

ENGINEERING REPORT

6 NYCRR PART 360

PERMIT APPLICATION

FOR

LANDFILL GAS RECOVERY

AT THE

OSWEGO COUNTY SILK ROAD LANDFILL

MAY, 1987

PREPARED FOR: Oswego County Dept. of Public Works
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May 12, 1987

PROJECT MANAGER

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New York State Department of
Environmental Conservation
Region 7 Headquarters
7481 Henry Clay Blvd.
Liverpool, New York 13088

Re: Part 360 Permit
Application
Landfill Gas
Recovery Facility

File: 132.31

Dear Mr. Gross:

Herewith please find the engineering plans and report including the Application For Approval To Construct A Solid Waste Management Facility, Full Environmental Assessment Form, and Application For Permit To Construct A Stationary Combustion Installation as required by the New York State Department of Environmental Conservation for the Oswego County Silk Road Landfill Gas Recovery Facility. Also included is Addendum No. 1 to the permit application, addressing a condensate recirculation system.

The gas recovery system will utilize gas recovered from the landfill via an existing trench collecting system, for conversion to electricity in internal combustion engine-generator sets. The electricity will be sold to Niagara Mohawk. The facility will be located adjacent to the fill area on County property.

We believe the system presented is in substantial compliance with 6 NYCRR Part 360. Please contact our office should you have any questions.

Very truly yours,

BARTON & LOGUIDICE, P.C.

Frank A. Loguidice, P.E.
Executive Vice President

DFS/sle
Enclosure

ADDENDUM NO. 1
TO ENGINEERING REPORT FOR
6NYCRR PART 360 PERMIT APPLICATION
FOR
LANDFILL GAS RECOVERY
AT
OSWEGO COUNTY SILK ROAD LANDFILL

MAY 1987

This addendum addresses the proposal to provide a condensate recirculation system at the Oswego County Silk Road Landfill. The system will provide a means of recycling condensate collected at the Landfill Gas Recovery Facility back to the refuse. The condensate, carried from the refuse in the saturated gas, is removed from the gas during processing prior to the gas being utilized in internal combustion engines driving generators producing electricity.

Condensate recycling has been demonstrated to result in more rapid refuse stabilization and increased gas production rates (Pacey; Pohland). The recirculated condensate provides moisture for biological activity and a means of nutrient and microorganism distribution within the refuse. The New York State Energy Research Development Authority has fostered development in this area through a number of proposals (Seneca Meadows Landfill, Seneca Falls, Ronald Scrudato; Broome County Landfill, Binghamton, Wehran Engineering and Dynatech). The facility planned for the Oswego County Silk Road Landfill offers the opportunity to implement a recirculation system over a leachate collection system.

The proposed system for the Oswego County Silk Road Landfill will incorporate an injection system with the condensate force main, as shown on the attached Plan (Sheet No. A1). The condensate force main transfers the condensate from the gas recovery facility to the existing leachate tank, as described in the Engineering Report. As an alternative, the condensate could be recirculated to the refuse via the injection wells. The injection wells are located only over the northern portion of the fill that has a bottom soil liner and leachate collection system, as described in the Closure Engineering Report (Barton & Loguidice, P.C., February, 1984).

As shown in the attached sketch (Figure A2), the condensate force main and the injection wells are a buried system. The wells are valved so that any individual well can be isolated. The condensate can be pumped either to the wells or to the leachate tank. The wells consist of perforated pipe to provide for distribution of condensate throughout the refuse at a relatively shallow depth. The injection takes place beneath the existing cap. The condensate will diffuse down through the refuse, distributing the anaerobic bacteria and nutrients in the refuse while

providing the moisture, thus enhancing the anaerobic decomposition. The condensate will either be entrained in the gas, and drawn from the refuse via the recovery system or intercepted by the leachate collection system and returned to the leachate tank.

Relative to environmental impacts, there will be no adverse effect on the environment. The condensate is liquid originating in the fill, which when recycled, will accelerate stabilization. The accelerated stabilization will lead to reduced long-term care requirements for gas migration, leachate treatment, cover maintenance, and a subsequent saving in operating costs.

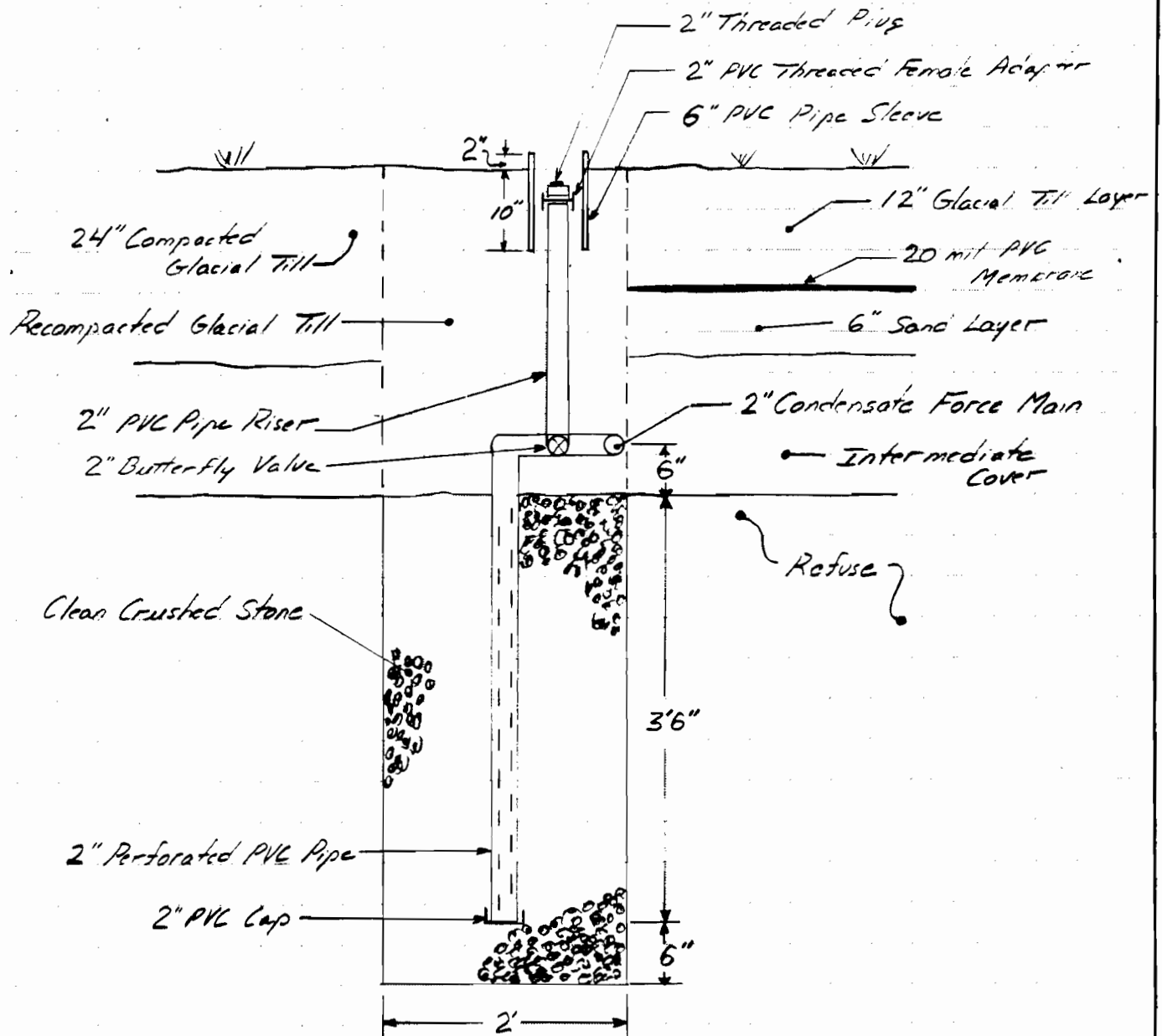
Since the condensate system is a closed pipe system, except at the injection well beneath the landfill cap, there are no surface water discharges or subsequent odors associated with the system. As indicated in the Engineering Report, it is expected that the condensate quality will be similar to that of the leachate since it originates from the same source.

In summary, the condensate recirculation system offers an alternative for condensate utilization other than disposal of the liquid in a wastewater treatment plant. The condensate recycling will provide a means of microorganism and nutrient distribution in the refuse, thus enhancing stabilization of the refuse and an increased gas production rate. The system can be incorporated into the existing leachate handling system without any adverse impact on the environment.

References

Pacey, J.G. "Controlled Landfill Methane Project, Mountain View, California." GRCDA 6th International Landfill Gas Symposium, Industry Hills, California, 1983.

Pohland, F.G. "Sanitary Landfill Stabilization With Leachate Recycle and Residual Treatment". EPA Grant No. R-801397, 1975.



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OSWEGO COUNTY SILK ROAD LANDFILL
 GAS RECOVERY
 CONDENSATE RECIRCULATION
 INJECTION WELL

FIGURE
 2A
 PROJECT NO.
 132.31

TABLE OF CONTENTS

	<u>PAGE</u>
1.0 INTRODUCTION	1
2.0 PROJECT DESCRIPTION	1
3.0 GAS GENERATION AND QUALITY	3
4.0 ENVIRONMENTAL IMPACT	4
4.1 Gas Venting and Migration	4
4.2 Safety	5
4.3 Emissions	6
4.4 Noise	6
4.5 Process Wastes	7
4.5.1 Waste Oil	7
4.5.2 Condensate	8
4.5.3 Gas Filter Elements	8
4.6 No-Project Alternative	9
5.0 SITE ANALYSIS	9
6.0 OPERATIONS	11
6.1 Management	11
6.2 Maintenance	12
6.3 Access	12
6.4 Facilities	13
6.5 Noise	14
6.6 Odors	15
6.7 Waste Materials	15
6.8 Bulk Oil Storage	15
6.9 Safety	15
6.10 Contingency Plans	16
6.10.1 Fire	16
6.10.2 Gas Leaks	17
6.10.3 Gas Venting	17
6.10.4 Condensate Transfer	18
6.10.5 Gas Flow	18
6.10.6 Oil Storage	18
6.10.7 Noise	19
6.11 Closure	19
7.0 ECONOMIC ANALYSIS	19
8.0 SUMMARY	20

TABLE OF CONTENTS (Continued)

BIBLIOGRAPHY

APPENDICES

- A. Application For Approval to Construct A Solid Waste Management Facility
- B. SEQR - Full Environmental Assessment Form
- C. Stationary Combustion Installation - Application For Permit to Construct or Certificate To Operate
- D. Gas Analysis
- E. Waste Oil Hauling Service
- F. Leachate Disposal Agreement
- G. Operating Maintenance and Data Records

ENGINEERING REPORT
FOR
LANDFILL GAS RECOVERY
AT
OSWEGO COUNTY SILK ROAD LANDFILL

1.0 INTRODUCTION

This engineering report is part of the New York State Department of Environmental Conservation 6 NYCRR Part 360 permit application to construct and operate a landfill gas recovery facility at the Oswego County Silk Road Landfill. The facility will convert landfill gas extracted from the closed landfill site to electricity, which will be sold to Niagara Mohawk.

The report incorporates the Part 360 construction permit application (Appendix A); the DEC Environmental Assessment Form (EAF) (Appendix B); the air permit application (Appendix C); and the Engineering Report. The report includes a description of: the proposed project; the gas recovery system; site analysis; environmental impact; operations; and economic analysis. This report is accompanied by a set of Engineering Plans showing the site location and development and the gas processing system.

2.0 PROJECT DESCRIPTION

The landfill gas recovery facility will utilize gas extracted from beneath the landfill capping system at the Oswego County Silk Road Landfill to produce electricity. The gas will be fed into electric generating engine-generator sets. The generators are driven by internal combustion engines that are fueled by the

landfill gas. This process is utilized by 65 percent of the approximately 85 landfill gas recovery facilities presently operating (Waste Age, 1987).

The landfill gas, which is comprised mainly of methane (50-60% CH₄) and carbon dioxide (40-50% CO₂), is a byproduct of the naturally occurring decomposition of the refuse in the landfill. The gas also contains small amounts of nitrogen, oxygen, hydrogen sulfide and other trace gases. This gas can be used as a source of energy, similar to natural gas. Some of the potential uses are in a gas boiler; upgrading of the gas for direct sale to an industrial customer or public utility; or generation of electric power, as in this case.

A header pipe will transport the gas from the existing in-place collection system to the gas processing facility. The collection system was installed beneath a synthetic PVC membrane cap on the less sloped top 20 acres of the site. It consists of perforated PVC pipe placed in a series of horizontal trenches backfilled with clean crushed stone. Gas migrating to the top of the landfill is extracted from beneath the cap via the collection trenches. The collection trenches are all connected to two header pipes, as shown in the accompanying Plans.

The gas is drawn to the processing facility by a vacuum placed on the header system by a compressor. The compressor and other gas filtering equipment are located in a building that is located adjacent to the fill area. The compressed gas is then fed to two 400 KW engine-generator sets that are located in an adjacent building, as shown in the accompanying Plans. The generators are driven by internal combustion engines designed to

operate on low Btu landfill gas. The generators produce 480 volt power, which will then be stepped up to 13.2 KV for export to the utility, Niagara Mohawk, on their existing line on Howard Road.

During periods when the engine-generator sets may be down for any length of time for maintenance and/or repairs, the gas will be vented through a controlled combustion flare, thus controlling any odors that may result from freely venting gas. The flare will be manually activated as needed.

3.0 GAS GENERATION AND QUALITY

Preliminary estimates of gas generation from the refuse, substantiated by subsequent field testing, indicated that sufficient gas is available from the collection system to support the 800 KW production level. Gas production will decrease with time as the decomposable portion of the waste is exhausted. It is anticipated that gas production will drop below significant production after approximately 15 years.

Analysis of gas samples taken during pilot field testing show that the gas has an average methane content of 56 percent, carbon dioxide content of 39 percent, and nitrogen content of 3.5 percent with the remaining volume made up of oxygen and other trace gases. Hydrogen sulfide was below detectable limits at less than 2 parts per million (ppm), as shown in Appendix D. An organics analysis revealed that only a small number of compounds were detected, at relatively low levels. These results are also shown in Appendix D.

4.0 ENVIRONMENTAL IMPACT

A number of environmental safety concerns are addressed in the following sections including gas venting and migration, emissions, noise and the disposal of process waste materials. The facility will have no significant adverse impact on public health, safety or welfare, the environment or natural resources. The SEQR - Environmental Assessment Form is in Appendix B.

4.1 Gas Venting and Migration

The landfill gas recovery system will result in positive environmental impacts relative to gas emissions, odors and safety. The recovery system will provide for the collection and control of otherwise freely venting gases that may pollute the atmosphere. Combustion of the gases will result in not only the destruction of any trace toxic elements that may be present in the gas, but also the control of odor producing compounds (Kester and Van Slyke, 1986). The combustion of these compounds can be accomplished via the gas engines or the flaring system. Combustion is a commonly accepted method of control of these gases (Walsh, et. al., 1986).

As previously indicated, the production of landfill gas is a naturally occurring phenomenon, causing a positive pressure in the landfill, requiring relief which results in gas movement in the path of least resistance. In an uncontrolled landfill, the gas will vent through the exposed surface. On a capped site, the gas may migrate horizontally off site if not vented. Migrating gas can result in vegetation kills, odor problems, or even worse, potentially explo-

sive situations if allowed to accumulate in enclosed areas. The gas collection system provides a controlled path of least resistance, thus reducing the risks associated with gas migration and off-site accumulation.

4.2 Safety

As indicated in the previous section, the gas recovery system will help alleviate certain safety risks associated with migration and venting. The gas will be combusted via either the engines or the flare. Discharge of the gas directly to the atmosphere will occur only during brief temporary periods when the facility goes down for maintenance or emergencies. If the facility is down for any length of time, the gas will be manually switched over to the flaring facility.

