

CHAPTER III

EXISTING SYSTEM & RESOURCES

3.0 Introduction

In order to develop a residuals management plan for the Pittsburgh Energy Technology Center it is necessary to examine the existing management mechanism, rearrange the criteria for ordering of selected waste streams, determine the available resources available and establish departmental policies and constraints which must be considered.

Existing in-place practices implemented at the Center appear to be highly dependant on contractor availability (coupled with the Center's expressed desire to comply with all prevailing regulations). Laboratory chemical wastes as well as other residuals (other than refuse) are consigned to a single contractor with the expectation of regulatory compliance. Passage of the Resource Conservation and Recovery Act (P.L. 94-580) has introduced pressures for radical changes in the waste management system. Expectation of compliance with proposed statutes by the enforcement agencies may be high, but actual implementation in accordance with the regulations will be spotty. Contractor reliability in this respect will depend on his (the contractor's) entrepreneurial ability to find an ultimate disposal facility that is in compliance with the new regulations. In addition, the situation will change from day to day with no guarantee of any long term stability.

Area resources do not appear to exert any great influence on the chosen mechanisms for managing wastes of the type generated at the Center. An explanation of this phenomena may be due to two aspects of solid and

hazardous wastes resulting from energy research, namely the relatively small volumes of the waste streams and the absence of environmental enforcement (with low assigned priorities by the agencies) on the larger quantities of solid wastes with undetermined characteristics. Implementation of the regulations being promulgated under RCRA will place greater emphasis on the available area resources (in an economic sense) due to the expected uniformity of environmental protection requirements on a national scale, thus eliminating regional differences. Movement of hazardous wastes over large distances in search of acceptable disposal locations will only make sense on a cost basis. Uniformity of environmental protection regulations will eliminate enforcement level cost differences in waste disposal. Available area resources for processing of the Center's wastes must be an essential component in developing an environmentally acceptable and economically feasible management plan. Approximately seven sanitary landfills are presently in operation in Allegheny County at the present time. Some facilities are processing wastes similar to those originating at the Pittsburgh Energy Technology Center on an approved basis (under existing regulations).

3.1 Existing Solid Waste Management System

The first report of this project (21) described the mechanisms employed in the management of laboratory waste chemicals by eight research laboratories in the Pittsburgh region. Accumulated mixed chemicals (spent solvents and cleaners) are also included in the laboratory waste category. Some recommended methodologies for treating and disposing

of various categories of organic and inorganic chemicals was also included in the report. Origin of the recommended treatments is the Manufacturing Chemists Association bulletins on proper waste disposal of chemicals. A compilation of the findings of the first phase document are listed in Table 3-1.

As illustrated in Table 3-1, all laboratory chemical wastes are consigned to industrial waste brokers or refuse disposal companies. It is safe to assume that the wastes processed by the refuse haulers were delivered to operating landfills in the area. Actual environmental impacts resulting from this activity are probably minimal due to the very small mass processed when compared to the overall tonnages of municipal refuse which make up the codisposal operation. There is some potential for releasing small quantities of extremely toxic substances to the water environment. In addition, the occupational exposure (with complete ignorance of the hazards) of the landfill personnel increases the likelihood of accidental injury.

Brokers providing services to the Center are knowledgeable, to a certain degree, of the hazards associated with the materials they are processing. Consequently, their management methodology includes careful handling of the residues by their own personnel, compliance with packaging and transportation regulations (and the statutes built-in safeguards with respect to occupational hazards) and consignment to an ultimate disposal facility which has some technical capability. It is in the ultimate disposal phase that the state-of-the-art has not kept pace with the regulatory requirements.

A. Laboratory Waste Chemicals (PETC): Waste chemicals are periodically picked up by a hazardous waste broker (Ecology Chemicals and Refining)

