
- # Constraints of site (e.g., adequate space, land use restrictions, availability of sewer or positive drainage to accept discharge);
- # Regulatory requirements (federal, state, and local).

Some treatment and/or disposal options for different spill residuals are listed below:

- # Recovered Petroleum Product. You may recycle recovered product by filtering or re-refining it.
- # Contaminated Soil. Soils heavily contaminated with organics can be burned; however, a considerable volume would remain for disposal. Soil containing volatile contaminants can be spread into a thin layer allowing contaminants to volatilize to a low level. This should only be done as part of a bioremediation process with nutrients added to stimulate activity. Land farming alone is not recommended.
- # Contaminated Water. Contaminated water may be treated on site (e.g., using an air stripper, activated carbon unit, and/or an oil/water separator) and then discharged to a storm or sanitary sewer, discharged directly to surface water, allowed to infiltrate into the soil, or re-injected into the ground at depth. A permit is required for discharges to a storm sewer, and the effluent quality would have to meet certain limits. The approval of the local sewer authority is required for discharges to the sanitary sewer. Infiltration methods are limited by the permeability of the surface soils. Underground injection/recirculation (UIR)

Exhibit 2.3-4

Hierarchy of Preferred Treatment Disposal Options in Order of Environmental Desirability

Petroleum Products	Oil-Soaked Debris
1. Recycling as soon as possible	1. Recycling as soon as possible
2. Incineration at high temperatures with adequate emission control equipment, complying with Part 212 of the State Water Laws	2. Off-Site Incineration at high temperatures with adequate emission control equipment, complying with Part 212 of the State Water Laws.
3. Land Burial , if the recovered petroleum product is containerized and placed in a land burial site approved pursuant to Part 360 of the State Water Laws	3. Natural Degradation on impermeable land
	4. Land Burial in a site approved pursuant to Part 360 of the State Water Laws
	5. Sanitary Landfill pursuant to Part 360 of the State Water Laws
	6. On-Site Incineration if prior approval is given pursuant to Part 215 of the State Water Laws

Source: As taken from the New York State Water Laws, Part 611.6.

NOTES

requires a SPDES permit unless the area is contained by a physical or hydraulic barrier or the site is being remediated pursuant to an order. Injected water must meet the groundwater discharge standards of section 703.6.³

- # Oils Containing PCBs. Debris containing PCBs is managed, under the federal Toxic Substances Control Act, according to the concentration of PCBs in the material. If the material contains less than 50 ppm PCBs, there are no regulations governing the treatment or disposal of the PCB-containing material. If the material contains anywhere from 50 to 500 ppm PCBs, the material can be incinerated, sent to a landfill, or treated chemically at facilities permitted to receive these materials. A material that contains more than 500 ppm PCBs must be incinerated.

Exhibit 2.3-5 lists the advantages and disadvantages of the following general types of treatment and disposal options for spill residuals: recycling; incineration; open burning; off-site or on-site landfilling; on-site and off-site land treatment; and on-site and off-site treatment with discharge to sanitary sewer, or surface waters, to surface soils via infiltration, or re-injection into groundwater. Each of these general treatment/disposal options is discussed below. The subsection that follows focuses on permit requirements for various treatment/disposal options.

Recycling

- # Recycling/reclamation is the preferred disposal option for spill residuals whenever feasible.
- # Organizations that facilitate recycling/reclamation include waste exchanges (e.g., Northeast Industrial Waste Exchange) and solvent reclaimers or recyclers.
- # You must supply the recycler with the following information: a complete chemical analysis; the quantity of material available; and the location of the material.
- # Principal costs are those for packaging, transporting, and processing the residual.
- # On-site or off-site facilities accepting hazardous waste must have an EPA Identification Number.
- # Manifesting and other regulatory requirements must be met.