Gas leakage from the facility is unlikely since (1) there is no gas storage on this facility and (2) the collection system is under vacuum, thus any leaks would result in air entering the piping system rather than gas coming out. Oxygen analyzers in the system will activate an alarm indicating any breaks or leaks in the system.

All operating equipment and buildings will be monitored with various alarms, including smoke sensors and gas detectors, indicating any emergency situations. These alarms will be relayed to the Oswego County Energy Recovery Facility in Fulton which is manned 24 hours per day. All gas lines are protected with flame arrestors to prevent the backflash of combustion into the landfill itself.

4.3 Emissions

Relative to emissions that may cause a potential health risk, there are two primary sources. The first is that of the venting and/or migrating gas. As previously indicated, the collection and recovery system will provide a means of destroying any toxic or odorous compounds via incineration.

The second source is that of the emissions from combustion from the engines. Typically, these emissions include particulates, sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO) and unburned hydrocarbons (HC). Of these compounds, particulates and sulfur dioxide will be negligible due to the combustion process and low sulfur content of the fuel gas. The NO_x, CO and HC emissions will be kept low since a low emission engine is specified for this project. An estimate of these emissions including the flare, is given with the air permit application in Appendix C.

4.4 Noise

Regarding noise impact, operation of the gas processing equipment and engines will result in significant noise levels which will have to be muffled. The various sources of the noise have been identified and mitigating measures implemented. These include locating the equipment in insulated buildings, utilizing slow speed fans and mounting exhaust silencers on the engines. The sound levels from the various sources are being modeled to demonstrate that these sound proofing measures will be adequate. The nearest residences that could be impacted include the Coakley residence (approximately 600+ feet southwest) and the Kerfien Mobile

Home Park (approximately 2000± feet to the north). Other background noise levels include the Oswego County Airport to the south, and the truck traffic on Silk and Howard Roads. Noise from traffic to and from the site will be minimal, except during construction and startup, since it will typically require only one or two trips of a small vehicle during the day. During construction, all work will take place only during daylight hours for a 6± month period. All construction equipment will be required to have mufflers, and the sound levels should be no greater than that which occurred while the landfill operation itself was active. During startup, there will be additional small vehicle traffic for approximately 4 to 6 weeks.

4.5 Process Wastes

Waste materials to be disposed of include used lubricating oil from the engines and compressors, condensate from the gas processing, and filter elements from the gas filters.

4.5.1 Waste Oil

The used oil will be drained from the engines into a 550 gallon underground holding tank. The tank will meet the requirements of the New York State Uniform Fire Protection and Building Code, Title 9(B) and NYSDEC 6 NYCRR 360.8(b)(6). The tank will be a double wall tank that will be emptied by a hauling service already employed by the County (see Appendix E). Transfer of the oil from the engine to the waste oil holding tank will be through a closed pipe system, thus eliminating the risk of spills. No oil will be disposed of on site.

4.5.2 Condensate

All condensate will be drained from the various sources (accumulator tank, scrubbers, compressors) via closed pipe systems to the condensate lift station located immediately adjacent to the compressor building. It will then be pumped via a buried pipe to the in-place leachate tank for storage, from which it will ultimately be disposed of at a wastewater treatment plant. Presently the leachate is being hauled to the City of Fulton Treatment Plant (see Appendix F).

The concrete leachate tank has a 336,000 gallon capacity with one foot freeboard. Presently, the tank is collecting about 300,000 gallons of leachate per year. It is anticipated that the condensate will contribute a maximum of 40,000 additional gallons per year.

Since the source of the condensate is the refuse, it is anticipated that the condensate will be similar to the leachate in quality. Condensate samples will have to be analyzed once operational to determine how it will impact the storage tank contents.

4.5.3 Gas Filter Elements

Filter elements from the gas filter will be disposed of in the Bristol Hill Landfill. There are a total of 66 elements, each weighing 10 lbs, that will be

changed once a year. Replacement of the filters can be done on a rotational basis.

4.6 No-Project Alternate

The "no project" alternative will result in continued vertical and lateral migration of the landfill gas, resulting in possible discharge of potentially dangerous gas to the atmosphere and/or accumulation in adjacent structures.

An alternate project would be to collect and flare the gas. This project will result in a net cost to the County for operation and maintenance of the system. The gas recovery system will allow the County to recover some of the costs. The economic analysis of the project is discussed in Section 7.0.

5.0 SITE ANALYSIS

The project is to be located on the west side of the Oswego County Silk Road Landfill, located at the corner of Howard and Silk Roads in the Town of Volney, Oswego County (as shown on the accompanying Plans). The 55-acre site received approximately 1.9 million tons of residential, commercial and non-hazardous industrial wastes over a nine year period. The site, closed since 1983, has been capped with a synthetic PVC membrane on the top, less sloped 20 acres and compacted glacial till on the steeper sideslopes. As previously indicated, a horizontal trench gas collection system was installed under the PVC concurrent with the capping.

The gas recovery facility buildings are to be located on virgin soil in the wooded section immediately adjacent to the toe of the slope on the west side of the fill. Oswego County owns this property, which is adjacent to the borrow area previously excavated for daily cover during landfill operations. The wooded section is approximately 7 acres, of which one acre will be developed for the facility site. The site is bordered to the east by the landfill slope; to the south by the Oswego County Airport; and to the north and west by wooded areas and some residential properties. The Coakley residence is approximately 600± feet to the southwest; and the Kerfien Mobile Home Park is approximately 2000± feet to the north. The property line at the closest point is approximately 260± feet from the facility.

The facility will be located in wooded areas, thus minimizing its visibility. The trees will also aid in noise abatement. The site and access road have been located so as to minimize tree removal. The County owns all the property, so no acquisition of rights-of-way will be required. There are no utility lines on the site. A right-of-way will be granted to Niagara Mohawk for a power line along the access road out to Howard Road. There are no surface water channels contiguous to the site, nor any wastewater disposal that would impact any surface or groundwaters.

All the structures involved will be located on concrete slabs; therefore, excavation will be minimal. It will not be necessary to haul any material off-site except for the cleared brush and trees, which will be disposed of at the County's solid waste facility. The only grading changes that will take place are that for surface water drainage, which will direct the sur-

face water runoff to existing drainage channels. Drainage culverts will be located as shown on the Plans and all disturbed areas will be revegetated.

The gas header pipe connecting the existing header outlets to the recovery facility will be placed on the capped landfill surface and covered with soil and vegetation. No excavation into the refuse or cap will be necessary, and the pipe soil cover will be placed to accommodate surface water drainage and maintenance such as mowing of the vegetation.

All of the necessary codes and permits are being applied for and include: NYSDEC 6 NYCRR Part 360 permit to construct and operate; NYSDEC Air Permit; and the NYS Building Permit. The SEQR process is addressed in the attached Environmental Assessment Form.

6.0 OPERATIONS

6.1 Management

The gas recovery facility will be owned, managed and maintained by Oswego County. The facility will be operational 24 hours per day, year round, except during periods for routine maintenance and repairs. The gas recovery system will be continuously monitored via a remote sensing system that will be relayed to the Oswego County Energy Recovery Facility (ERF) in Fulton, approximately 2.5 miles away. The ERF is manned around the clock. The gas recovery facility will be routinely checked by County personnel for visual inspection and routine maintenance.

6.2 Maintenance

Routine maintenance items will include: visual inspection of all operating equipment (compressors, engines, radiators, pumps); recording of operating data; and changing of lubricating oils and filters. The monitoring system will record the operating data on a regular interval as outlined in Appendix G. Maintenance will be performed by personnel trained in the operation of this system. Repairs will be done by County mechanics or contracted to equipment suppliers as needed. All necessary tools and equipment for repairs will be located at the facility, or be available on a service truck that will be used by maintenance personnel. There will be light and electric power provided in the buildings for maintenance work. Routine data logging and maintenance schedules are shown in Appendix G.

6.3 Access

Access to the facility will be controlled by fences with locked gates. Presently, the landfill site is fenced on all road accessible sides, and all gates are locked. In addition, the gas recovery facility will be completely enclosed with an eight foot fence as shown on the site plan. Other than authorized County personnel, Niagara Mohawk will be the only other party with site access to the substation and utility switchgear.

The facility will not be open to the public. The landfill is a closed facility and no longer accepts wastes. No solid or liquid wastes, from either outside the facility or the facility itself, will be disposed of on the premises.

Construction of the facility does not require the disturbance of any in-place wastes; therefore, no waste relocation is needed.

The access road to the facility will be maintained by the County Highway Department. The road will be paved to eliminate dust and facilitate snow removal. This road will be used only for access to the gas recovery facility; therefore, traffic will be minimal.

6.4 Facilities

Both buildings, the generator and compressor buildings, will be totally enclosed and insulated and will meet all building codes as per New York State Uniform Fire Prevention and Building Code. Overhead doors will facilitate equipment installation and repairs while mandors are provided for routine access. While operating, sufficient heat will be generated by the equipment to keep the buildings warm during the winter. Should the equipment be down, backup electric space heaters are provided for heating. Power exhausters are provided to remove heat during the summer months. All engine exhaust is discharged to the exterior of the building through silencers.

Toilet facilities are provided in the generator building as shown on the floor plan. This includes an incinolet and sink. The incinolet provides self-contained destruction of waste material, while the sink will discharge to the lift station that handles the condensate and floor drains. Fresh potable water will be trucked in.

As previously indicated, the condensate drains from the gas process vessels to the lift station via closed piping. The condensate line has a water trap to prevent gas escape. The floor drains located in both buildings discharge to an oil/water separator. From the separator, the water portion discharges to the lift station, while the oil discharges to the waste oil holding tank referred to in Section 4.5.1. The pump in the lift station is activated by a level float switch. A backup pump for the lift station will be available in the spare parts. All of the condensate and drain water will be pumped to the existing leachate tank. There will be no on-site discharge of the liquid wastewater stream.

6.5 Noise

Noise impacts were discussed in Section 4.4. Presently, resultant sound levels are being evaluated and recommendations made for mitigating measures. These include: (1) locating equipment in insulated buildings; (2) silencers on the engine exhaust systems; (3) orientation of noise sources so they discharge away from residences; (4) retain wooded areas as buffers; and (5) use of equipment and materials designed for noise suppression. The facility will be constructed based on the on-going noise analysis. Noise levels are being modeled based on manufacturer's data for equipment operation in conjunction with the above noise suppression measures.

6.6 Odors

Combustion of odor producing constituents in the gas, such as sulfur compounds and mercaptans, via incineration through the engine or flare will reduce odors, as described in Section 4.1.

6.7 Waste Materials

As previously indicated, the waste materials include used lubricating oil from the engines and compressors, condensate from the gas processing and filter elements from the gas filters. The disposal of these wastes was addressed in Section 4.5.

6.8 Bulk Oil Storage

Clean oil for the engines will be stored in a 550 gallon, double wall, underground, storage tank located between the generator and compressor buildings. The oil will be pumped to the Engine Room via a closed pipe system. The tank installation will meet NYSDEC 6 NYCRR Part 614 regulations for petroleum bulk storage. Since the facility is under 1100 gallons, the tank does not have to be registered under 6 NYCRR Part 612.

6.9 Safety

Minimization of health and safety risks will be achieved by the following measures:

1. All equipment and piping must meet OSHA standards.

2. All personnel will be trained by equipment suppliers in the safe and proper operation and maintenance of the equipment.
3. No smoking will be permitted in the buildings, or near any gas handling equipment.
4. There will be gas detectors and forced ventilation in the buildings.
5. Personnel will be required to wear personal gas detectors when disassembling piping to the equipment.
6. Fire alarms will be located in the building, both automatic and pull stations, and a pull station will be located outside the building.
7. Fire extinguishers will be located in the buildings.
8. All leaks, liquid or gas, will require that the equipment be shut down and the leak repaired.

6.10 Contingency Plans

The following contingency plans have been incorporated into the design.

6.10.1 Fire

Fire alarms, both automatic and manual are located in the buildings. The fire alarms are transferred through a dialer system to the Oswego County ERF and the

local fire department. The fire department will have been informed of the nature of the site and necessary precautions. All equipment will automatically shut down in case of fire.

6.10.2 Gas Leaks

Gas leaks in the process pipe will be detected via the oxygen analyzer and in the building via gas detectors. The detectors will activate an alarm at the ERF, and the equipment will shut down. Likewise, should there be a pressure loss in the system, it will shut down. When the equipment shuts down, automatic valves shut off the flow of gas to the equipment. The main header valve, located outside the buildings, can then be closed and the buildings vented. The leak can then be repaired. All personnel involved in the repair work will be required to wear personal gas detectors until the leak is found and the building and piping free of gas.

6.10.3 Gas Venting

Should the engines be shut down, the gas will be fed through the gas flare. If the gas flare or compressors are shut down, the main header valve to the facility will be closed and gas vented through individual vents on the fill as is presently being done. These vents are located in the collection system trenches, at a spacing of one per acre, and disperse the gas to the atmosphere.

6.10.4 Condensate Transfer

If the pump in the condensate transfer station should fail, a spare pump will be available for immediate replacement. Should the problem be other than the pump, the condensate can be transferred from the lift station to the leachate tank by hauling it directly with the leachate tanker owned and operated by the County. As a backup, condensate flow can be eliminated by shutting off the flow of gas to the facility by closing the main header valve.

6.10.5 Gas Flow

Gas flow to the facility can be stopped by closing the main header valve located outside the compressor building. Should this valve fail, each collection trench is individually valved, thus gas flow into the header can be stopped. Once these are closed, the main valve can be removed and a blind flange placed in its place during repair. Personnel will wear personal gas detectors during all repairs on the header system.

6.10.6 Oil Storage

Both the bulk oil storage and waste oil holding tanks are double walled and have leak detection systems on them. Should oil be detected between the walls, the tanks will be emptied and necessary repairs done. During this time, the oil will be hauled to and from the facility via 55 gallon drums. The waste oil holding tank also has a high level alarm switch in it.

6.10.7 Noise

Excessive noise levels typically would be the result of a failed silencer. In this case, the unit will be shut down until a new silencer can be installed.

6.11 Closure

Upon closing of the facility, the equipment will be dismantled and relocated or salvaged. The gas will continue to be flared till the flow rate is no longer able to sustain a flame. At this point, flow rates will have dropped to insignificant levels where odors and migration are no longer a potential hazard. The site will be restored to that which may be useful to the County, with either the buildings used for some other purpose, or dismantled and the site revegetated. Any further closing or monitoring activities will be part of the landfill site closure plan.

7.0 ECONOMIC ANALYSIS

Initially, a number of alternatives for gas control at the Silk Road Landfill were evaluated by Oswego County, of which electric generation and/or flaring were included. Based on the fact that some form of gas control was necessary from an environmental standpoint, it was determined that electric generation would be the most beneficial to the County. Since there are no revenues generated by straight flaring of the gas, the generation of electricity and subsequent sales to Niagara Mohawk offer the County the opportunity to recover some of the costs of the gas control and landfill closure systems.

The gas recovery system requires a cash investment of approximately 1.5 million dollars and a first year operating cost of 55,000 dollars. The anticipated net revenue to the County over the life of the project will depend on the up time of the system, and is expected to be between 1.5 to 3 million dollars, assuming no debt service since the County is not borrowing funds for this project. Landfill closure costs to date have totalled approximately 2 million dollars and an estimated annual post closure maintenance cost of between 30 to 40 thousand dollars. Thus, the revenues generated by this project will help to defray some of the closure costs. The project will be financed through County funds, and will not require the borrowing of funds.

8.0 SUMMARY

This Engineering Report is part of the 6 NYCRR Part 360 permit application to construct a landfill gas recovery facility at the Oswego County Silk Road Landfill. The facility will convert landfill gas to electricity through two 400 KW engine-generator sets. The electricity will be sold to Niagara Mohawk. The gas will be extracted through a horizontal trench collection system installed beneath a PVC membrane cap already in place on the closed site.