A. Laboratory & Plant Wastes	(1) Clean Combustible Liquids Chlorinate & non-chlorinated	DOT Container Consign to Broker or Hauler	Off-site Incineration
	(2) Toxic Wastes-Heavy Metals	Standard Drums-Broker hauling	Sanitary Landfilling
	(3) Reactive Chemicals & known carcinogens.	On-Site Processing	On-Site Processing
	(4) Radioactive Wastes	Transfer to Parent Co. facility	NRC approved disposal
	(5) Plant Refuse	Refuse Hauler	Sanitary Landfilling
	(6) Waste Oil	Drums-Consign to Reprocessor	Reprocessed
B. Laboratory Wastes	(1) Outdated Chemicals & lab. chemical wastes SAME METHODOLOGY AS PRESENTLY USED AT PETC	DOT Containerization-Consign to Broker-Trans-shipment	Permitted Landfill
C. Laboratory Wastes	(A) Flammable Liquids (70%)	DOT Containerization-Consign to Broker	Incineration @ Arco Polymer (Monaca)
	(B) Viscous Materials-plastics and coal tars	Refuse Hauler	Landfill
	(C) Acids & Alkalais	No neutralization	Landfill
	(D) Very Hazardous Wastes	Special Handling-Case by Case Basis	
D. Laboratory Wastes	(1) Flammable Solvents	55 Gal. Drums-Non DOT	Landfill
	(2) Hazardous Fraction	Consign to Waste Broker Packing	?
	(3) General Wastes-Glass, etc.	Refuse Hauler	Landfill
E. Laboratory & Process Wastes	(1) Refuse	Refuse Hauler	Landfill-Sanitary
	(2) Hazardous Waste & On-Site Treatment Residues	Waste Broker	Landfill(Cleveland)
F. Small Lab.	Paper		On-Site Incineration
	Scrap Metal	Recycling Broker	Recycled
	Chemical Wastes	On-site processing	Uncontrolled land disposal

Table 3-1 Present Residuals Management Practices by Six Surveyed Laboratories (21).

The contractor's personnel collect the residues at the generating points and pack them in appropriate containers (DOT Specification Units) with vermiculate used as a cushioning agent. The waste chemicals are selectively placed in the drums (using reactivity characteristics as criteria). Charges for the packing service is on an hourly basis and the price for transport and disposal of the chemical wastes is based on the size and number of containers. Intrinsic hazardous nature of the discarded substances is not usually a factor in the pricing structure.

Liability relationships are not clear from the data gathered. It is assumed the broker's personnel are covered by Workman's Compensation in the case of accidental injury or death due to explosions or exposure to hazardous substances. Responsibility of accidental damage to PETC facilities and personnel cannot be ascertained. This is dependent on the responsibility and liability clauses embedded in the purchase contract between the broker and PETC. The same holds true for accidental damage or injury to PETC personnel both inside the facility and during the movement phase of the pick-up operation within PETC grounds..

After the consignment of laboratory waste chemicals leaves the PETC property, liability and responsibility for damage caused by the residuals is not well-delineated unless the ownership of the wastes has been clarified. Usual practice is to consign ownership of the shipment to the carrier via a bill of lading or special assignment document. The broker (now the owner of the wastes) is covered by general liability insurance in case of any accidents or spills that cause harm or damage during the transport operation.

The methodology used by Ecology Chemicals & Refining to process the laboratory chemical wastes includes transporting the consignment to a

central transfer facility in Manor, Pennsylvania. The wastes are then held for consolidation with other streams (in the originally packed DOT containers) to make up optimal handling volumes for trans-shipment to a state licensed and permitted industrial waste processing site in Alabama. The license and permit are those issued by that state (under their specific regulations) to allow handling and disposal of this class of residuals.

B. Household and Miscellaneous Chemical and Industrial Wastes: From a volume perspective, this category is probably the largest handled by the waste disposal contractor. Drums of mixed flammables such as toluene, acetone and organic solvents make up the bulk of this group. The contractor will either provide the DOT specification containers or transfer the liquid fractions to a single bulk transport unit. Where feasible, this broker will sell the flammable liquids to a bulk processor of blended waste fuels.

All of the liability relationships described for the laboratory waste chemicals apply to this group of liquid flammable residuals. Questions of liability arising from temporary storage at the broker's transfer site (with respect to PETC) appear to be similar to that of the waste generator vis-a-vis the ultimate disposal site. Regulatory interest in this part of industrial waste management is manifested by the regulatory need of a state permit to operate a storage facility, fuels reprocessing operation and ultimate disposal site. Practical and legal considerations would indicate the impossible task of specifically identifying the damage contribution from the wastes generated at PETC in the case of an accident, deleterious health effects to on-site personnel or the public at large, or pollution episodes at the temporary storage location and the fuel

reprocessing plant.