³ *Exceptions to meeting these standards occur when: the injection is into a "contained" area; there is no net increase in the concentration of any chemical pollutant in the discharge prior to injection; and the remedial plan for the site includes ground-water monitoring to ensure that no degradation of ground-water quality will result.*

Exhibit 2.3-5

Treatment and Disposal Options for Residuals

Treatment/ Disposal Option	Advantages	Disadvantages	Comments
Recycling	Most efficient use of residuals; long-term benefits	Recycling/re-refining facilities not always accessible to spill site	Preferred disposal method if feasible
On-Site Incineration	Reduces volume of waste; effective method when dealing with hazardous wastes	Could cause smoke, odor, and particulate emissions	Trial burn, emission tests, monitoring equipment may be needed; may need state air pollution permit
Off-Site Incineration	Reduces volume of waste; effective method when dealing with hazardous wastes	Could cause smoke, odor, and particulate emissions	Need transport permit; facility must have air permit
Open-Air Burning	Economical and simple	Creates air pollution	Only allowable when: # Residual is not toxic; # Weather conditions are favorable; and # Use of other methods is impossible or economically prohibitive. RAPCE must issue permit
Wastewater Treatment	Certain residuals can be fully treated and discharged to ground water or surface water	On-site: need sewer lines available near recovery well; off- site: expensive to treat large volumes of waste because of transport costs	Treatment method depends on nature of wastewater and quality of effluent desired; if discharged, need SPDES permit

Exhibit 2.3-5

Treatment and Disposal Options for Residuals (continued)

Treatment/ Disposal Option	Advantages	Disadvantages	Comments
On-Site Landfill	One of most economical disposal options for solid waste	Potential risk of ground-water contamination if line system fails; expensive option	Subject to regulatory control
Off-Site Landfill	One of most economical disposal options for solid waste	Limited number of facilities; option becoming increasingly expensive	Subject to regulatory control; should be considered only if use of other options is not possible; transport and manifest permits needed
Publicly Owned Treatment Works	May be cheapest available option for handling large volumes of contaminated water	Effluent often must be pretreated before discharge and additional monitoring may be required; can be very expensive if large volumes of water are subject to sewer use fees	POTW must have hydraulic capacity to handle volume and contaminant loading; discharge permit may be needed; may have to achieve minimum effluent quality limits.

NOTES

Incineration

- # Incineration is the most effective method for disposal of hazardous wastes. Certain hazardous materials, however, such as those containing significant quantities of heavy metals or those that decompose violently are NOT to be incinerated without first being pretreated.
- # Incineration at a municipal solid waste incineration facility must be approved by the Regional Solid Waste Engineer, the Regional Hazardous Waste Remediation Engineer, and the Regional Air Pollution Control Engineer (RAPCE).
- # To determine suitability of wastes for incineration, consider the following:
 - Heat content of waste (higher heat content makes the material easier to burn)
 - Viscosity (lower viscosity material is more pumpable)
 - Water content (less water means less fuel needed to burn water in the waste)
 - Halogen content (less halogen means less acid gases in stack emissions)
 - Ash content (less ash or solids content yields less particulate emissions)
- # Costs may range from \$14 per ton to \$842 per ton, depending on the amount of waste, type of material, and distance to facility.
- # Disposal by incineration must meet manifesting, packaging and transportation, air pollution, and other regulatory requirements governing the burning of hazardous and non-hazardous wastes.

Open Burning

- # Occasionally, open burning of contaminated debris will be allowed when other methods are inefficient, time-consuming, or expensive. Under criteria specified in 84-AIR-10, the Division of Air may allow the use of open burning to minimize adverse effects of spills of combustible liquids. However, **open burning is only to be used as a last resort when the use of other methods of cleanup is impossible or economically prohibitive.** Whenever possible, spilled combustible liquids, mop-up materials, and contaminated debris should be disposed of in a landfill or an incinerator.