The equipment will be located in buildings in a wooded area immediately adjacent to the landfill. The facility will be owned by Oswego County, using trained County personnel to operate and maintain the system. No process wastes will be disposed of on site. The equipment is designed to minimize emissions and noise.

This project will result in improved health and safety conditions due to the control of venting and migrating gases, and in addition will provide the County with revenue that can be put towards the cost of the landfill closure and gas control. The project will be a net benefit to the County and the environment.

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- Waste Age, 1987. "Landfill Gas Survey Update", pg. 103, March.

APPENDIX A

6 NYCRR Part 360 Permit Application
To Construct A Solid Waste
Management Facility

47-19-2 (5/77)
Formerly SW-7

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**APPLICATION FOR APPROVAL TO CONSTRUCT
A SOLID WASTE MANAGEMENT FACILITY**

FOR STATE USE ONLY	
PROJECT NO.	DATE RECEIVED
DEPARTMENT ACTION	DATE
<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved	

SEE APPLICATION INSTRUCTIONS ON REVERSE SIDE

1. OWNER'S NAME Oswego Co. Dept. of Public Works	2. ADDRESS (Street, City, State, Zip Code) 46 E. Bridge St., Oswego, New York 13126	3. Telephone No. 315-343-1134
4. OPERATOR'S NAME Oswego Co. Dept. of Public Works	5. ADDRESS (Street, City, State, Zip Code) 46 E. Bridge St., Oswego, New York 13126	6. Telephone No. 315-343-1134
7a. ENGINEER'S NAME Barton & Loguidice, P.C.	8. ADDRESS (Street, City, State, Zip Code) 290 Elwood Davis Rd., Box 3107, Syracuse, New York 13220	9. Telephone No. 315-457-5200
7b. ENGINEER'S N.Y.S. LICENSE NO. 25295	10. TYPE OF PROJECT FACILITIES: <input type="checkbox"/> Composting <input type="checkbox"/> Transfer <input type="checkbox"/> Shredding <input type="checkbox"/> Baling <input type="checkbox"/> Sanitary Landfill <input type="checkbox"/> Incineration <input type="checkbox"/> Pyrolysis <input type="checkbox"/> Resource Recovery-Energy <input type="checkbox"/> Resource Recovery-Materials <input checked="" type="checkbox"/> Other <u>Landfill Gas Recovery</u>	

11. Briefly describe the project including the basic process and major components: **Conversion of landfill gas recovered from a capped, solid waste landfill to electricity via engine generator sets utilizing internal combustion engines. The gas will be extracted thru an existing trench collection system, compressed and filtered prior to the engines.**

12. Describe location of facility. (Attach a USGS Topographic Map showing the exact location of the facility) **The facility will be located on County property on the west side of the Oswego County Silk Road Landfill, located at Howard and Silk Rds. in the Town of Volney. Location map is on the title sheet of the accompanying Plans.**

13. County in which facility is located: Oswego County	14. Environmental Conservation Region in which facility is located: NYSDEC Region 7
--	---

15. Municipalities Served by Facility	County	No. of Municipalities
Sale of electricity to local utility, Niagara Mohawk	Oswego	N/A

16. Describe briefly how the proposed facility relates to the Comprehensive Solid Waste Management Plan for the Municipality. Explain any deviation from that Plan. **The facility is part of the overall Closure Plan for the Silk Rd. Landfill. The site has been capped with PVC on the flatter upper 20 acres and compacted glacial till on the steeper side-slopes. The gas recovery system processes the gas vented from beneath the cap, thus controlling odors and reducing the potential for gas migration.**

17. If the facility is other than a sanitary landfill, describe the residues in terms of quantities and types. Also indicate the methods and locations of residue disposal or, if recyclable, indicate markets:
Condensate from gas process; est. 40,000 gal/yr max; stored in existing leachate tank and transferred to POWTP. Gas filters; 66 elements/yr @ 10 lbs ea; disposed of at permitted solid waste landfill. Waste oil for engines; approx. 3,700 gal/yr; to be hauled away by existing recycle hauler.

18. If the facility is a sanitary landfill, provide the following information:

a. Total useable area - _____ Acres	e. Distance to nearest airport - _____ miles
b. Distance to nearest surface water - _____ Feet	f. Expected life of site - _____ years
c. Depth to nearest ground water - _____ Feet	g. Is site on a flood plain? <input type="checkbox"/> Yes _____ Year Flood <input type="checkbox"/> No
d. Depth to nearest rock - _____ Feet	h. Predominant type of soil on site: _____ (Use Unified Soil Classification System)

19. Anticipated construction starting and completion dates From 7/87 To 12/87	20. Estimated Population Served Current N/A Design N/A
21. Estimated Cost Initial \$1.5 mm Annual \$55,000/yr	22. Estimated Daily Tonnages of Solid Waste Current N/A Design N/A
23. Operating Hours per Day	24. Are attached plans and specifications in substantial conformance with "Content Guidelines for Plans and Specifications"? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

25. CERTIFICATION:
I hereby affirm under penalty of perjury that information provided on this form and attached statements and exhibits is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law.

5/11/87 Date [Signature] Signature and Title

APPENDIX B

SEQR-Full Environmental Assessment Form

617.20
Appendix A
State Environmental Quality Review
FULL ENVIRONMENTAL ASSESSMENT FORM

Purpose: The full EAF is designed to help applicants and agencies determine, in an orderly manner, whether a project or action is likely to be significant. The question of whether an action is significant is not always easy to answer. Frequently, there are aspects of a project that are subjective or unmeasurable. It is also understood that those who will need to determine significance will range from those with little or no formal knowledge of the environment to those who are technically expert in environmental analysis. In addition, many who have knowledge in one particular area may not be aware of the broader concerns affecting the question of significance.

The full EAF is intended to provide a method whereby applicants and agencies can be assured that the determination process has been orderly, comprehensive in nature, yet flexible to allow introduction of information to fit a project or action.

Full EAF Components: The full EAF is comprised of three parts:

- Part 1:** Provides objective data and information about a given project and its site. By identifying basic project data, it assists a reviewer in the analysis that takes place in Parts 2 and 3.
- Part 2:** Focuses on identifying the range of possible impacts that may occur from a project or action. It provides guidance as to whether an impact is likely to be considered small to moderate or whether it is potentially-large impact. The form also identifies whether an impact can be mitigated or reduced.
- Part 3:** If any impact in Part 2 is identified as potentially-large, then Part 3 is used to evaluate whether or not the impact is actually important.

DETERMINATION OF SIGNIFICANCE

If you find that one (or more) impact(s) is both large and its consequence is important, then the project is likely to be significant, a positive declaration must be issued, and a draft environmental impact statement must be prepared.

SCOPING

If a draft EIS is needed, the Environmental Assessment Form can be a valuable tool in determining the scope of the issues to be covered by the draft EIS.

PART 1—Prepared by Project Sponsor

PROJECT INFORMATION

NOTICE: This document is designed to assist in determining whether the action proposed may have a significant effect on the environment. Please complete the entire Data Sheet. Answers to these questions will be considered as part of the application for approval and may be subject to further verification and public review. Provide any additional information you believe will be needed to complete Parts 2 and 3.

It is expected that completion of the full EAF will be dependent on information currently available and will not involve new studies, research or investigation. If information requiring such additional work is unavailable, so indicate and specify each instance.

NAME OF PROJECT Oswego County Landfill Gas Recovery			
NAME OF APPLICANT Oswego County		BUSINESS TELEPHONE (315) 343-1134	
ADDRESS 46 E. Bridge Street			
CITY/PO Oswego		STATE NY	ZIP CODE 13126
NAME OF OWNER (if different)		BUSINESS TELEPHONE ()	
ADDRESS			
CITY/PO		STATE	ZIP CODE
DESCRIPTION OF PROJECT (Briefly describe type of project or action) Conversion of landfill gas recovered from a capped, solid waste landfill to electricity via engine generator sets utilizing internal combustion engines. The gas will be extracted thru an existing trench collection system, compressed and filtered prior to the engines.			

Please Complete Each Question—Indicate N.A. if not applicable

A. Site Description - Entire Landfill Site:

Physical setting of overall project, both developed and undeveloped areas.

1. General character of the land: Generally uniform slope Generally uneven and rolling or irregular.
2. Present land use: Urban Industrial Commercial Residential (suburban) Rural (non-farm)
 Forest Agriculture Other Existing closed landfill site.

3. Total acreage of project area: 85 acres.

APPROXIMATE ACREAGE	PRESENTLY	AFTER COMPLETION
Meadow or Brushland (Non-agricultural)	<u>5</u> acres	<u>5</u> acres
Forested	<u>12.8</u> acres	<u>11.7</u> acres
Agricultural (Includes orchards, cropland, pasture, etc.)	<u>-</u> acres	<u>-</u> acres
Wetland (Freshwater or tidal as per Articles 24, 25 of ECL)	<u>-</u> acres	<u>-</u> acres
Water Surface Area	<u>-</u> acres	<u>-</u> acres
Unvegetated (Rock, earth or fill) Borrow Area	<u>12</u> acres	<u>12</u> acres
Roads, buildings and other paved surfaces	<u>0.2</u> acres	<u>1.3</u> acres
Other (Indicate type) Capped Landfill - Vegetated	<u>55</u> acres	<u>55</u> acres

4. What is predominant soil type(s) on project site? Hinckley gravelly loamy sand/Ira gravelly fine sandy loam

a. Soil drainage: Well drained 100 % of site Moderately well drained _____ % of site
 Poorly drained _____ % of site

b. If any agricultural land is involved, how many acres of soil are classified within soil group 1 through 4 of the NYS Land Classification System? 0 acres. How many acres are classified within soil groups 5 through 7? 0 acres.

5. Are there bedrock outcroppings on project site? Yes No

a. What is depth of bedrock? 64 (in feet)

6. Approximate percentage of proposed project site with slopes: 0-10% 100 % 10-15% 0 %
 15% or greater 0 %

7. Is project contiguous to, or contain a building or site listed on or eligible for listing on the State or the National Register of Historic Places? Yes No

8. Is project contiguous to a site listed on the Register of National Natural Landmarks? Yes No

9. What is the depth of the water table? 11 (ft.)

10. Do hunting or fishing opportunities presently exist in the project area? Yes No

11. Does project site contain any species of plant or animal life that is identified as threatened or endangered?

Yes No according to NYSDEC, Cortland Office - Mr. David Thompson

Identify each species _____

12. Are there any unique or unusual land forms on the project site? (i.e., cliffs, dunes, other geological formations)

Yes No Describe _____

13. Is the project site presently used by the community or neighborhood as an open space or recreation area?
 Yes No

14. Does the present site offer or include scenic views or vistas known to be important to the community?

Yes No

15. Streams within or contiguous to project area: None

a. Name of Stream and Name of River to which it is tributary _____

16. Lakes, ponds, wetland areas within or contiguous to project area:

a. Name PE32 Borders northern portion of landfill; b. Size (In acres) Approx. 16 Ac.
no wetlands contiguous to landfill gas recovery project site.

17. What is dominant land use and zoning classification within a ¼ mile radius of the project (e.g. single family residential, R-2) and the scale of development (e.g. two-story). Nearby land use is rural, single family, residential; airport located nearby to the south. Zoning to the south is industrial; remainder of surrounding area is zoned agricultural.

18. Is the site located in an agricultural district certified pursuant to Agricultural and Markets Law, Article 25, Section 303?
 Yes No
19. Is the site located in or adjacent to a Critical Environmental Area designated pursuant to Article 8, 6 NYCRR 6177?
 Yes No
20. Has the site been used for land disposal of solid or hazardous wastes?
 Yes No
 Closed capped landfill site.

B. Project Description

1. Physical dimensions and scale of project (fill in dimensions as appropriate)

- a. Total contiguous acreage owned by project sponsor 85 acres. Project site is approx. 7.3 acres in wooded area.
 b. Project acreage developed: 0 acres initially; 1.1 acres ultimately
 c. Project acreage to remain undeveloped 6.2 acres.
 d. Length of project, in miles: N/A (If appropriate)
 e. If project is an expansion of existing, indicate percent of expansion proposed: building square footage N/A; developed acreage N/A.

- f. Number of off-street parking spaces existing N/A; proposed N/A.
 g. Maximum vehicular trips generated per hour 1 per day (upon completion of project)?

h. If residential: Number and type of housing units: N/A

	One Family	Two Family	Multiple Family	Condominium
Initially	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Ultimately	<u> </u>	<u> </u>	<u> </u>	<u> </u>

i. If: N/A

	Orientation (Neighborhood-City-Regional)	Estimated Employment
Commercial	<u> </u>	<u> </u>
Industrial	<u> </u>	<u> </u>

- j. Dimensions (in feet) of tallest proposed structure 26 [in feet] height; 35 width; 70 length.
 k. Linear feet of frontage along a public throughfare project will occupy is 0

2. How much natural material (i.e., rock, earth, etc.) will be removed from the site? 0 tons
0 cubic yards.

3. Will the site be reclaimed? Yes No Structures removed if not used;
 a. If yes, for what intended purpose is the site being reclaimed? equipment relocated.
 b. Will topsoil be stockpiled for reclamation? Yes No N/A
 c. Will upper subsoil be stockpiled for reclamation? Yes No

4. How many acres of vegetation (trees, shrubs, ground covers) will be removed from site? 1.1 acres.
 5. Will any mature forest (over 100 years old) or other locally-important vegetation be removed by this project?
 Yes No

6. Are there any plans for re-vegetation to replace that removed during construction? Yes No

7. If single phase project: Anticipated period of construction 6 months, (including demolition).

8. If multi-phased:

- a. Total number of phases anticipated 1 (number).
 b. Anticipated date of commencement phase 1 7 month 87 year, (including demolition).
 c. Approximate completion date final phase 12 month 87 year.
 d. Is phase 1 financially dependent on subsequent phases? Yes No

9. Will blasting occur during construction? Yes No

10. Number of jobs generated: during construction 0; after project is complete 1.5.

11. Number of jobs eliminated by this project None.

12. Will project require relocation of any projects or facilities? Yes No If yes, explain

13. Is surface or subsurface liquid waste disposal involved? Yes No
 a. If yes, indicate type of waste (sewage, industrial, etc.) _____
 b. If surface disposal, name of stream into which effluent will be discharged _____

14. Will surface area of existing lakes, ponds, streams, bays or other surface waterways be increased or decreased by proposal? Yes No

15. Is project or any portion of project located in the 100 year flood plain? Yes No

16. Will the project generate solid waste? Yes No
 a. If yes, what is the amount/month 55 ~~2500~~ pounds/month

b. If yes, will an existing solid waste facility be used? Yes No

c. If yes, give name Oswego Co. Bristol Hill LF; location Volney, Oswego County

d. Will any wastes not go into a sewage disposal system or into a sanitary landfill? Yes No

17. Will the project involve the disposal of solid waste? Yes No

a. If yes, what is the anticipated rate of disposal? _____ tons/month.

b. If yes, what is the anticipated site life? _____ years.

18. Will project use herbicides or pesticides? Yes No

19. Will project routinely produce odors (more than one hour per day)? Yes No

20. Will project produce operating noise exceeding the local ambient noise levels? Yes No

21. Will project result in an increase in energy use? Yes No If yes, indicate type(s) _____

22. If water supply is from wells, indicate pumping capacity N/A gallons/minute.

23. Total anticipated water usage per day 10 gallons/day. (Trucked in)

24. Zoning:

a. What is dominant zoning classification of site? Industrial Zoning; closed landfill site

b. Current specific zoning classification of site? None

c. Is proposed use consistent with present zoning? Yes No

d. If no, indicate desired zoning _____

25. Approvals:

a. Is any Federal permit required? Yes No

b. Does project involve State or Federal funding or financing? Yes No

c. Local and Regional approvals?