G. Process Wastes (From Ongoing Research Projects): At the present time, operations at the Pittsburgh Energy Technology Center are producing some relatively small volumes of what has been described as indeterminate (with respect to potential hazardous classifications by RCRA standards) wastes. The scope of this report does not include a detailed assessment of the process residues presently generated and future residuals from proposed test and pilot plant evaluations. However, handling of some waste streams such as char from the now discontinued (at PETC) Synthane process, slags from fluidized bed combustion evaluation, coal dusts, coal catalyst residues does have a history at the facility.

The solid residuals (chars, slags and coal residuals) have been deposited on-site. It is not clear from the data already gathered whether the disposal area was engineered, prepared and constructed to some developed standards or specifications. A major goal of additional research should be to assess the regulatory and environmental impact implications of past practices at the Center.

Wastewater, accumulated as a consequence of operating the Synthane plant by an outside contractor (Lummis Co.), was consigned to a disposal company for offsite treatment and disposal. The procedures used in the management of this relatively high volume (as compared to liquid wastes from laboratory operations) have not been clearly reported in any detail. The only statement that can be made with some certainty is that the wastewater left the Energy Technology Center.

Presently the wastes resulting from the research projects are being managed in the same institutional framework. Outside contractors (in this case, the General Electric Company) are saddled with the responsibility

of managing the residuals from the magnetohydrodynamic research project. It has come to our attention that their proposed management scheme is to consign the residues to the most responsible waste broker available at the present time. Characteristics of the wastes may be known, however the broker has not been made aware of them in any great detail. It appears that the project contractor is depending on the broker to provide an approved (by regulatory agencies) methodology with a dearth of information. The case in point is the solid residuals, which may contain or be made up entirely of soluble salts, with some potential for environmental degradation. Possible health effects associated with the residuals streams are even more tenuous and may not be addressed in this management system.

Due to the greater quantities of this category of residues, there may be some important economic constraints that should be included in the transport and disposal elements of overall management. The wastes are indeterminate, with assessments ranging from innocuous (or inert) to extremely hazardous, depending on the vested interest of the group making the determination. It will be important, both from an economic and public health protection view, to come up with alternatives that are viable. Greatest difficulty will be in establishing the reliability of any chosen system in the rapidly changing regulatory climate.

3.2 Present Management Policies

A cursory examination of management policies which seem to be influencing present practices include the following factors: (1) internal policies at the Pittsburgh Energy Technology Center; (2) policies and procedures of the responsible environmental regulatory agencies; and (3)

the waste management industry procedures.

1. Internal Policies and Procedures at the Center: The perceived objectives of PETC with respect to management of residuals are: (a) handling and disposal of the wastes generated in compliance with all the governing statutes; (b) greatest possible separation (in a liability and legal sense) from pollution and accidental spill episodes; (c) adhering to administrative procedures that may be imposed by a higher central authority (DOE general policy-both stated and implied); and (d) minimal involvement in external management of the residues. Fiscal policies may act to constrain the selection of waste management alternatives with regard to restriction of capital expenditures and directing spending toward operational costs. There also may be an established policy covering use of consultants and contractors for on-site operations.

Where the proper management of residuals is considered, there is a conflict in objectives in almost any research endeavor. Primary objectives of any effort in a facility such as PETC is the achievement of research goals i.e. to provide new processes of coal conversion with more convenient and economical forms of energy to the ultimate consumer. Management of the residuals may be counterproductive due to the introduction of economic and environmental constraints into the overall assessment of the conversion processes. A more detailed analysis of prevailing policies should be undertaken by the Center to optimize the fulfillment of their primary mission with the least probability of major disturbances from the residual component of the processes under investigation.

2. Environmental Regulatory Procedures: Present policy covering the control of the classes of residuals generated at the Center are not

specifically delineated in any one regulation or statute. Practices in environmental pollution control have evolved over time and vary from one region to another. Individual administrative style, especially in managing hazardous wastes, has had more influence in determining acceptable handling methodologies than that of published regulations. The main explanation may be in the interpretation of the regulations as they are deliberately vague with respect to intrinsic characteristics of hazards. Most regulations include a catch-all phrase which can allow wide latitude of discretion on the part of the regional environmental enforcement administrator.