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- # Requests for open burning of wastes must be approved by the Regional Air Pollution Control Engineer (RAPCE) through the issuance of a permit. The RAPCE weighs the disadvantages of open burning, the adverse impact on air quality, against the advantage, achieving quick and economical relief from a serious ecological or health problem.
- # Open burning of spilled combustible liquids and/or added mop-up materials and debris should only be allowed when:
 - The spilled liquid has been identified and it has been determined that the liquid and its products of combustion are not toxic (in general, this would restrict open burning as an option to virgin fuel oil, gasoline, and in some cases, virgin lubricating oil);
 - Meteorological and topographical conditions are such that good dispersion will occur and that sensitive receptors will not be impacted;
 - Regional Environmental Quality personnel have agreed that the use of other methods of cleanup is impossible or economically prohibitive and that not burning would cause a severe environmental impact.
- # The federal government prohibits burning on open waters, and the NY State Navigation Law prohibits the introduction of any liquid into NY waters to aid the ignition of petroleum product.
- # If the open burning is to take place within a fire town or fire district, contact the Regional Forest Protection and Fire Management personnel and the local fire marshal or chief for the appropriate permit.

Off-Site Landfilling

- # Landfilling should be considered as a disposal option only after it has been determined that recycling, treatment, and incineration are not possible, and if state and federal law allow the material to be landfilled.
- # Make sure that wastes that can be treated or incinerated are separated from those for which there is no other alternative to landfilling.
- # Non-hazardous solid waste may be disposed of in any sanitary landfill that the RSHWE designates as capable of accepting and disposing of oily debris.

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- # The cost to transport the debris to an acceptable landfill may be quite high since there are few off-site landfills in the state that can accept these materials.
- # Transporters must have a Part 364 permit for solid waste. Hazardous waste must be manifested.
- # Disposal facility must have a Part 373 permit to be able to accept hazardous wastes.

On-Site Landfilling

- # Landfilling must comply with state and federal environmental standards related to the location, design, construction, operation, and maintenance of landfill facilities.
- # The potential risks posed by depth of the ground water and the degree of naturally available ground-water protection, if liner system should fail, must be evaluated.
- # Other considerations include the costs for ground-water monitoring and for additional corrective action if the ground water becomes contaminated.
- # On-site landfilling is an expensive option for waste disposal and should be considered only when all three of the following conditions are met:
 - There is so much waste to be disposed of that total cost of waste management at an acceptable off-site disposal facility is comparable;
 - Simple capping of site will not provide adequate protection of human health and environment;
 - On-site conditions will allow for the construction of a landfill that will protect human health and environment;
- # Since it is rare that all three conditions are met, on-site landfilling is not a frequently used method of disposal.
- # On-site facilities must obtain EPA Identification Number.

On-Site/Off-Site Treatment

- # The treatment process selected depends on the nature of wastewater and the quality of effluent desired. Choices include: liquids-solids separation, chemical treatment, biological treatment, and physical treatment.

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- # Wastewaters discharged to a treatment plant often must be pretreated so that discharge does not create conditions at the plant that would be in violations of the plant's permit.
- # Make sure that the treatment plant has the hydraulic capability to handle the volume and waste loading.
- # An approval to discharge may be contingent upon meeting additional monitoring requirements or paying fees or other charges.
- # The use of treatment options can incur opposition from the community in the vicinity of the treatment site.
- # Treatment plant must be permitted to accept residual.
- # State Pollutant Discharge Elimination System permit is required for direct or indirect (through a storm sewer) discharge to surface water (6 NYCRR Part 751).

6. Handling of Treated Ground Water - Special Considerations

Treated ground water discharged from an air stripper, carbon adsorption unit, or biological treatment system must be handled in accordance with local, state, and federal requirements. Effluent disposal may not be a problem at most sites. However, at other sites, physical, geological, and/or political constraints may complicate and increase the expense of effluent disposal.