	Approval Required	Type	Submittal Date	Approval Date
City, Town, Village Board	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____	_____
City, Town, Village Planning Board	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____	_____
City, Town Zoning Board	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____	_____
City, County Health Department	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____	_____
Other Local Agencies	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____	_____
Other Regional Agencies	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____	_____
State Agencies	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<u>NYSDEC Part 360</u>	<u>4/87</u>	_____
Federal Agencies	<input type="checkbox"/> Yes <input type="checkbox"/> No	<u>NYSDEC Air Permit</u>	<u>4/87</u>	_____
		<u>NYS Building Code</u>	<u>4/87</u>	_____

C. Zoning and Planning Actions

1. Type of Application:
 zoning amendment zoning variance special use permit subdivision site plan
 new/revision of master plan resource management plan other _____
2. What is present zoning of the site? Industrial
3. What is the maximum potential development of the site if developed as permitted by the present zoning district? N/A
4. What is the proposed zoning of the site? N/A
5. What is the maximum potential development of the site if developed as permitted by the proposed zoning district? N/A
6. Are there any physical characteristics of the site that would constrain or limit future development?
Yes, it is a closed landfill and contains refuse.
7. Is the proposed action consistent with the recommended uses in local land use plans? Yes No
a. If yes, specify the plan and year adopted N/A
8. Is the proposed action compatible with adjoining/surrounding land uses within a 1/4 mile? Yes No
9. If the proposed action is the subdivision of land, how many lots are proposed? N/A
a. What is the minimum lot size proposed? _____
10. Is the site served by existing public utilities? Yes No
a. If yes, does sufficient capacity exist to allow connection? Yes No
b. If yes, will improvements be necessary to allow connection? Yes No
11. If question 10a. was answered NO, will proposed action require additional authorization(s) for the formation of sewer or water districts? Yes No
12. Will the proposed action create a demand for any community provided services (recreation, education, police, fire protection)? Yes No
a. If yes, is existing capacity sufficient to handle projected demand? Yes No
13. Will the proposed action result in the generation of traffic significantly above present levels? Yes No
a. If yes, is the existing road network adequate to handle the additional traffic? Yes No

D. Informational Details

Attach any additional information as may be needed to clarify your project. If there are or may be any adverse impacts associated with your proposal, please discuss such impacts and the measures which can be taken to mitigate or avoid them

E. Verification

I certify that the information provided above is true to the best of my knowledge.

Applicant/Sponsor Name Arthur Ospelt Date 5/11/87
Signature *Arthur Ospelt* Title Highway Superintendent

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment.

Part 2—Responsibility of Lead Agency Project Impacts and Their Magnitude

General Information (Read Carefully)

- In completing the form the reviewer should be guided by the question: Have my decisions and determinations been reasonable? The reviewer is not expected to be an expert environmental analyst.
- Identifying that an effect will be potentially large (column 2) does not mean that it is also necessarily significant. Any large impact must be evaluated in PART 3 to determine significance. By identifying an impact in column 2 simply asks that it be looked at further.
- The Examples provided are to assist the reviewer by showing types of impacts and wherever possible the threshold of magnitude that would trigger a response in column 2. The examples are generally applicable throughout the State and for most situations. But, for any specific project or site other examples and/or lower thresholds may be appropriate for a Potential Large Impact rating.
- Each project, on each site, in each locality, will vary. Therefore, the examples have been offered as guidance. They do not constitute an exhaustive list of impacts and thresholds to answer each question.
- The number of examples per question does not indicate the importance of each question.

Instructions (Read carefully)

- a. Answer each of the 19 questions in PART 2. Answer Yes if there will be any impact.
- b. Maybe answers should be considered as Yes answers.
- c. If answering Yes to a question then check the appropriate box (column 1 or 2) to indicate the potential size of the impact. If threshold impact equals or exceeds any example provided, check column 2. If impact will occur but threshold is lower than example, check column 1.
- d. If reviewer has doubt about size of the impact then consider the impact as potentially large and proceed to PART 3.
- e. If a potentially large impact or effect can be mitigated by a change in the project to a less than large magnitude, check the yes box in column 3. A No response indicates that such a reduction is not possible.

IMPACT ON LAND

1. Will the proposed action result in a physical change to the project site?
 NO YES

Examples that would apply to column 1

- Any construction on slopes of 15% or greater, (15 foot rise per 100 foot of length), or where the general slopes in the project area exceed 10%.
- Construction on land where the depth to the water table is less than 3 feet.
- Construction of paved parking area for 1,000 or more vehicles.
- Construction on land where bedrock is exposed or generally within 3 feet of existing ground surface.
- Construction that will continue for more than 1 year or involve more than one phase or stage.
- Excavation for mining purposes that would remove more than 1,000 tons of natural material (i.e., rock or soil) per year.
- Construction of any new sanitary landfill.
- Construction in a designated floodway.
- Other impacts _____

2. Will there be an effect to any unique or unusual land forms found on the site? (i.e., cliffs, dunes, geological formations, etc.) NO YES

- Specific land forms: _____

1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No

IMPACT ON WATER

3. Will proposed action affect any water body designated as protected?
(Under Articles 15, 24, 25 of the Environmental Conservation Law, ECL)
NO YES

Examples that would apply to column 2

- Developable area of site contains a protected water body.
- Dredging more than 100 cubic yards of material from channel of a protected stream.
- Extension of utility distribution facilities through a protected water body.
- Construction in a designated freshwater or tidal wetland.
- Other impacts: _____

4. Will proposed action affect any non-protected existing or new body of water?
NO YES

Examples that would apply to column 2

- A 10% increase or decrease in the surface area of any body of water or more than a 10 acre increase or decrease.
- Construction of a body of water that exceeds 10 acres of surface area.
- Other impacts: _____

5. Will Proposed Action affect surface or groundwater quality?
NO YES

Examples that would apply to column 2

- Proposed Action will require a discharge permit.
- Proposed Action requires use of a source of water that does not have approval to serve proposed (project) action.
- Proposed Action requires water supply from wells with greater than 45 gallons per per minute pumping capacity.
- Construction or operation causing any contamination of a public water supply system.
- Proposed Action will adversely affect groundwater.
- Liquid effluent will be conveyed off the site to facilities which presently do not exist or have inadequate capacity.
- Proposed Action requiring a facility that would use water in excess of 20,000 gallons per day.
- Proposed Action will likely cause siltation or other discharge into an existing body of water to the extent that there will be an obvious visual contrast to natural conditions.
- Proposed Action will require the storage of petroleum products greater than 1,100 gallons.
- Proposed Action will allow residential uses in areas without water and/or sewer services.
- Proposed Action locates commercial and/or industrial uses which may require new or expansion of existing waste treatment and/or storage facilities.
- Other impacts: _____

6. Will proposed action alter drainage flow, patterns or surface water water runoff?
NO YES

Examples that would apply to column 2

- Proposed Action would impede flood water flows.

1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No

- Proposed Action is likely to cause substantial erosion.
- Proposed Action is incompatible with existing drain patterns.
- Proposed Action will allow development in a designated floodway.
- Other impacts: _____

Impact on Air - See Attached Notes

- 7 Will proposed action affect air quality? NO YES
 Examples that would apply to column 2
- Proposed Action will induce 1,000 or more vehicle trips in given hour.
 - Proposed Action will result in the incineration of more than 1 ton of refuse per hour.
 - Proposed Action emission rate of all contaminants will exceed 5 lbs. per hour or a heat source producing more than 10 million BTU's per hour.
 - Proposed action will allow an increase in the amount of land committed to industrial use.
 - Proposed action will allow increase in the density of industrial development existing industrial areas.
 - Other impacts: _____

Impact on Plants and Animals

- 8 Will Proposed Action affect any threatened or endangered species? NO YES
 Examples that would apply to column 2
- Reduction of one or more species listed on the New York or Federal list, using the site, over or near site or found on the site.
 - Removal of any portion of a critical or significant wildlife habitat.
 - Application of pesticide or herbicide over more than twice a year other than for agricultural purposes.
 - Other impacts: _____
- 9 Will Proposed Action substantially affect non-threatened or endangered species? NO YES
 Examples that would apply to column 2
- Proposed Action would substantially interfere with any resident or migratory fish or wildlife species.
 - Proposed Action requires the removal of more than 10 acres of mature forest (over 100 years of age) or other locally important vegetation.

Impact on Agricultural Land Resources

- 10 Will the Proposed Action affect agricultural land resources? NO YES
 Examples that would apply to column 2
- The proposed action would sever, cross through, or limit access to a field of agricultural land (includes cropland, hayfields, pasture, vineyard, orchard, etc.)

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
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- Construction activity would excavate or compact the soil profile of agricultural land.
- The proposed action would irreversibly convert more than 10 acres of agricultural land or, if located in an Agricultural District, more than one acre of agricultural land.
- The proposed action would disrupt agricultural land management systems (e.g., subsurface drain lines, outlet ditches, strip cropping); prevent agricultural land management measures from being installed; or create a need for such measures (e.g. cause a farm field to drain poorly due to increased runoff)
- Prime or unique farmland as defined by USDA-SCS 7 CFR Part 657 and governed by the Farmland Protection Policy Act of 1981 is involved.
- Other impacts: _____

Impact on Aesthetic Resources or Community Character

11. Will proposed action affect aesthetic resources, or the character of the neighborhood or community? NO YES
(If necessary use the visual EAF Addendum in Section 617.23)

Examples that would apply to column 2

- Introduction of proposed land uses, projects or project components obviously different or in sharp contrast to current surrounding land use patterns or existing man-made additions to the landscape.
- Introduction of proposed land uses, projects or project components as described in the above example that will be visible to users of aesthetic resources. This will eliminate or significantly reduce the public enjoyment or appreciation of the appearance or aesthetic qualities of a resource or community character.
- Introduction of project components that will result in the elimination or significant screening of scenic views known to be important to the area.
- Other impacts: _____

Impact on Historic and Archeological Resources

12. Will Proposed Action impact any site or structure of historic, pre-historic or paleontological importance? NO YES

Examples that would apply to column 2

- Proposed Action occurring wholly or partially within or contiguous to any facility or site listed or eligible for listing on the State or National Register of historic places.
- Any impact to a archeological site or fossil bed located within the project site.
- Proposed Action will occur in an area designated as sensitive for archeological sites on the NSY Site Inventory.
- Other impacts: _____

Impact on Open Space and Recreation

13. Will Proposed Action affect the quantity or quality of existing or future open spaces or recreational opportunities?

Examples that would apply to column 2 NO YES

- The permanent foreclosure of a future recreational opportunity.
- A major reduction of an open space important to the community.
- Other impacts: _____

1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No

Impact on Transportation

14. Will there be an effect to existing transportation systems? NO YES

Examples that would apply to column 2

- Alteration of present patterns of movement of people and/or goods.
- Proposed Action will result in severe traffic problems.
- Other impacts: _____

Impact on Energy

15. Will proposed action affect the communities sources of fuel or energy supply? NO YES

Examples that would apply to column 2

- Proposed Action will cause a greater than 5% increase in any form of energy in municipality.
- Proposed Action will require the creation or extension of an energy transmission or supply system to serve more than 50 single or two family residences.
- Other impacts: _____

Impact on Noise - See Attached Notes

16. Will there be objectionable odors, noise, glare, vibration or electrical disturbance as a result of the Proposed Action? NO YES

Examples that would apply to column 2

- Blasting within 1,500 feet of a hospital, school or other sensitive facility.
- Odors will occur routinely (more than one hour per day).
- Proposed Action will produce operating noise exceeding the local ambient noise levels for noise outside of structures.
- Proposed Action will remove natural barriers that would act as a noise screen.
- Other impacts: _____

Impact on Public Health and (Hazards) Safety - See Attached Notes

17. Will Proposed Action affect public health and safety? NO YES

Examples that would apply to column 2

- Proposed Action will cause a risk of explosion or release of hazardous substances (i.e. oil, pesticides, chemicals, radiation, etc.) in the event of accident or upset conditions, or there will be a chronic low level discharge or emission.
- Proposed Action will result in the burial of "hazardous wastes" (i.e. toxic, poisonous, highly reactive, radioactive, irritating, infectious, etc., including wastes that are solid, semi-solid, liquid or contain gases).
- Storage facilities for one million or more gallons of liquified natural gas or other liquids.
- Other impacts: _____

1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
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Impact on Growth and Character of Community or Neighborhood

18. Will Proposed Action affect the character of the existing Community NO YES

Examples that would apply to column 2

- The population of the city, town or village in which the project is likely to grow by more than 5% of resident human population.
- The municipal budgets for capital expenditures or operating services will increase by more than 5% per year as a result of this project.
- Will involve any permanent facility of a non-agricultural use on more than one acre in an agricultural district or remove more than 10 acres of (prime) agricultural lands from cultivation.
- Proposed Action will replace or eliminate existing facilities, structures or areas of historic importance to the community.
- Development will induce an influx of a particular age group with special needs.
- Proposed Action will set an important precedent for future projects.
- Proposed Action will relocate 15 or more employees in one or more businesses.
- Other impacts: _____

19. Is there public controversy related to Potential Adverse Environmental Impacts? NO YES

Examples that would apply to column 2

- Either government or citizens of adjacent communities have expressed opposition or rejected the project or have not been contacted.
- Objections to the project from within the community.

1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated By Project Change
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No
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If Any Action in Part 2 Is Identified as a Potential Large Impact or If You Cannot Determine the Magnitude of Impact, Proceed to Part 3

Determination of Significance

Portions of EAF completed for this project: Part 1 Part 2 Part 3

Upon review of the information recorded on this EAF (Parts 1, 2 and 3) and considering both the magnitude and importance of each impact, it is reasonably determined that:

- A. The project will result in no major impacts and, therefore, is one which may not cause significant damage to the environment. Prepare a negative declaration:
- B. For unlisted actions only. Although the project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described in PART 3 have been included as part of the proposed project. Prepare a CONDITIONAL negative declaration:
- C. The project will result in one or more major adverse impacts that cannot be reduced and may cause significant damage to the environment. Prepare a positive declaration, proceed with EIS:

Frank A. Lepore
Signature of Preparer (if different from responsible officer)

5/11/87
Date

Signature of Responsible Officer in Lead Agency

Print or Type Name of Responsible Officer in Lead Agency

Name of Lead Agency

Date

Part 3—Responsibility of Lead Agency

Evaluation of the Importance of Impacts

Information

- Part 3 is prepared if one or more impact or effect is considered to be potentially large.
- The amount of writing necessary to answer Part 3 may be determined by answering the question: In briefly completing the instructions below, have I placed in this record sufficient information to indicate the reasonableness of my decisions?

Instructions

Complete the following for each impact or effect identified in Column 2 of Part 2:

1. Briefly describe the impact.
2. Describe (if applicable) how the impact might be mitigated or reduced to a less than large impact by project change.
3. Based on the information available, decide if it is reasonable to conclude that this impact is important to the municipality (city, town or village) in which the project is located.

To answer the question of importance, consider:

- The probability of the impact or effect occurring
- The duration of the impact or effect
- Its irreversibility, including permanently lost resources of value
- Whether the impact or effect can be controlled
- The regional consequence of the impact or effect
- Its potential divergence from local needs and goals
- Whether known objectives to the project apply to this impact or effect.

Determination of Significance

An action is considered to be significant if:

One (or more) impact(s) is determined to be (both) large and its (their) consequence, based on the review above, is important.

Part 3 Statements

(Continue on Attachments, as needed)

Environmental Assessment - Part III

The following sections address the environmental impacts as determined in Part II of this form.

Impact on Air

The maximum emission for two engine-generator sets is:

Total Particulates	1.8	lbs/hr
Sulfur Dioxide	0.05	lbs/hr
Nitrogen Oxides	18.8	lbs/hr
Carbon Monoxide	18.8	lbs/hr
Hydrocarbons	<u>9.4</u>	lbs/hr
Total	48.85	lbs/hr

Based on the analysis in the EAF, this emission level may result in a potential large impact. The project design requires that the engines provided are the most current state-of-the-art "lean burn" models available. Examples of models that may be provided include the Caterpillar 398 turbo, lean burn and the Waukeska 3600 GL, turbo, lean burn.