Historically, the leading enforcement activity has been taken by the Pennsylvania Department of Environmental Resources. The key administrator (at least in the initial phases of chemical waste processing and disposal) has been the regional solid waste director. He has set the judgemental tone for acceptable disposal techniques due to the absence of strictly delineated regulations and low level of guidance from the federal authorities.

Allegheny County involvement has increased in the last year but both the county and state look to the U.S. Environmental Protection Agency for directions since the development of the federal regulations. Although the apparent intent of policy and procedures practiced by all three levels of government is directed toward more federal involvement, the effect of their enforcement activity has been the movement of most chemical and industrial wastes to other states for ultimate disposal. It is not the present policy nor is it legally possible for the county or state to control or review the ultimate disposal mechanisms utilized outside their own jurisdiction. Actual disposition of the residuals outside their political

boundaries is of interest for informational purposes only.

A radical change in the above situation is expected as a result of promulgation of new federal regulations (with the goal of uniformity of enforcement) covering hazardous wastes. Most of the states, in our case the Commonwealth of Pennsylvania, have publicly stated their desire to accept primacy for enforcement of the federal statutes.

3. Waste Management Industry Procedures: Present operating strategies of the waste disposal industry, from the small waste broker to the national companies, is to process the residuals at minimum cost within the present regulations that are enforced. They will move the residues to a location, which complies with regional statutes as they are applied by local regulators, where disposal practices entail the least cost. An example of this strategy in action is the movement of industrial wastes (defined by present regulations or interpretation of the statutes)

from the Pittsburgh area to a disposal site near Youngstown, Ohio. The industry is very responsive to the everchanging levels of enforcement activity, economics being the prime mover in directing industrial waste streams to specific locations.

Long range goals (and policies now in the process of formulation) of the industry is to prepare new sites that will comply with the proposed RCRA regulations. The waste disposal industry does not expect radical alterations in the proposed regulations dictating the processing and disposal compliance standards before the regulations become law.

3.3 Regional Management Resources

In order to develop a realistic and feasible residuals management plan for the Pittsburgh Energy Technology Center, a determination of

present and future resources needed for implementation is necessary. External (from the Center) physical resources include a service industry with the necessary capabilities for pick-up and transport of the residuals, processing (where appropriate) plants and land disposal installations. Some resources for handling spent laboratory chemical and process wastes are now in place in the western Pennsylvania region. A chemical waste disposal industry is in the development phase in the Pittsburgh district. Large operations already exist in this area for the processing and treatment of acid and alkaline residuals. Some liquid waste incinerators are in operation, but none of them have any great capacity and are only available for processing on-site combustible liquids. Land disposal facilities running the gamut from sanitary landfills to specialized industrial waste operation are in existence. A number of newly proposed sites are in the process of obtaining permits for management of some residuals generated at the Center.

A. Handling and Transport

Almost all refuse disposal services offered in the region can provide pickup and removal of the laboratory waste chemicals and the larger waste streams. None of them can furnish the certification now required (approval by the responsible enforcement agency) by the Center. Two of the listed companies (RAD Services and Ecclogy Chemical & Refining Co.) do provide packing and containerization services which comply with DOT regulations. Chambers Development Company and Sabatini Disposal Service will offer similar help without the certification.

National disposal companies (Chem-Dyne, Browning Ferris Industries, Rollins-Perl) are processors of bulk waste streams. They will store and pickup wastes in 30 yard containers (roll-off containers and tanks) and

3000 gallon skid-mounted tanks) and stationary storage tanks for liquid wastes. Many of the local liquid waste handlers (A-M-O Pollution, Inc., Chambers Development Co., Kelly Run Sanitation, Browning Ferris Industries) have truck-mounted vacuum pumps for removing liquid wastes from stationary storage tanks located on-site. The vacuum tankers can also be used to remove sludges and liquid wastes from lagoons and ponds.

Bulk waste acids (3500 gallon lots) are collected at the generating location and processed by Mill Service Company and Industrial Waste Co. at their own regionally located neutralization plants. They also handle inorganic wastewater treatment plant sludges and liquids.

As can be surmised by the above and Table 3-2, there is no lack of resources available for management of the Center's waste streams. All of the activity described above is carried out under present day regulatory requirements.