Effluent from a ground-water treatment system can be handled using one or some combination of the following options:

- # Discharge to a nearby positive drainage system like a creek, stream, river, or lake;
- # Discharge to a nearby municipal or county sanitary or storm sewer;
- # Discharge to an on-site infiltration trench or basin where the water can percolate into the soils;
- # Discharge to an on-site injection well where the water can be reintroduced into the saturated zone; or
- # Collection for transport to an off-site disposal location where one or more of the options above may be available or feasible.

Some ground-water remediation sites will present circumstances where one or more of these disposal options are available. Your choice of one option over another becomes a question of technical feasibility, local acceptance, cost, and whether effluent quality meets the prescribed

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limits to receive the necessary approvals/permits. You may be confronted at another site, however, with a situation where no on-site option is feasible, and only the off-site disposal option is available. In these situations, especially if the volume of treated ground water is large, effluent handling represents a significant cost. This cost may be so significant, in fact, that ground-water treatment is viewed as infeasible and other remedies (e.g., alternative water supplies) must be implemented.

The following subsections describe the available effluent disposal options, what conditions must be met for their use, and what problems or complications can arise with each.

a. Discharge to Surface Water

If a surface water body is located near a site and access to it can be secured, effluent from a ground-water treatment system may be piped above or below ground and discharged to it. The quality of this discharge must meet certain limits before it can be allowed under the requirements of the State Pollution Discharge Elimination System (SPDES). There may be a requirement that the effluent contain less than 5 ppb if drinking water is involved. This discharge will be subject to a SPDES permit, which will often require monitoring effluent quality at a specified frequency for the duration of the permit.

The feasibility of this option, of course, first depends on the presence of a positive drainage system in reasonable proximity to the site. Reasonable proximity, in most cases, would refer to distances of less than one mile certainly, and probably less than one-half mile. Even so, there may be other complications that can render this option infeasible. Chief among these is the inability to secure property owners' permission to lay piping through their property to reach the discharge point. Another complication that can arise is the need for additional chemical treatment to eliminate bacterial problems or iron precipitation. The volume of effluent may also be too great for a small drainage system to handle.

b. Discharge to a Sewer System

Many urban and suburban sites will have a sanitary or storm sewer available to receive effluent discharged from a ground-water treatment system. Discharge to the sanitary sewer may be acceptable to the local city or county authorities provided the volume flow and effluent quality can be handled by the receiving wastewater treatment plant. The specific approval of the local authority will usually be needed. The local authority may impose more stringent effluent quality limits and user fees. In general, these local conditions are to be met unless adjustments are negotiated.

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The discharge of effluent to the storm sewer is equivalent to a direct discharge to surface water for all intents and purposes. SPDES requirements will be imposed and a SPDES permit will be required. Special approval from the local authority may also be necessary and, again, sewer use fees may be applied.

This option may be feasible only if: (a) there is a sewer system located in reasonable proximity to the treatment site; (b) the sewer system is accessible; and (c) local approval and other permits are secured. Even when these conditions are met, however, the costs incurred in the payment of sewer use fees can be excessive, especially when large flow volumes must be discharged. Other effluent disposal options may prove more cost-effective in these cases.

c. Discharge to Infiltration Trench or Basin

The use of this option is very dependent upon the geologic conditions found at a site and effluent quality. If feasible, this option can represent a low-cost, low-maintenance choice for effluent disposal. In addition, its use can be incorporated into the design of the ground-water remediation system. For example, the treated ground water can be returned to the subsurface at a location(s) hydraulically upgradient of the contamination site. This recirculated flow can help leach contaminants out of the unsaturated zone and speed contaminant flow toward the recovery/extraction well(s). Nutrients and hydrogen peroxide (as an oxygen source) can also be added to the returned flow to enhance biological degradation of the contaminants in the subsurface. A portion of the treated ground water is not recirculated, but instead is discharged to surface waters or the sewer. This helps the system operate at a net hydraulic deficit and prevents pollutants from migrating beyond the contaminated area.