In addition to the above, if the project converting the gas to electricity is not implemented, the gas would continue to vent to the atmosphere, as in present. As indicated in the accompanying Engineering Report, the gas is comprised of approximately 55 percent methane, 45 percent carbon dioxide and other trace gases, including hydrogen sulfide and other hydrocarbons. These gases can result in varying degrees of toxicity and/or odor problems. This project offers a means of controlling these risks. Furthermore, the power generated replaces power which might otherwise be generated by burning fossil fuels which produce contaminants of their own. For these reasons, this impact is not considered "important" to this project.

Impact on Noise

The impact on noise is not considered large for the following reasons:

1. All sources have been identified and the necessary mitigation measures implemented, including:
 - building orientation away from residences
 - building insulated to minimize sound transmission
 - slow speed, quiet equipment
 - silencers on exhaust equipment
 - retain wooded areas as buffers

2. Recommendations will be implemented to control the noise as result of noise analysis.

Impact on Public Health and Safety

Landfill gas is a natural byproduct of decomposing refuse which will normally vent to the atmosphere. It is a source of hydrocarbons, sulfides and trace organics. It can result as a nuisance as odors or a health risk due to migrating gases accumulating in closed areas. Landfill gas contains approximately 55 percent methane, which is explosive when mixed with air at concentrations of 5 to 15 percent methane.

The gas recovery system will provide a positive impact on the environment by controlling the discharge of the gases; reducing migration and the associated risks; controlling odors; and providing controlled combustion of trace organics and hydrocarbons.

From an operations safety standpoint, there is no storage of the gas; it is used as produced. Oxygen analyzers and pressure sensing will monitor the system for leaks and provide for automatic shutdown and venting. The facility is provided with fire and gas detection alarms. There will be no disposal of any solid or liquid wastes on the site. In light of the above, there are no negative impacts on public health or safety.

APPENDIX C

Air Permit Application

OP LOCATION FACILITY EMISSION POINT C

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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READ INSTRUCTIONS CONTAINED IN FORM 76-11-4 BEFORE ANSWERING ANY QUESTION

A ADD
 C CHANGE
 D DELETE

STATIONARY COMBUSTION INSTALLATION
 APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

1. NAME OF OWNER/FIRM Oswego County Dept. of Public Works	9. NAME OF AUTHORIZED AGENT Hollis J. Iselin, Chairman Oswego County Legislature	10. TELEPHONE 315-343-1134	19. FACILITY NAME (IF DIFFERENT FROM OWNER/FIRM) Oswego County Landfill Gas Recovery
2. NUMBER AND STREET ADDRESS 46 E. Bridge Street	11. NUMBER AND STREET ADDRESS 46 E. Bridge Street	14. ZIP 13126	20. FACILITY LOCATION (NUMBER AND STREET ADDRESS) Howard and Silk Road
3. CITY - TOWN - VILLAGE Oswego	4. STATE NY	5. ZIP 13126	21. CITY - TOWN - VILLAGE Volney
6. OWNER CLASSIFICATION <input type="checkbox"/> COMMERCIAL <input checked="" type="checkbox"/> INDUSTRIAL <input type="checkbox"/> FEDERAL <input type="checkbox"/> MUNICIPAL <input type="checkbox"/> EDUC INST <input type="checkbox"/> OTHER <input type="checkbox"/> HOSPITAL <input type="checkbox"/> RESIDENTIAL <input type="checkbox"/> OTHER	12. CITY - TOWN - VILLAGE Oswego	13. STATE NY	22. ZIP 13069
7. NAME & TITLE OF OWNERS REPRESENTATIVE Arthur Ospeit Highway Superintendent	15. NAME OF PE OR ARCHITECT PREPARING PLANS Barton & Loguidice Frank A. Loguidice	16. N.Y.S. P.E. OR ARCHITECT LICENSE NO. 25295	23. BUILDING NAME OR NUMBER N/A
8. TELEPHONE 343-1134	17. TELEPHONE 315-457-5200	24. FLOOR NAME OR NUMBER N/A	25. START UP DATE 6 / 87
26. DRAWING NUMBERS OF PLANS SUBMITTED 132.31-01 to 08	27. PERMIT TO CONSTRUCT <input checked="" type="checkbox"/> NEW SOURCE <input type="checkbox"/> MODIFICATION	28. CERTIFICATE TO OPERATE <input type="checkbox"/> NEW SOURCE <input type="checkbox"/> EXISTING <input type="checkbox"/> MODIFICATION	

29. EMISSION POINT ID. 0001	30. GROUND ELEVATION (FT.) 480	31. HEIGHT ABOVE STRUCTURES (FT.) 1	32. STACK HEIGHT (FT.) 26	33. INSIDE DIMENSION(S) (IN.) 10	34. EXIT TEMPERATURE (°F) 750	35. EXIT VELOCITY (FT./SEC.) 114	36. EXIT FLOW (ACFM) 3730	37. HEAT INPUT (MILLION BTU/HR) 5.5	38. CONTINUOUS MONITOR(S) <input type="checkbox"/> OXYGEN <input type="checkbox"/> SULFUR DIOXIDE <input type="checkbox"/> NITROGEN OXIDES <input type="checkbox"/> OTHER
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39. UNIT TYPE 07	40. UNIT MANUFACTURER'S NAME AND MODEL NUMBER Unspecified Gas Internal Combustion Engine	41. UNIT HEAT INPUT 5.5 MBtu/hr	42. AIR INTAKE 2	43. SOURCE CODE
44. BURNER TYPE 69	45. NO. OF BURNERS 12 cyl.	46. BURNER MANUFACTURER'S NAME AND MODEL NUMBER Unspecified Gas Internal Combustion Engine	47. FUEL TYPE 79	48. AVG. QUANTITY OF FUEL/HR 10,000 CF/HR
49. MAX. QUANTITY OF FUEL/HR 78.8x10⁶ CF/HR	50. QUANTITY OF FUEL/YR @ 550 Btu/CF	51. HRS./DAY 24	52. DAYS/YEAR 328	53. % OPERATION BY SEASON Winter: 2 5 2 5 2 5 2 5 Spring: 2 5 2 5 2 5 2 5 Summer: 2 5 2 5 2 5 2 5 Fall: 2 5 2 5 2 5 2 5
54. NAME OF SUPPLIER(S) Landfill gas from a municipal solid waste landfill	55. BURNER TYPE 56 NO OF BURNERS	57. BURNER MANUFACTURER'S NAME AND MODEL NUMBER	58. FUEL TYPE 59	59. AVG. QUANTITY OF FUEL/HR @ 550 Btu/CF
60. MAX. QUANTITY OF FUEL/HR 61	61. QUANTITY OF FUEL/YR @ 550 Btu/CF	62. HRS./DAY 63	63. DAYS/YEAR 64	64. % OPERATION BY SEASON Winter: 67 68 69 70 71 72 73 74 Spring: 67 68 69 70 71 72 73 74 Summer: 67 68 69 70 71 72 73 74 Fall: 67 68 69 70 71 72 73 74

65. NAME OF SUPPLIER(S) None Used	66. EMISSION CONTROL EQUIP. I.D. 67	67. CONTROL TYPE 68	68. MANUFACTURER'S NAME AND MODEL NUMBER None Used	69. DISPOSAL METHOD 70	70. DATE INSTALLED MO./YR. 71	71. USEFUL LIFE 72
---	---	-------------------------------	--	----------------------------------	---	------------------------------

CALCULATIONS

Heat Input = Engine Output (713 Hp) x Fuel Rate (7708 Btu/Hp Hr) = 5.5×10^6 Btu/hr
 Fuel Consumption: Fuel is landfill gas with LHV of 550 Btu/CF (average)
 Fuel Rate = 5.5×10^6 Btu/hr / 550 Btu/CF = 10,000 CF/Hr @ 550 Btu/CF
 Fuel Quant/Yr = 10,000 CF x 24 Hr x 365 day x .9 (up time) = 78.8 x 10⁶ CF/Yr @ 550 Btu/CF

Hr day Yr

TO BE COMPLETED FOR ALL SOURCES USING ITEM 27 AND OTHER SOURCES AS DEFINED IN THE INSTRUCTION FORM 76-11-4

S E C T I O N	CONTAMINANT	CAS NUMBER	EMISSIONS			% CONTROL EFFICIENCY	HOURLY EMISSIONS (LBS/HR)		ANNUAL EMISSIONS (LBS/YR)		
			ACTUAL	UNIT	HOW DET.		PERMISS.	ACTUAL	10 ⁴ PERMISS.		
78	TOTAL PARTICULATES	79 NY075-00-0	80 0.17	81 11	82 4	83	84	85	86 7095	87 0	88
89	SULFUR DIOXIDE	90 7446-09-5	91 0.0045	92 11	93 6	94	95	96	97 197	98 0	99
100	NITROGEN OXIDES	101 NY210-00-0	102 1.7	103 11	104 4	105	106	107	108 7.4	109 4	110
111	Carbon Monoxide	112 630-08-0	113 1.7	114 11	115 4	116	117	118	119 7.4	120 4	121
122	Hydrocarbons	123	124 0.85	125 11	126 4	127	128	129	130 3.7	131 4	132

Upon completion of construction sign the statement listed below and forward to the appropriate field representative
 THE STATIONARY COMBUSTION INSTALLATION HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS.

133 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT

DATE

[Signature]

5/11/87

134. LOCATION CODE	135. FACILITY ID. NO.	136. U.T.M. (E)	137. U.T.M. (N)	138. SIC NUMBER	139. DATE APPL RECEIVED	140. DATE APPL. REVIEWED	141. REVIEWED BY:
P E R M I T T O C O N S T R U C T							
142. DATE ISSUED	143. EXPIRATION DATE	144. SIGNATURE OF APPROVAL	145. FEE				
/ /	/ /						
R E C O M M E N D E D A C T I O N R E : C . O .							
147. DATE ISSUED	148. EXPIRATION DATE	149. SIGNATURE OF APPROVAL	150. FEE				
/ /	/ /						
151. <input type="checkbox"/> INSPECTED BY _____ DATE _____ <input type="checkbox"/> INSPECTION DISCLOSED DIFFERENCES AS BUILT VS PERMIT, CHANGES INDICATED ON FORM <input type="checkbox"/> ISSUE CERTIFICATE TO OPERATE FOR SOURCE <input type="checkbox"/> APPLICATION FOR C.O. DENIED _____ DATE _____ INITIALED _____							
152. SPECIAL CONDITIONS:							
1. _____							
2. _____							
3. _____							
4. _____							
5. _____							
6. _____							
7. _____							
8. _____							

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	6. OWNER CLASSIFICATION <input type="checkbox"/> COMMERCIAL <input checked="" type="checkbox"/> UTILITY <input type="checkbox"/> INDUSTRIAL <input type="checkbox"/> FEDERAL <input type="checkbox"/> OTHER	18. SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT <i>Frank A. Loguidice</i>	25. START UP DATE 6 / 87	26. DRAWING NUMBERS OF PLANS SUBMITTED 132.31-01 to 08
	7. NAME & TITLE OF OWNERS REPRESENTATIVE Arthur Ospelt Highway Superintendent	8. TELEPHONE 343-1134	27. PERMIT TO CONSTRUCT <input checked="" type="checkbox"/> NEW SOURCE <input type="checkbox"/> MODIFICATION	28. CERTIFICATE TO OPERATE <input type="checkbox"/> NEW SOURCE <input type="checkbox"/> EXISTING <input type="checkbox"/> MODIFICATION

29. EMISSION POINT ID.	30. GROUND ELEVATION (FT)	31. HEIGHT ABOVE STRUCTURES (FT)	32. STACK HEIGHT (FT)	33. INSIDE DIMENSION(S) (IN)	34. EXIT TEMPERATURE (°F)	35. EXIT VELOCITY (FT/SEC)	36. EXIT FLOW (ACFM)	37. HEAT INPUT (MILLION BTU/HR)	38. CONTINUOUS MONITOR(S)
00002	480	1	26	10	750	114	3730	5.5 x 3	<input type="checkbox"/> OPACITY <input type="checkbox"/> SULFUR DIOXIDE <input type="checkbox"/> NITROGEN OXIDES <input type="checkbox"/> OXYGEN <input type="checkbox"/> CARBON DIOXIDE <input type="checkbox"/> OTHER

39. UNIT TYPE	40. UNIT MANUFACTURER'S NAME AND MODEL NUMBER	41. UNIT HEAT INPUT	42. AIR INTAKE	43. SOURCE CODE
07	Unspecified Gas Internal Combustion Engine	5.5 MBtu/hr	2	
44. BURNER TYPE	45. NO OF BURNERS	46. BURNER MANUFACTURER'S NAME AND MODEL NUMBER	47. FUEL TYPE	48. AVG. QUANTITY OF FUEL/HR
69	12 cyl.	Unspecified Gas Internal Combustion Engine	79	10,000 CF/HR
49. MAX. QUANTITY OF FUEL/HR	50. QUANTITY OF FUEL/YR	51. HRS./DAY	52. DAYS/YEAR	53. % OPERATION BY SEASON
10,000 CF/HR	78.8x10 ⁶ CF/HR	24	328	Winter: 2 5 2 5 2 5 Spring: 2 5 2 5 2 5 Summer: 2 5 2 5 2 5 Fall: 2 5 2 5 2 5
60. MAX. QUANTITY OF FUEL/HR	61. QUANTITY OF FUEL/YR	54. NAME OF SUPPLIER(S)	55. BURNER TYPE	56. NO OF BURNERS
@ 550 Btu/CF	@ 550 Btu/CF	Landfill gas from a municipal solid waste landfill	57. BURNER MANUFACTURER'S NAME AND MODEL NUMBER	58. FUEL TYPE
62. HRS./DAY	63. DAYS/YEAR	64. % OPERATION BY SEASON	65. NAME OF SUPPLIER(S)	
		Winter: 2 5 2 5 2 5 Spring: 2 5 2 5 2 5 Summer: 2 5 2 5 2 5 Fall: 2 5 2 5 2 5		

EMISSION CONTROL EQUIP. I.D.	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MO/YR.	USEFUL LIFE
66	67	68	69	70	71
72	73	74	75	76	77
		None Used			

CALCULATIONS

Heat Input = Engine Output (713 Hp) x Fuel Rate (7708 Btu/Hp Hr) = 5.5×10^6 Btu/hr
 Fuel Consumption: Fuel is landfill gas with LHV of 550 Btu/CF (average)
 Fuel Rate = 5.5×10^6 Btu/hr / 550 Btu/CF = 10,000 CF/Hr @ 550 Btu/CF
 Fuel Quant/Yr = 10,000 CF x 24 Hr x 365 day x .9 (up time) = 78.8×10^6 CF/Yr @ 550 Btu/CF

TO BE COMPLETED FOR ALL SOURCES USING ITEM 27 AND OTHER SOURCES AS DEFINED IN THE INSTRUCTION FORM 76-11-4

CONTAMINANT	NAME	CAS NUMBER	EMISSIONS			% CONTROL EFFICIENCY	HOURLY EMISSIONS (LBS/HR)		ANNUAL EMISSIONS (LBS/YR)		
			ACTUAL	UNIT	HOW DET.		PERMISS.	ACTUAL	10 ³ PERMISS.		
78	TOTAL PARTICULATES	79 NY075-00-0	80 0.17	81 11	82 4	83	84 N/A	85 0.9	86 7095	87 0	88
89	SULFUR DIOXIDE	90 7446-09-5	91 0.0045	92 11	93 6	94	95 N/A	96 0.025	97 197	98 0	99
100	NITROGEN OXIDES	101 NY210-00-0	102 1.7	103 11	104 4	105	106 N/A	107 9.4	108 7.4	109 4	110
111	Carbon Monoxide	112 630-08-0	113 1.7	114 11	115 4	116	117 N/A	118 9.4	119 7.4	120 4	121
122	Hydrocarbons	123	124 0.85	125 11	126 4	127	128 N/A	129 4.7	130 3.7	131 4	132

Upon completion of construction sign the statement listed below and forward to the appropriate field representative
 THE STATIONARY COMBUSTION INSTALLATION HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS.

133. SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT

DATE

134 LOCATION CODE 135 FACILITY ID. NO. 136 U.T.M. (E) 137 U.T.M. (N) 138 SIC NUMBER 139 DATE APPL. RECEIVED 140 DATE APPL. REVIEWED 141 REVIEWED BY:

142 DATE ISSUED / / 143 EXPIRATION DATE / / 144 SIGNATURE OF APPROVAL 145 FEE

PERMIT TO CONSTRUCT

146
 1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
 2. THIS IS NOT A CERTIFICATE TO OPERATE
 3. TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

151
 1. INSPECTED BY _____ DATE _____
 2. INSPECTION DISCLOSED DIFFERENCES AS BUILT VS. PERMIT, CHANGES INDICATED ON FORM
 3. ISSUE CERTIFICATE TO OPERATE FOR SOURCE
 4. APPLICATION FOR C.O. DENIED _____ DATE _____ INITIALED _____

152. SPECIAL CONDITIONS:

1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 6. _____
 7. _____
 8. _____

A G E N C Y U S E O N L Y

A G E N C Y U S E O N L Y

Emissions Calculations for Internal Combustion Engines

Based on data supplied by the engine manufacturer, all calculations on a per engine basis.

1. Heat Output: 2.6×10^6 Btu/hr per engine
2. Particulates: Estimated that particulates are maximum of 20% of hydrocarbons. Maximum hydrocarbon emission of 3 grams/BHp hr., therefore particulates 0.6 gm/BHp hr

$$\frac{\text{lbs}}{\text{MBtu}} = 0.6 \frac{\text{gm}}{\text{BHp hr}} \times \frac{\text{lb}}{454 \text{ gm}} \times \frac{\text{hr}}{5.5 \text{ MBtu}} \times 713 \text{ BHp} = 0.17 \text{ lbs/MBtu}$$

$$\frac{\text{lbs}}{\text{hr}} = 0.6 \frac{\text{gm}}{\text{BHp hr}} \times \frac{\text{lb}}{454 \text{ gm}} \times 713 \text{ BHp} = 0.9 \text{ lbs/hr}$$

$$\frac{\text{lbs}}{\text{yr}} = 0.9 \frac{\text{lbs}}{\text{hr}} \times 24 \frac{\text{hr}}{\text{day}} \times 365 \frac{\text{day}}{\text{yr}} \times 0.9 (\% \text{ up time}) = 7095 \text{ lbs/yr}$$

3. Sulfur Dioxide: Sulfur dioxide in the exhaust is dependent on sulfur compounds in the fuel gas. Gas analysis at the Silk Rd. Landfill indicate that sulfur concentrations include:

	<u>Concen</u>	<u>Mol. Wt.</u>
Hydrogen Sulfide (H ₂ S)	<3 mg/m ³	34
Carbon Disulfide (CS ₂)	20.4 mg/m ³	76
Total Sulfur = $\left(\frac{32}{34} \times 3\right) + \left(\frac{64}{76} \times 20.4\right) = 20 \text{ mg/m}^3$		

$$\text{Sulfur as SO}_2 = 20 \times 64/32 = 40 \text{ mg/m}^3 \text{ gas}$$

$$\frac{\text{lb}}{\text{ft}^3} = 40 \frac{\text{mg}}{\text{m}^3} \times \frac{\text{gm}}{1000 \text{ mg}} \times \frac{\text{lb}}{454 \text{ gm}} \times \frac{\text{m}^3}{35.3 \text{ ft}^3} = 2.5 \times 10^{-6} \text{ lb/ft}^3$$

$$\frac{\text{lbs}}{\text{MBtu}} = 2.5 \times 10^{-6} \frac{\text{lb}}{\text{ft}^3} \times \frac{\text{ft}^3}{550 \text{ Btu}} \times 10^6 = .0045 \text{ lbs/MBtu}$$

$$\frac{\text{lbs}}{\text{hr}} = 2.5 \times 10^{-6} \frac{\text{lb}}{\text{ft}^3} \times 10,000 \frac{\text{ft}^3}{\text{hr}} = 0.025 \text{ lbs/hr}$$

$$\frac{\text{lbs}}{\text{yr}} = 0.025 \frac{\text{lb}}{\text{hr}} \times 24 \frac{\text{hr}}{\text{day}} \times 365 \frac{\text{day}}{\text{yr}} \times 0.9 (\text{up time}) = 197 \text{ lb/yr}$$

Emission Calculations - Continued

4. Nitrogen Oxides: Manuf. Data 6 gm/BHp Hr

$$\frac{\text{lbs}}{\text{MBtu}} = 6 \frac{\text{gms}}{\text{BHP hr}} \times \frac{\text{lb}}{454 \text{ gm}} \times \frac{\text{hr}}{5.5 \text{ MBtu}} \times 713 \text{ BHp} = 1.7 \frac{\text{lbs}}{\text{MBtu}}$$

$$\frac{\text{lbs}}{\text{hr}} = 6 \frac{\text{gms}}{\text{BHP hr}} \times \frac{\text{lb}}{454 \text{ gm}} \times 713 \text{ Bhp} = 9.4 \frac{\text{lbs}}{\text{hr}}$$

$$\frac{\text{lbs}}{\text{yr}} = 9.4 \frac{\text{lbs}}{\text{hr}} \times 24 \frac{\text{hrs}}{\text{day}} \times 365 \frac{\text{days}}{\text{yr}} \times 0.9 \text{ (up time)} = 7.4 \times 10^4 \frac{\text{lbs}}{\text{yr}}$$

5. Carbon Monoxide: Manuf. Data 6 gm/BHp hr

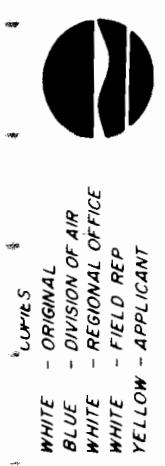
Same calcs as NO_x

6. Hydrocarbons: Manuf. Data 3 gm/BHp hr

$$\frac{\text{lbs}}{\text{MBtu}} = 3 \frac{\text{gms}}{\text{BHP hr}} \times \frac{\text{lb}}{454 \text{ gm}} \times \frac{\text{hr}}{5.5 \text{ Btu}} \times 713 \text{ BHp} = 0.85 \frac{\text{lbs}}{\text{MBtu}}$$

$$\frac{\text{lbs}}{\text{hr}} = 3 \frac{\text{gms}}{\text{BHP hr}} \times \frac{\text{lb}}{454 \text{ gm}} \times 713 \text{ BHp} = 4.7 \frac{\text{lbs}}{\text{hr}}$$

$$\frac{\text{lbs}}{\text{yr}} = 4.7 \frac{\text{lbs}}{\text{hr}} \times 24 \frac{\text{hrs}}{\text{day}} \times 365 \frac{\text{days}}{\text{yr}} \times 0.9 \text{ (up time)} = 3.7 \times 10^4 \frac{\text{lb}}{\text{yr}}$$



COPIES
 WHITE - ORIGINAL
 BLUE - DIVISION OF AIR
 WHITE - REGIONAL OFFICE
 WHITE - FIELD REP
 YELLOW - APPLICANT

NEW YORK STATE
 DEPARTMENT OF ENVIRONMENTAL CONSERVATION

STATIONARY COMBUSTION INSTALLATION

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

1. NAME OF OWNER / FIRM Oswego County Dept. of Public Works	9. NAME OF AUTHORIZED AGENT Hollis J. Iselein, Chairman	10. TELEPHONE 315-343-1134	19. FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM) Oswego County Landfill Gas Recovery
2. NUMBER AND STREET ADDRESS 46 E. Bridge Street	11. NUMBER AND STREET ADDRESS 46 E. Bridge Street	13. STATE NY	20. FACILITY LOCATION (NUMBER AND STREET ADDRESS) Howard and Silk Road
3. CITY - TOWN - VILLAGE Oswego	12. CITY - TOWN - VILLAGE Oswego	14. ZIP 13126	21. CITY - TOWN - VILLAGE Volney
4. STATE NY	15. NAME OF PE OR ARCHITECT PREPARING PLANS Barton & Loguidice	16. N.Y.S. P.E. OR ARCHITECT LICENSE NO. 25295	22. ZIP 13069
5. ZIP 13126	17. TELEPHONE 315-457-5200	23. BUILDING NAME OR NUMBER N/A	24. FLOOR NAME OR NUMBER N/A
6. OWNER CLASSIFICATION <input type="checkbox"/> COMMERCIAL <input checked="" type="checkbox"/> INDUSTRIAL <input type="checkbox"/> FEDERAL <input type="checkbox"/> UTILITY <input type="checkbox"/> HOSPITAL <input type="checkbox"/> RESIDENTIAL <input type="checkbox"/> OTHER	18. SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT <i>Frank A. Loguidice</i>	25. START UP DATE 6/87	26. DRAWING NUMBERS OF PLANS SUBMITTED 132.31-01 to 08
7. NAME & TITLE OF OWNERS REPRESENTATIVE Arthur Ospeit Highway Superintendent	8. TELEPHONE 343-1134	27. PERMIT TO CONSTRUCT <input checked="" type="checkbox"/> NEW SOURCE <input type="checkbox"/> MODIFICATION	28. CERTIFICATE TO OPERATE <input type="checkbox"/> NEW SOURCE <input type="checkbox"/> EXISTING <input type="checkbox"/> MODIFICATION

29. EMISSION POINT ID. 0003	30. GROUND ELEVATION (FT) 480	31. HEIGHT ABOVE STRUCTURES (FT) 18	32. STACK HEIGHT (FT) 18	33. INSIDE DIMENSION(S) (IN.) 60	34. EXIT TEMPERATURE (°F) 1400	35. EXIT VELOCITY (FT/SEC) 3.0	36. EXIT FLOW (ACFM) 3465	37. HEAT INPUT (MILLION BTU/HR) 11	38. CONTINUOUS MONITOR(S) <input type="checkbox"/> OPACITY <input type="checkbox"/> SULFUR DIOXIDE <input type="checkbox"/> NITROGEN OXIDES <input type="checkbox"/> CARBON DIOXIDE <input type="checkbox"/> OTHER
---------------------------------------	---	---	------------------------------------	--	--	--	-------------------------------------	--	---

39. UNIT TYPE 99	40. UNIT MANUFACTURER'S NAME AND MODEL NUMBER Thermal Oxidation Flare (Controlled Combustion)	41. UNIT HEAT INPUT 11 MBtu/hr	42. AIR INTAKE 1	43. SOURCE CODE
44. BURNER TYPE 61	45. NO. OF BURNERS 8	46. BURNER MANUFACTURER'S NAME AND MODEL NUMBER Unspecified Thermal Oxidation Flare	47. FUEL TYPE 79	48. AVG. QUANTITY OF FUEL/HR 20,000 CF/HR
49. MAX. QUANTITY OF FUEL/HR 20,000 CF/HR	50. QUANTITY OF FUEL/YR 17.5x10⁶ CF/YR	51. HRS./DAY 24	52. DAYS/YEAR 37	53. % OPERATION BY SEASON Winter: 2 5 2 5 2 5 2 5 Spring: 2 5 2 5 2 5 2 5 Summer: 2 5 2 5 2 5 2 5 Fall: 2 5 2 5 2 5 2 5
54. NAME OF SUPPLIER(S) Landfill gas from a municipal solid waste landfill	55. BURNER TYPE 56	56. NO. OF BURNERS	57. BURNER MANUFACTURER'S NAME AND MODEL NUMBER	58. FUEL TYPE
59. AVG. QUANTITY OF FUEL/HR @ 550 Btu/CF	60. MAX. QUANTITY OF FUEL/HR @ 550 Btu/CF	61. QUANTITY OF FUEL/YR @ 550 Btu/CF	62. HRS./DAY	63. DAYS/YEAR
64. % OPERATION BY SEASON Winter: Spring: Summer: Fall:	65. NAME OF SUPPLIER(S)			

66. EMISSION CONTROL EQUIP. I.D. 67	67. CONTROL TYPE None Used	68. MANUFACTURER'S NAME AND MODEL NUMBER	69. DISPOSAL METHOD 69	70. DATE INSTALLED MO./YR. 70	71. USEFUL LIFE 71
72. EMISSION CONTROL EQUIP. I.D. 73	73. CONTROL TYPE None Used	74. MANUFACTURER'S NAME AND MODEL NUMBER	75. DISPOSAL METHOD 75	76. DATE INSTALLED MO./YR. 76	77. USEFUL LIFE 77

CALCULATIONS

Heat Input = Diversion of landfill gas from engine-generator sets (ID Nos. 00001 and 00002)
 5.5 x 10⁶ Btu/hr x 2 = 11 MBtu/hr
 Fuel Consumption: Fuel is landfill gas with LHV of 550 Btu/CF (Average)
 Fuel Rate = 11 x 106 Btu/hr / 550 Btu/CF = 20,000 CF/Hr @ 550 Btu/CF
 Fuel Quant/Yr = 20,000 CF x 24 Hr x 365 day x .1 (up time) = 17.5 x 10⁶ CF/Yr @ 550 Btu/CF

TO BE COMPLETED FOR ALL SOURCES USING ITEM 27 AND OTHER SOURCES AS DEFINED IN THE INSTRUCTION FORM 76-11-4

S E C T I O N	CONTAMINANT		EMISSIONS				% CONTROL EFFICIENCY	HOURLY EMISSIONS (LBS/HR)		ANNUAL EMISSIONS (LBS/YR)	
	NAME	CAS NUMBER	ACTUAL	UNIT	HOW DET.	PERMISS.		ACTUAL	PERMISS.	ACTUAL	PERMISS.
78	TOTAL PARTICULATES	79 NY075-00-0	80 ND	11	4	83	85	ND	86	0	88
89	SULFUR DIOXIDE	90 7446-09-5	91 0.0045	11	6	94	96	0.025	97	0	99
100	NITROGEN OXIDES	101 NY210-00-0	102 0.06	11	2	103	107	0.66	108	5.8	110
111	Carbon Monoxide	112 630-08-0	113 0.20	11	2	116	118	2.2	119	1.9	121
122	Hydrocarbons	123	124 0.025	11	6	127	129	0.275	130	2.4	132

133. SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT: *[Signature]* DATE: 5/11/87

Upon completion of construction sign the statement listed below and forward to the appropriate field representative THE STATIONARY COMBUSTION INSTALLATION HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS.

134. LOCATION CODE	135. FACILITY ID. NO.	136. U.T.M. (E)	137. U.T.M. (N)	138. SIC NUMBER	139. DATE APPL. RECEIVED	140. DATE APPL. REVIEWED	141. REVIEWED BY:
P E R M I T T O C O N S T R U C T							
142. DATE ISSUED	143. EXPIRATION DATE	144. SIGNATURE OF APPROVAL		145. FEE	146. 1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT 2. THIS IS NOT A CERTIFICATE TO OPERATE 3. TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE		
/ /	/ /						
R E C O M M E N D E D A C T I O N R E : C O .							
147. DATE ISSUED	148. EXPIRATION DATE	149. SIGNATURE OF APPROVAL		150. FEE	151. 1. <input type="checkbox"/> INSPECTED BY _____ DATE _____ 2. <input type="checkbox"/> INSPECTION DISCLOSED DIFFERENCES AS BUILT VS. PERMIT, CHANGES INDICATED ON FORM 3. <input type="checkbox"/> ISSUE CERTIFICATE TO OPERATE FOR SOURCE 4. <input type="checkbox"/> APPLICATION FOR C.O. DENIED _____ DATE _____ INITIALED _____		
/ /	/ /						
152. SPECIAL CONDITIONS:							
1. _____							
2. _____							
3. _____							
4. _____							
5. _____							
6. _____							
7. _____							
8. _____							

Emissions Calculations for Landfill Gas Flare

Based on data supplied by the flare manufacturer, all quantities assume gas is fed to the flare only 10% of the time.