B. Processing and Treatment

The only industrial waste processing facilities (for off site residuals) located in the PETC region are the two acid neutralization plants. Most wastewater treatment installations in the area are specially built units for on-site treatment of the manufacturing facility. Units are not available for treatment of off site residuals. Many regional sewage treatment plants are now in operation as part of a regional sewage system. In some special instances, they may treat delivered industrial wastewater. With the advent of RCRA regulation enforcement, the sewage treatment plants will no longer process small lots of organic wastes from industry. Regional waste processing (by the disposal industry) of organic residues by employing biological treatment is non-existent.

PICKUP & TRANSPORT SERVICE COMPANIES

Refuse Haulers Offering Industrial Waste Services (LOCAL)

Kelly Run Sanitation Co.
Chambers Development Co.
Sanitary Landfill, Inc.

Sovereign Sanitation, Inc.
Sabatini Disposal Service
Browning-Ferris Industries of PA.

Industrial Waste Disposal Services (LOCAL)

A-M-O Pollution Services, Inc.
Industrial Waste Division of Cenco
Mill Service, Inc.

Ecology Chemical & Refining Co.
Browning-Ferris Industries
W. D. May Industrial Services.

Waste Oil Handlers and Processors (LOCAL)

A-M-O Pollution Services, Inc.
Ecology Chemicals & Refining Co.
Mill Service, Inc.

Pitt Oil Company
Wiseman Oil Corporation

Special Hazardous Wastes Processing Services (NATIONAL)

Rollins-Perl (Phillipsburg, New Jersey)
Chen-Dyne (Xenia, Ohio)
Chem-Trol, Division of SCA, Inc. (Model City, New York)
Erie Pollution Control, Inc. (Cleveland, Ohio)

Table 3-2 Disposal Industry Resources Available for PETC Residuals

Individual on-site industrial liquid waste incinerators are in operation in the region (Arco Polymers, Inc. in Monaca is one unit). There is one liquid waste incinerator processing a wide spectrum of liquid residuals from various industries. However, the unit can process approximately ten gallons per hour and consequently cannot be considered an available resource. The nearest industrial waste incinerator processing a wide spectrum of residuals is in the Cleveland area almost two hundred miles away. Plans have been announced by several groups of entrepreneurs, over the last five years, to erect and operate relatively large capacity units. None have come to fruition.