The underground recirculation or injection (see subsection d. below) of treated ground water requires a SPDES permit and is subject to the effluent standards contained in 6 NYCRR, Part 703.b. The SPDES permit requirement will not apply if (per the requirements of TOG 2.1.2.):

- # The area in which purging (or injection) is taking place is contained, either by a physical barrier (e.g., a slurry wall) or a hydraulic barrier (e.g., a large number of overlapping purge wells) so that contaminated ground water is prevented from migrating beyond the boundaries of the containment zone. Containment must be complete to the extent measurable and the system must operate at a sufficient hydraulic deficit so as to maintain a hydraulic gradient into the containment area;
OR

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- # The site is being remediated pursuant to an order. Any conditions that are necessary to satisfy the substantive technical requirements of the SPDES program can be incorporated into the order which, in effect, serves as a substitute for a permit. To allow this, it is necessary that a full agreement be reached with the responsible party on the appropriate conditions.

The recirculated (or injected) ground water will be required to meet the ground-water effluent standards of Part 703.b. unless:

- # The recirculation/injection is into a "contained" area as defined above; AND
- # There is no net increase in the concentration of any chemical pollutant in the discharge prior to recirculation/injection; AND
- # The remedial plan for the site includes ground-water monitoring, both inside and outside the contained area, sufficient to ensure that no degradation of ground-water quality will result.

When these conditions are all met, the effluent quality limits are to be specified to be representative of "best available technology."

The problems or complications that can be encountered with the infiltration option are many. First, the geologic conditions at the site must not preclude fairly rapid infiltration of the treated ground water into the soil. While the infiltration trench or basin itself is filled with a permeable material like gravel or rip rap, the permeability of the underlying soils may be insufficient to handle all but the smallest discharge flow volume. Second, particularly in areas where the iron content of the ground water is high, chemical pretreatment may be necessary to limit bacterial growth. Otherwise excessive bacterial growth clogs the pore spaces and limits the infiltration rate. Third, there may be insufficient site area or access to space to locate the infiltration trench or basin, especially at a location upgradient of the contaminated area. Fourth, it is difficult to demonstrate the net hydraulic deficit for the system required under the provisions of TOG 2.1.2. Finally, this option tends to be a warm temperature option as freezing temperatures tend to preclude its use.

d. Discharge to an Injection Well

The provisions of TOG 2.1.2 discussed above also apply to the injection of treated ground water. With this option, one or more injection wells are used, instead of infiltration trenches or basins, to return the treated ground water directly to the saturated zone

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usually upgradient of the contaminated area. This induces the flow of contaminants towards the recovery well(s).

Many of the same problems or complications mentioned for the infiltration option also can occur with the injection option. In addition, you have the technical aspects of installing a properly functioning injection well. Like monitoring wells, injection wells must also be constructed carefully to avoid the possibility of cross-contamination or providing a route for contaminants at or near the surface to reach ground water. Therefore, many of the construction requirements discussed for monitoring wells also apply to injection wells. Unlike monitoring wells, however, injection wells often require screen lengths two to three-times the length of the typical monitoring well screens. This larger screen length provides for more area over which to introduce the injected water flow into the saturated zone.

e. Collection for Off-Site Disposal

At some ground-water remediation sites, none of the effluent disposal options will be available or feasible to implement. In these cases, you may elect to: (1) collect the treated ground water for disposal at an off-site location, or (2) implement an alternative remedy that does not involve ground-water withdrawal and treatment.

The first option -- off-site disposal -- may be feasible technically, but is likely to be very expensive. The expense will be considerable in cases where the flow volume is large and/or the off-site disposal location is at some distance from the site. However, this may be the only option in situations where other remedies are not available and the ground-water resource is important to the drinking water supply.

Alternatively, the technical difficulties and expense of a ground-water remediation program may dictate selection of a different remedial option. For example, it may prove more feasible and less expensive to provide whole-house treatment systems or provide an alternative water supply. These alternative remedies must be selected cautiously as leaving significant ground-water contamination unaddressed is our least preferred option.