1. Particulates typically below detectable levels (ND) in raw landfill gas, based on information supplied by manufacturer (Zink) and Schumacher (1983).
2. Sulfur Dioxide: Sulfur dioxide leaving the flare is dependent on sulfur compounds in the fuel gas. Gas analysis at the Silk Rd. Landfill indicate that sulfur concentrations include:

	<u>Concen</u>	<u>Mol. Wt.</u>
Hydrogen Sulfide (H ₂ S)	<3 mg/m ³	34
Carbon Disulfide (CS ₂)	20.4 mg/m ³	76

$$\text{Total Sulfur} = \left(\frac{32}{34} \times 3\right) + \left(\frac{64}{76} \times 20.4\right) = 20 \text{ mg/m}^3$$

$$\text{Sulfur as SO}_2 = 20 \times 64/32 = 40 \text{ mg/m}^3 \text{ gas}$$

$$\frac{\text{lb}}{\text{ft}^3} = 40 \frac{\text{mg}}{\text{m}^3} \times \frac{\text{gm}}{1000 \text{ mg}} \times \frac{\text{lb}}{454 \text{ gm}} \times \frac{\text{m}^3}{35.3 \text{ ft}^3} = 2.5 \times 10^{-6} \text{ lb/ft}^3$$

$$\frac{\text{lbs}}{\text{MBtu}} = 2.5 \times 10^{-6} \frac{\text{lb}}{\text{ft}^3} \times \frac{\text{ft}^3}{550 \text{ Btu}} \times 10^6 = .0045 \text{ lbs/MBtu}$$

$$\frac{\text{lbs}}{\text{hr}} = 2.5 \times 10^{-6} \frac{\text{lb}}{\text{ft}^3} \times 10,000 \frac{\text{ft}^3}{\text{hr}} = 0.025 \text{ lbs/hr}$$

$$\frac{\text{lbs}}{\text{yr}} = 0.025 \frac{\text{lb}}{\text{hr}} \times 24 \frac{\text{hr}}{\text{day}} \times 365 \frac{\text{day}}{\text{yr}} \times 0.1 \text{ (up time)} = 22 \text{ lb/yr}$$

3. Nitrogen Oxides: Manufacturer Data (Zink) 0.06 lbs/MBtu:

$$\frac{\text{lbs}}{\text{hr}} = 0.06 \frac{\text{lbs}}{\text{MBtu}} \times 11 \frac{\text{MBtu}}{\text{hr}} = 0.66 \frac{\text{lbs}}{\text{hr}}$$

$$\frac{\text{lbs}}{\text{yr}} = 0.66 \frac{\text{lbs}}{\text{hr}} \times 24 \frac{\text{hrs}}{\text{day}} \times 365 \frac{\text{days}}{\text{yr}} \times 0.1 \text{ (up time)} = 578 \frac{\text{lbs}}{\text{yr}}$$

4. Carbon Monoxide: Manufacturer Data (Zink) 0.20 lbs/MBtu:

$$\frac{\text{lbs}}{\text{hr}} = 0.20 \frac{\text{lbs}}{\text{MBtu}} \times 11 \frac{\text{MBtu}}{\text{hr}} = 2.2 \frac{\text{lbs}}{\text{hr}}$$

$$\frac{\text{lbs}}{\text{yr}} = 2.2 \frac{\text{lbs}}{\text{hr}} \times 24 \frac{\text{hrs}}{\text{day}} \times 365 \frac{\text{days}}{\text{yr}} \times 0.1 \text{ (up time)} = 1927 \frac{\text{lbs}}{\text{yr}}$$

Emission Calculations - Continued

5. Hydrocarbons: Based on an estimated inlet gas concentration of 3000 mg/m³ (Rettenberger, et. al.), and an average destruction efficiency of 94% (Kester and Van Slyke), the hydrocarbon emission is:

$$\text{Emissions: } 3000 \text{ mg/m}^3 \times .06 = 180 \text{ mg/m}^3$$

$$\frac{\text{lbs}}{\text{MBtu}} = 180 \frac{\text{mg}}{\text{m}^3} \times \frac{\text{lbs}}{454,000 \text{ mg}} \times \frac{\text{m}^3}{28.32 \text{ CF}} \times \frac{\text{CF}}{550 \text{ Btu}} \times 10^6 = 0.025 \frac{\text{lbs}}{\text{MBtu}}$$

$$\frac{\text{lb}}{\text{hr}} = 0.025 \frac{\text{lbs}}{\text{MBtu}} \times 11 \frac{\text{MBtu}}{\text{hr}} = 0.275 \frac{\text{lbs}}{\text{hr}}$$

$$\frac{\text{lb}}{\text{yr}} = 0.275 \frac{\text{lbs}}{\text{hr}} \times 24 \frac{\text{hr}}{\text{day}} \times 365 \frac{\text{day}}{\text{yr}} \times 0.1 \text{ (up time)} = 241 \frac{\text{lbs}}{\text{yr}}$$

Kester, R. A. and S. M. Van Slyke, 1986. "Landfill Gas Flares: More Than Just Fire In A Pipe", Proceedings of the GRCDA 24th Annual International Seminar, Reno, Nevada, August 11-14.

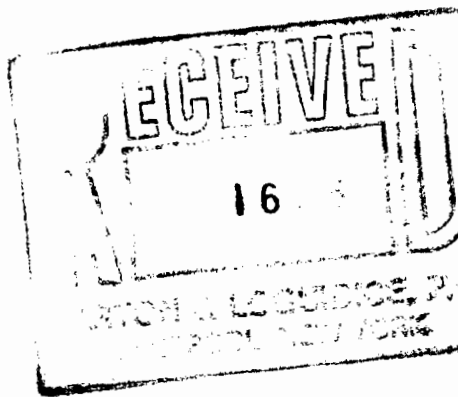
Rettenberger, G., A. Rat Dipl. - Ing., 1985. "Trace Compounds in Landfill Gas - Consequences for Gas Utilization", Proceedings from the GRCDA 8th International Landfill Gas Symposium, San Antonio, Texas, April 9-11.

Schumacher, M. M., Landfill Methane Recovery, Noyes Data Corporation, Energy Technology Review No. 84.1983.

Zink. Communication with Jim Alfred of the John Zink Company, Tulsa, OK, April 20, 1987.

APPENDIX D

Gas Analysis



WCAS
WEST COAST
ANALYTICAL
SERVICE, INC.
ANALYTICAL CHEMISTS

Barton & Loguidice, P. C.
290 Elwood Davis Road
Box 3107
Syracuse, NY 13220

ATTN: Don Sherman

June 12, 1986

Job Number: 3233

Page 1 of 1

LABORATORY REPORT

Samples: Two (2) gas samples in triplicate
Date Received: 6-11-86
Purchase Order No.: 132.22-61086

The samples were analyzed by GC for gas distribution. The Hydrogen sulfide concentration was determined using a Drager tube. These results listed in the table below.

The samples were also analyzed for volatile organic compounds using GCMS. The results are presented on the following Organics Analysis Data Results forms.

Volume Percent (V/V)

Compound	2A	1B
Oxygen and/or Argon	0.95	0.95
Nitrogen	3.45	3.48
Carbon monoxide	ND<0.01	ND<0.01
Methane	55.6	57.7
Carbon dioxide	40.0	37.9
Hydrogen sulfide	ND<2ppm	ND<2ppm

David R. Pierce
Senior Chemist

D. J. Northington, Ph.D.
Technical Director

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: BARTON & LOGUIDICE, P. C.
 SITE: NORTH HEADER
 SAMPLE: 3A
 ANALYSIS TYPE: GAS PHASE VOLATILE COMPOUNDS

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED: 06/11/86 GCMS FILENAME: 3233G2
 LEVEL: LOW MATRIX: GAS
 DATE PREPARED: 06/11/86 DATE ANALYZED: 06/11/86
 STANDARD ID: GAS108, GAS109 INSTRUMENT ID: 5100
 SAMPLE AMOUNT: 0.1ML

CAS #	COMPOUND	CONC: PPM (V/V)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	1.
74-83-9	BROMOMETHANE	ND	1.
75-01-4	VINYL CHLORIDE	4.	1.
75-00-3	CHLOROETHANE	1.	1.
75-09-2	METHYLENE CHLORIDE	ND	1.
67-64-1	ACETONE	ND	1.
107-02-8	ACROLEIN	ND	1.
107-13-1	ACRYLONITRILE	ND	1.
75-15-0	CARBON DISULFIDE	6.	3.
75-35-4	1, 1-DICHLOROETHENE	ND	1.
75-34-3	1, 1-DICHLOROETHANE	ND	1.
156-60-5	TRANS-1, 2-DICHLOROETHENE	ND	1.
540-59-0	CIS-1, 2-DICHLOROETHYLENE	2.	1.
109-99-9	TETRAHYDROFURAN	ND	1.
75-71-8	DICHLORODIFLUOROMETHANE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
76-13-1	FREON-TF	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
123-91-1	1, 4-DIOXANE	ND	1.
95-12-8	1, 2-DIBROMO-3-CHLOROPROPANE	ND	1.
67-66-3	CHLOROFORM	ND	1.
107-66-2	1, 2-DICHLOROETHANE	ND	1.
78-93-3	2-BUTANONE	5.	1.
71-55-6	1, 1, 1-TRICHLOROETHANE	ND	1.
16-23-5	CARBON TETRACHLORIDE	ND	1.
108-05-4	VINYL ACETATE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
79-34-5	1, 1, 2, 2-TETRACHLOROETHANE	ND	1.
79-87-5	1, 2-DICHLOROPROPANE	ND	1.
10061-02-6	TRANS-1, 3-DICHLOROPROPENE	ND	1.
79-01-6	TRICHLOROETHENE	ND	1.
124-48-1	CHLORODIBROMOMETHANE	ND	1.
79-00-5	1, 1, 2-TRICHLOROETHANE	ND	1.
71-43-2	BENZENE	ND	1.
10061-01-5	CIS-1, 3-DICHLOROPROPENE	ND	1.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	1.
75-25-2	BROMOFORM	ND	1.
119-78-6	3-HEXANONE	ND	1.
108-10-1	4-METHYL-2-PENTANONE	ND	1.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: BARTON & LOGUIDICE, P. C.
SITE: NORTH HEADER
SAMPLE: 3A
ANALYSIS TYPE: GAS PHASE VOLATILE COMPOUNDS

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED: 06/11/86 GCMS FILENAME: 323302
LEVEL: LOW MATRIX: GAS
DATE PREPARED: 06/11/86 DATE ANALYZED: 06/11/86
STANDARD ID: GAS108, GAS109 INSTRUMENT ID: 5100
SAMPLE AMOUNT: 0.1ML

CAS #	COMPOUND	CONC: PPM (V/V)	DETECTION LIMIT
127-18-4	TETRACHLOROETHENE	ND	1.
108-88-3	TOLUENE	8.	1.
108-90-7	CHLOROBENZENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
100-42-5	STYRENE	ND	1.
95-47-6	TOTAL XYLENES	2.	1.
108-41-8	M-CHLOROTOLUENE	ND	1.
541-73-1	1, 3-DICHLOROBENZENE	ND	1.
106-46-7	1, 4-DICHLOROBENZENE	ND	1.
95-50-1	1, 2-DICHLOROBENZENE	ND	1.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: BARTON & LOGUIDICE, P. C.
SITE: NORTH HEADER
SAMPLE: 3A

TENTATIVELY IDENTIFIED COMPOUNDS

COMPOUND NAME	FRACTION	CONCENTRATION PPM (V/V)
=====		
1 C6 H12 HYDROCARBON	GAS	5.
2 METHYL CYCLOHEXANE	GAS	3.
3 A C10 HYDROCARBON	GAS	4.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: BARTON & LOGUIDICE, P.C.
 SITE: SOUTH HEADER
 SAMPLE: 2B
 ANALYSIS TYPE: GAS PHASE VOLATILE COMPOUNDS

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED: 06/11/86 GCMS FILENAME: 3233G1
 LEVEL: LOW MATRIX: GAS
 DATE PREPARED: 06/11/86 DATE ANALYZED: 06/11/86
 STANDARD ID: GAS108, GAS109 INSTRUMENT ID: 5100
 SAMPLE AMOUNT: 0.1ML

CAS #	COMPOUND	CONC: PPM (V/V)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	1.
74-83-9	BROMOMETHANE	ND	1.
75-01-4	VINYL CHLORIDE	4.	1.
75-00-3	CHLOROETHANE	1.	1.
75-09-2	METHYLENE CHLORIDE	ND	1.
67-64-1	ACETONE	ND	1.
107-02-8	ACROLEIN	ND	1.
107-13-1	ACRYLONITRILE	ND	1.
75-15-0	CARBON DISULFIDE	5.	3.
75-35-4	1, 1-DICHLOROETHENE	ND	1.
75-34-3	1, 1-DICHLOROETHANE	ND	1.
156-60-5	TRANS-1, 2-DICHLOROETHENE	ND	1.
540-59-0	CIS-1, 2-DICHLOROETHYLENE	4.	1.
109-99-9	TETRAHYDROFURAN	ND	1.
75-71-8	DICHLORODIFLUOROMETHANE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
76-13-1	FREON-TF	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
123-91-1	1, 4-DIOXANE	ND	1.
96-12-8	1, 2-DIBROMO-3-CHLOROPROPANE	ND	1.
67-66-3	CHLOROFORM	ND	1.
107-66-2	1, 2-DICHLOROETHANE	ND	1.
78-93-3	2-BUTANONE	5.	1.
71-55-6	1, 1, 1-TRICHLOROETHANE	ND	1.
16-23-5	CARBON TETRACHLORIDE	ND	1.
108-05-4	VINYL ACETATE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
79-34-5	1, 1, 2, 2-TETRACHLOROETHANE	ND	1.
78-87-5	1, 2-DICHLOROPROPANE	ND	1.
10061-02-6	TRANS-1, 3-DICHLOROPROPENE	ND	1.
79-01-6	TRICHLOROETHENE	ND	1.
124-48-1	CHLORODIBROMOMETHANE	ND	1.
79-00-5	1, 1, 2-TRICHLOROETHANE	ND	1.
71-43-2	BENZENE	ND	1.
10061-01-5	CIS-1, 3-DICHLOROPROPENE	ND	1.
110-75-8	2-CHLOROETHYL VINYL ETHER	ND	1.
75-25-2	BROMOFORM	ND	1.
119-78-6	2-HEXANONE	ND	1.
108-10-1	4-METHYL-2-PENTANONE	ND	1.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: BARTON & LOGUIDICE, P. C.
 SITE: SOUTH HEADER
 SAMPLE: 2B
 ANALYSIS TYPE: GAS PHASE VOLATILE COMPOUNDS

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED: 06/11/86 GCMS FILENAME: 323391
 LEVEL: LOW MATRIX: GAS
 DATE PREPARED: 06/11/86 DATE ANALYZED: 06/11/86
 STANDARD ID: GAS108, GAS109 INSTRUMENT ID: 5100
 SAMPLE AMOUNT: 0.1ML

CAS #	COMPOUND	CONC: PPM (V/V)	DETECTION LIMIT
127-18-4	TETRACHLOROETHENE	ND	1.
108-88-3	TOLUENE	9.	1.
108-90-7	CHLOROBENZENE	ND	1.
100-41-4	ETHYLBENZENE	1.	1.
100-42-5	STYRENE	ND	1.
95-47-6	TOTAL XYLENES	3.	1.
108-41-8	M-CHLOROTOLUENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: BARTON & LOGUIDICE, P.C.
SITE: SOUTH HEADER
SAMPLE: 2B

TENTATIVELY IDENTIFIED COMPOUNDS

COMPOUND NAME	FRACTION	CONCENTRATION PPM (V/V)
1 C6 H12 HYDROCARBON	GAS	4.
2 METHYL CYCLOHEXANE	GAS	3.
3 A C10 HYDROCARBON	GAS	7.