G. Land Disposal

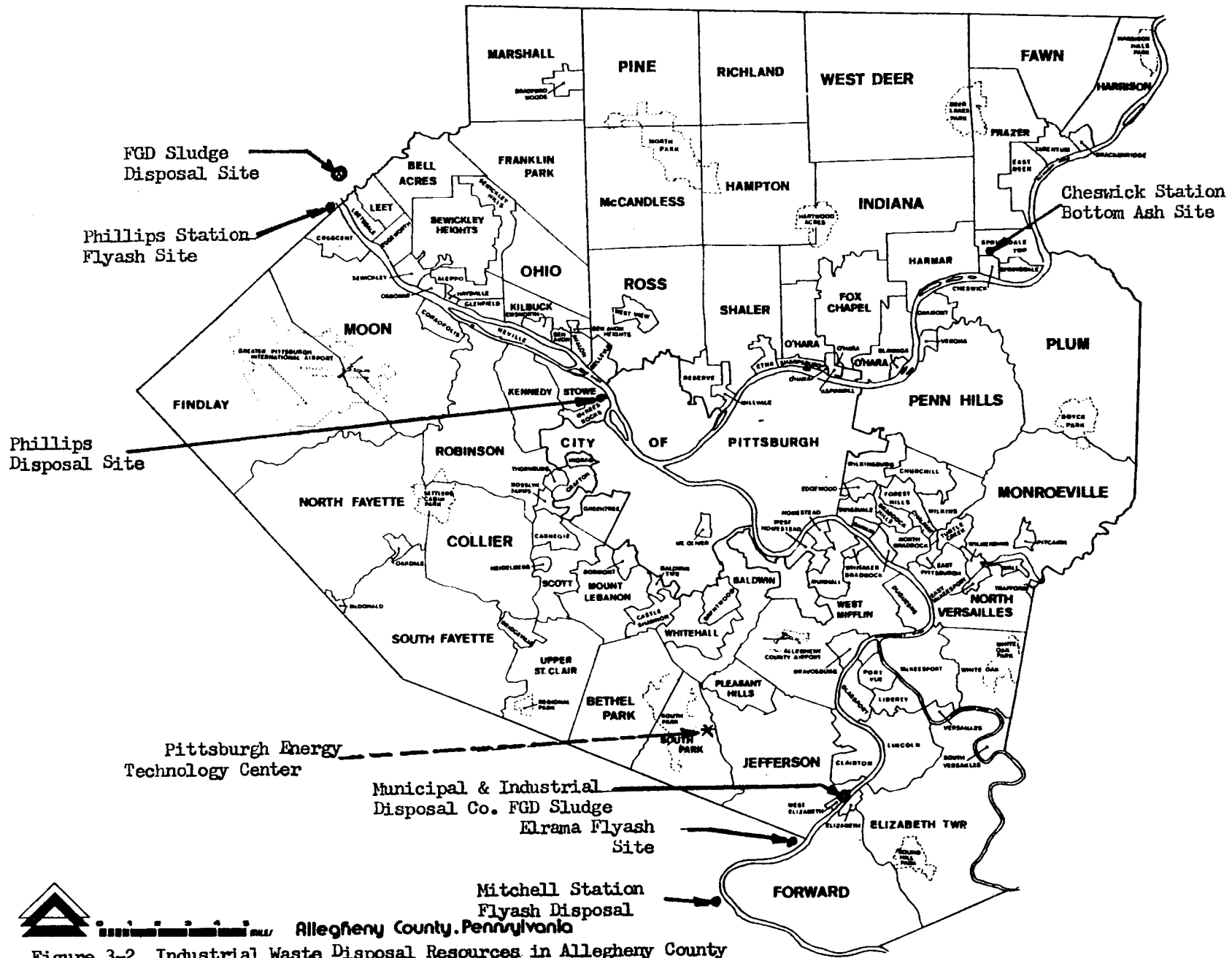
There are six permitted sanitary landfills located in Allegheny County. Their locations with relation to PETC are shown in Figure 3-1. All of them, with the exception of Baillie's Landfill, have and still are processing some wastes similar to the PETC residuals. (15) Chamber's Landfill in Monroeville disposed of laboratory waste chemicals (approximately 500 pounds) every six to nine months. This operation was carried out with the knowledge of environmental enforcement authorities and did not have any apparent environmental impacts. In the present regulatory climate, activity of this type is no longer feasible. However, all of the sanitary landfills, except as noted, have the potential to develop a small portion of their facility to process the waste streams generated at the Technology Center and comply with all existing and proposed regulations. Armoni's and Kelly Run Landfills would present the most feasible choices, if the proper incentives were forthcoming. As of this date, the financial incentives to offer hazardous waste disposal services by these

companies has not exceeded the risks and liabilities involved in complying with existing statutes.

Figure 3-2 is also a map of ultimate disposal facilities (and their geographical orientation with PETC) which process industrial solid waste streams. Included are all of the flyash disposal sites in the county that are used by the Duquesne Light Company. Also shown is the site run by West Penn Power for the Mitchell Station because it is relatively close to Bruceton. Codisposal of flyash with the indeterminate waste streams may be practical from a technological standpoint, but some institutional factors must be altered. The power companies do not have any motivation to share their disposal resources with others (unless they own and operate the full scale coal conversion plants). From an environmental protection perspective, the scheme for codisposal makes some technical sense.

New disposal operations to process stabilized flue gas desulfurization sludges are about to go on-line. Of greatest interest to PETC is the Municipal and Industrial Disposal Company site in West Elizabeth. This facility will process stabilized FGD wastes which (in time) become an excellent base material for containment of biological sludges and hazardous wastes. This concept was developed to handle the biological sludges generated from wastewater treatment at the U.S. Steel coke works in Clairton. Another FGD sludge disposal site is in the construction stage in Ambridge to handle the waste stream from Duquesne Light's Phillips Station. Both installations are privately owned and do have a strong interest and incentive to accept residuals originating at the Energy Technology Center.

The Phillips disposal site in Stowe Township disposes of cement



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Allegheny County, Pennsylvania
 Figure 3-2 Industrial Waste Disposal Resources in Allegheny County

dusts, steel mill slags and some indeterminate industrial solid wastes generated by the industrial complex on Neville Island. This location has the potential for development into an operation that could handle large tonnages of industrial solid wastes with regulatory compliance.