Data Reporting Qualifiers

- Value - If the result is a value greater than or equal to the Detection Limit (DL), the value is reported.
- ND - Indicates that the compound was analyzed for but not detected. The minimum DL for the sample is reported based on necessary concentration or dilution actions.
- TR - Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified DL but greater than zero.

APPENDIX E

Waste Oil Hauling Service

APPENDIX E

Attached is a billing from Speedy Oil Services for the used fuel oil taken from the Oswego County Bristol Hill Landfill. This same service will be used to pickup the used lubricating oil at the Oswego County Silk Road Landfill Gas Recovery Facility.

11/4/86

INVOICE

SPEEDY OIL SERVICES, INC.

CONTROL # 241360 8159

P.O. BOX 427, BUFFALO, NY 14205

BILL TO:

SERVICE ADDRESS:

Chicago Co. Indfish
Rte 3 east of Fulton
Volney, N.Y. 13069

[Handwritten Signature]

CUSTOMER NUMBER

DATE OF INVOICE	DRIVER	YOUR P.O. #	TAX EXEMPTION #	TRUCK #	DATE SERVICED	TERMS
10-21-86	Joe Fern	2000		57	10-21-	10 DAYS/NET

DESCRIPTION	QTY.	UNIT PRICE	AMOUNT
(waste oil charging 20' per gal)	1100	20	\$220.00 -
Bill + inv	1		1
	1100	20	\$220.00

STATE TAX APPLICABLE

WHITE COPIES - CUSTOMER YELLOW COPY - BRANCH OFFICE PINK COPY - A/P GREEN COPY - FILE

CUSTOMER SIGNATURE *Robert Clark* CUSTOMER PHONE # *593-3800* PLEASE PAY THIS AMOUNT

A SERVICE CHARGE OF 2% PER MONTH, (24% PER ANNUM), WILL BE CHARGED ON ALL OVERDUE ACCOUNTS

WESTERN PA 1-412-264-4281	NORTHEAST OH 1-216-725-0111	WESTERN NY 1-716-855-2311	MICHIGAN 1-313-278-1199	EASTERN PA 1-215-639-0706	WEST VIRGINIA 1-304-357-6053	CENTRAL NY 1-315-488-2381
------------------------------	--------------------------------	------------------------------	----------------------------	------------------------------	---------------------------------	------------------------------

APPENDIX F

Leachate Disposal Agreement

New York State Department of Environmental Conservation



**Henry G. Williams
Commissioner**

Region 7, Environmental Quality Office
7481 Henry Clay Boulevard
Liverpool, New York 13088

May 14, 1986

Mayor Woodward and City Council
City of Fulton
Municipal Building
Fulton, New York 13069

Ladies and Gentlemen:

As requested by Mayor Woodward, an evaluation of the Fulton Sewage Treatment Plant's current capacity to accept and treat landfill leachate from the Oswego County landfill has been performed.

This evaluation was based on the following leachate characteristics:

- BOD₅ Concentration = 30,000 mg/l
- Suspended Solids Conc. = 1,200 mg/l
- Metals Concentrations as Shown on the Attached Sheet
- Priority Pollutants as Shown on the Attached Sheet

Since the above values are based on only one sampling point with values for only one of the two landfills, it is suggested that one additional sample from each of the two landfills be analyzed for all parameters listed on these data sheets.

It is also recommended that Part 360 and RCRA sampling be performed on the treatment plant sludge every three months for the first year of operation. If no sludge contamination is detected, annual sampling is recommended thereafter.

Considering current treatment plant performance and current SPDES effluent limits the plant can accept 2,000 gallons of leachate per day.

If accepted, the leachate should be fed at an even flow rate during the off-peak hours at the treatment plant. The plant operator must have control over the feeding of the leachate in order to minimize any adverse effects on the treatment process.

-2-

May 14, 1986

Mayor Woodward and City Council

Please feel free to contact me if there are any questions.

Very truly yours,



PAUL L. SHENEMAN
Sr. Sanitary Engineer

PLS/lis
Attachment

CC: Howard LaFever, P.E.



BARTON & LOGUIDICE, P.C.
CONSULTING ENGINEERS & LAND SURVEYORS

OFFICERS:

EDWIN J. BARTON, P.E., L.S.
FRANK A. LOGUIDICE, P.E.
LAWRENCE W. WORMALD, P.E.
PAUL F. DUDDEN, P.E.
S. THOMAS AISTON, P.E.
ROBERT W. HORNADAY, P.E.

June 17, 1986

ENGINEERS/ARCHITECTS:

DONALD C. MCCARTHY, P.E.
WILLIAM F. SOUTHERN, P.E.
WILLIAM H. HUGHES, P.E.
WILLIAM R. JONES, P.E.
HOWARD D. BATES, P.E.
PAUL R. CZERWINSKI, P.E.

OFFICE MANAGER:

ANNE R. PAWLICK

New York State Department of
Environmental Conservation
Region 7
Environmental Quality Office
7481 Henry Clay Blvd.
Liverpool, New York 13088

Attn: Mr. Paul L. Sheneman
Senior Sanitary Engineer

Dear Mr. Sheneman:

Your letter of May 14 to the City of Fulton (relative to landfill leachate) has been passed on to Oswego County and then to ourselves for review. The major input we have to offer is in the area of leachate strength parameters.

Attached is a summary sheet which compares March 1986 leachate test results from both the Silk Road (Oswego Valley) landfill and the new Bristol Hill landfill to the 1980 results (from Silk Road) attached to your letter.

The Silk Road results in particular show a much milder leachate than that used in your analysis. We would request that consideration be given to increasing the allowable leachate loading per day to a level above the 2000 gallons stated in your letter, based on milder leachate.

We would appreciate the opportunity to meet with you to discuss this matter.

Very truly yours,

BARTON & LOGUIDICE, P.C.

Paul F. Dudden, P.E.
Vice President

PFD/sle
Attachment

cc: Ms. Rush
Mr. Arthur Ospelt

File #
Orange Co
St. Paul
Company

TABLE 2.
OSWEGO VALLEY LEACHATE CHARACTERISTICS

1980 OR 81

	LEACHATE SAMPLE #1 5/17	LEACHATE SAMPLE #2 6/24	LEACHATE SAMPLE #3 6/30	AVE.	REPORTED AVE.	REPORTED RANGE 2
COD	31,100	44,300	45,460	40,287	8,000	40-89,520
BOD ₅	23,000	32,600	32,230	29,277	-	81-33,360
TOC	12,900	13,840	13,900	13,547	-	256-28,000
Ammonia N	840	1,136	1,020	999	-	0-1,106
TKN	1,430	1,350	1,150	1,310	-	-
Total Suspended Solids	360	860	2,300	1,173	-	10-700
Total Settleable Solids	<0.1	20	4.0	8	-	-
Oil & Grease	130	59	367	185	-	-
Sulfur	100	112	91	101	-	-
pH	6.3	6.1	6.1	6.2	6.3	3.7 - 8.5
Free Cyanides	2.7	0.067	0.072	0.95	-	-
Complex Cyanides	<0.1	0.087	0.115	0.067	-	-
Arsenic	<0.01	<0.002	<0.002	<0.01	0.1	-
Cadmium	0.01	0.08	0.05	0.05	-	0.03 - 17
Chromium T	<0.05	0.16	0.14	0.1	-	-
Chromium Hex	<0.05	-	0.009	0.003	-	-
Iron	720	990	960	890	6.3	0-2,820
Manganese	97	81	90	89	0.06	0.09-125
Nickel	1.11	0.57	0.60	0.76	0.7	0.2-10.29
Beryllium	<0.01	<0.01	<0.01	<0.01	-	-
Aluminum	4.2	5.0	2.0	3.7	-	-
Barium	0.8	<1.0	2.5	1.1	0.8	-
Copper	0.02	0.06	0.08	0.05	0.05	0-9.9
Lead	0.06	0.26	0.48	0.27	-	0.1-2.0
Mercury	0.3	<0.002	0.005	0.1	-	-
Zinc	12.0	12.0	7.0	10.3	0.13	0-370
Selenium	<0.001	<0.002	<0.002	<0.002	-	-
Silver	<0.01	<0.02	0.02	<0.02	-	-
Phenols	3.4	5.46	7.90	5.6	-	-

mg/l

TABLE 2a.
LEACHATE CHARACTERISTICS
PRIORITY POLLUTANTS

ug/l	LEACHATE SAMPLE #1 5/17	LEACHATE SAMPLE #2. 6/24	LEACHATE SAMPLE #3 6/30	LEACHATE AVERAGE
ene	1,100	349	791	747
zene	-	16	41	29
noform	16	BDL	BDL	5
trachloroethylene	40	45	246	110
orathane	-	49	59	54
-Dichloroethane	-	76	281	179
yl benzene	-	40	75	58
<u>ylene Chloride</u>	-	258	423	340
-Trans-Dichloroethylene	-	59	69	64
<u>chloroethylene</u>	-	77	335	206
yl Chloride	-	BDL	50	25

BDL - Below
Detection Limits

The following priority pollutants were tested for and were not
found in Samples #2 and #3.

Bis (Chloromethyl) Ether	1,2-Dichloropropane
Carbon Tetrachloride	1,2-Dichloropropylene
Chlorobenzene	Methyl Bromide
Chlorodibromomethane	Methyl Chloride
2-Chloroethylvinyl Ether	1,1,2,2-Tetrachloroethane
Dichlorobromomethane	1,1,1-Trichloroethane
Dichlorodifluoromethane	1,1,2-Trichloroethane
1,2-Dichloroethane	Trichlorofluoromethane
1,2-Dichloroethylene	Chloroform

The following priority pollutants were tested for and were not
found in Sample #3.

Aldrin	Endrin Aldehyde
Alpha-BHC	Heptachlor
Beta-BHC	Heptachlor Epoxide
Gamma-BHC	PCB-1242
Delta-BHC	PCB-1254
Chlordane	PCB-1221
4,4'-DDT	PCB-1232
4,4'-DDE	PCB-1248
4,4'-DDD	PCB-1260
Dieldrin	PCB-1016
Alpha-Endosulfan	Toxaphene
Beta-Endosulfan	Mirex
Endosulfan Sulfate	Total PCB's
Endrin	

APPENDIX G

Operating Maintenance Tasks
and
Monitoring

TABLE G-1

ALARM AND SHUT DOWN SYSTEM

Alarm Point	Fault Activating Alarm	Alarm/ Shut Down
1. Waste Oil Holding Tank	High Liquid Level	Alarm
2. Expansion Tank, Gen. Set 1	Low Liquid Level	Both
3. Expansion Tank, Gen. Set 2		
4. 13.2 KV Switchgear	Over Current	Both
5. 480 Volt Generator Switchgear	Over Voltage	Both
6. 480 Volt Building Switchgear	Under Voltage	Both
	Over/Under Frequency	Both
	100 KW Minimum Load	Alarm
	Over 800 KW Export	Alarm
	Out of Synch	Both
	Reverse KW	Both
	Reverse VAR	Both
	Ground Fault	Both
	Generator Set Shutdown	Both
7. Compressor Package 1	Low Oil Pressure	Both
8. Compressor Package 2	High Fuel Gas Temperature Leaving Compressor	Both
	Low Oil Level in Compressor Oil Reservoir	Both
	Low Inlet Gas Pressure	Both
	High Cooling Water Temperature Leaving Compressor	Both
	High Compressor Gas Outlet Pressure	Both
	High Condensate Level At Inlet or Outlet Scrubber	Both
	High Oxygen Content	Both

Table G-1
Alarm and Shut Down System (Continued)

Alarm Point	Fault Activating Alarm	Alarm/ Shut Down
9. Generator Set 1 10. Generator Set 2	High Jacket Water Temperature Engine Overspeed Low Oil Pressure Low Gas Pressure Compressor Package Shut Down	Both Both Both Both Both
11. Generator Building LEL 12. Compressor Building LEL	Gas Detector Fire Alarm	Both Both
13. Monitored Operating Points	Any monitoring point listed in Table G-2 can be programmed to activate an alarm at a pre-set level.	Alarm

TABLE G-2

Monitored Operating Points

<u>Point</u>	<u>Gen Set</u> <u>1</u>	<u>Gen Set</u> <u>2</u>	<u>Common</u>
Fuel Gas Temperature	X	X	
Fuel Gas Pressure	X	X	
Lube Oil Temperature	X	X	
Jacket Water Temperature	X	X	
Inlet Manifold Gas Temperature	X	X	
Fuel Gas Flow	X	X	
KW Level	X	X	
Total KW Exported			X
Outside Ambient			X
Generator Room Temperature			X

TABLE G-3

Routine Inspection Tasks

1. Check all gauges.
2. Check all levels: Coolant system expansion tank
Engine lube oil maintainer
Compressor lube oil
Waste oil holding tank
3. Drain gas condensate from gas filter.
4. Drain condensate from plant air compressor.
5. Check water trap level in condensate accumulator pit.
6. Visual inspection of all systems for leaks.
7. Check for unusual vibrations.
8. Check engine battery charge.
9. Check that all safety locks and safety covers are in proper place and condition.
10. Check potable water level.
11. Clean out incinolet as needed.
12. Check outside fencing and gates.
13. Record and report to Supervisor any abnormal findings.
14. Inspect all valves for leakage.
15. Check safety/backup valves for proper operation.
16. Check all building vents for passage and proper operation.
17. Check all alarm systems for proper operation.

TABLE G-4

Maintenance Tasks

1. Change engine lubricating oil.
2. Collect engine oil sample for oil analysis.
3. Change engine lubricating oil filter.
4. Change engine air filter.
5. Check water pump drive belts.
6. Inspect rubber hoses and lines.
7. Check exhaust silencer to be in good repair.
8. Perform routine engine maintenance as specified by manufacturer (i.e., spark plugs and wires, valve adjustment, magneto repairs).
9. Do valve (top end) overhaul as recommended by manufacturer.
10. Do major overhaul as recommended by manufacturer.
11. Change compressor lubricating oil.
12. Change gas filter elements.
13. Change engine pre-filter element.
14. Test individual collect trench gas quality and adjust header valves as needed.

TABLE G-5

Suggested Valve Overhaul Specifications

1. Remove cylinder head(s) from engine.
2. Complete disassembly.
3. Hot tank.
4. Check head gasket surface for condition and warpage.
5. Pressure test for cracks.
6. Bead blast and clean for assembly.
7. Install new valve guides.
8. Install new valve seats.
9. Precision grind valve seats.
10. Check seat concentricity.
11. Install new valves.
12. Check valve to guide clearance.
13. Check valve spring compressed height.
14. Record fits and clearances for future reference.
15. Assemble valves and springs.
16. Paint heads and apply rustproofing.
17. Install cylinder head(s) and test.

TABLE G-6

Suggested Major Overhaul Specifications

1. Complete disassembly.
2. Inspect all engine components, noting any damage.
3. Hot tank all reusable parts.
4. Clean all fluid passages.
5. Inspect crankcase main bearing bore size and alignment.
6. Inspect crankcase for deck and sleeve bore deterioration.
7. Magnaflux crankshaft, measure shaft journals, check for straightness and polish all bearing journals.
8. Magnaflux connecting rods, rebush, machine to size and inspect bearing bore sizes.
9. Replace all gear bearings or bushings.
10. Magnaflux camshaft, inspect for straightness, regrind and inspect.
11. Rebuild oil pump, water pump, injection pump, injectors, carburetor, mechanical governor, starter and turbocharger.
12. Measure and record all fits and clearances for future reference.
13. Valve overhaul per valve overhaul schedule.
14. Assemble with the following new parts: Sleeves, pistons, rings, all bearings, valve lifters, all seals and gaskets, hoses, wiring and clamps.
15. Perform all preventive maintenance items per schedule.
16. Paint and preserve.
17. Removal and replacement is not included.