INCINERATOR STUDY FOR HARRY S TRUMAN ANIMAL IMPORT CENTER NAS KEY WEST FL

2/1/1995

BERNARD JOHNSON YOUNG INC

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INCINERATOR STUDY

HARRY S. TRUMAN ANIMAL IMPORT CENTER
KEY WEST, FLORIDA

PREPARED FOR:

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
CONTRACT NO. 53-3294-2-035
TASK ORDER NO. 15

DRAFT FINAL

FEBRUARY 1995

BJI J.O. 92315

ADTECHS CORPORATION
INCINERATOR CONSULTANT

BERNARD JOHNSON YOUNG INC.
Architecture • Engineering • Planning • Systems

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EXECUTIVE SUMMARY

Introduction

ADTECHS is tasked to produce a feasibility and inspection study evaluating the three *Environmental Control Products, Inc.* incinerators for possible modification relative to Florida State Department of Environmental Protection (FDEP) Emissions Standards. The study seeks to address each of the following items and criteria:

Item 1: The best method to meet the particulate matter emission standard of 0.08 grains per dry standard cubic foot of flue gas per hour.

Recommend: The replacement of the current burners with new burners that can control and limit the amount in air introduced into the burning chamber is a necessary first modification for all cases. Following a test of the performance of the recommended new burners, a wet scrubber addition might then also be a necessary addition to satisfy this relaxed FDEP standard.

Item 2: The best method to meet the particulate matter emission standard of 0.02 grains per dry standard cubic foot of flue gas per hour.

Recommend: Following the burner replacement and test recommendations noted above, the addition of a dry electrostatic precipitator type off gas treatment system might be necessary to meet the current

FDEP standard depending on how effective the burner modification is in improving combustion efficiency.

Criteria: The study basis is 1000 pounds per hour rather than the 1600 pounds per hour rating of the units.

Recommend: Rate of feed considerations are subordinate to burner efficiency in meeting FDEP standards. ADTECHS' recommendations concentrate on improving burner efficiency while accommodating expected range of feed rate.

Criteria: Following the recommendations of this study would result in all other emission standards of FDEP being met in addition the particulate matter emission standard, and in no case would following the recommended modifications to these incinerators result in worse performance.

Item 3: Condition of the existing semi-automatic loaders/feeders.

Recommend: The inspection found no compelling evidence which would otherwise support a recommendation to replace or modify the existing semi-automatic loaders/feeders. The evidence is that, by inspection, the equipment is highly maintained and in an excellent working condition.

Item 4: The study estimates costs relative to recommendations.

Item 5: The study evaluates the existing electrical system supply and building structure relative to recommendations.

Recommend: The existing electrical motor control system which supports the incinerator complex is found to have excess capacity and would be able to accommodate new burners and the addition of off-gas treatment systems as necessary. The structural capacity of the incinerator foundation system and the structural capacity of the poured in place concrete roof are found to be of sufficient capacity to accommodate the anticipated loads associated with the range of gas treatment systems that might need to be installed. In short, no major impact on either electrical or structural systems is anticipated.

Findings

The three incinerator units and their supporting systems are all in excellent physical condition. There are no obvious signs of deterioration or malfunction, therefore there is no need to replace these units. Replacement of the incinerators would not necessarily achieve regulatory compliance. There are no barriers or difficulties anticipated in executing any of the recommendations (modifications) made by this study.

An important finding is that, due to the configuration and operation of the burners, especially in the lower chamber of each unit, it is difficult if not impossible to

maintain a proper overall burning condition. The absence of maintaining a "controlled air" combustion configuration is seen as the major contributor to the overall lack of compliance with particulate emission standards. The absence of an ability to control and especially to limit the amount of air entering the lower chamber as a result of continuous blower operation associated with the burner is highly suspect as the leading cause of emission problems. This condition has the effect of not allowing the "starved air" portion of the incinerator to function. The resulting incomplete volatization of material, (probable entrainment of particles and tendency to air quench the temperature in the lower chamber) would substantially contribute to the unexpectedly large particulate discharges noted in previous tests.

Recommendations

A step-wise approach to making modifications necessary to achieve particulate emission compliance is recommended. The first step of the recommendation is to replace the burners with a type that allows for the explicit control of incoming air. Burner and control replacement is recommended recognizing that direct modification of the existing burners to add air-flow modulation control to the blowers is an option. Moreover, it is known that converting from utilizing #2 oil to LPG or natural gas as a fuel would also reduce particulate emissions. While conversion to LPG or natural gas should be considered, the associated direct reduction in particulate emissions would not be sufficient to bring the units

into regulatory compliance. Oxygen and temperature monitoring should also be available to the operators for proper operation (i.e. burners and controls).

The next step is to re-test the units with new controlled air burners in place. The outcome of that test should demonstrate a dramatic improvement in particulate emissions and may even result in compliance with FDEP standards especially if the new 0.08 grains value is adopted.

A properly operated controlled air incinerator should easily be able to meet the 0.08 grain standard. By properly operated it is meant that there is "starved air" conditions in the lower chamber, "excess air" in the upper chamber, maintenance of the recommended temperature in each chamber, maintenance of the recommended residence time in the upper chamber and maintenance of the recommended feed rate. The operators on site are well trained and knowledgeable in all of these issues, the missing element is the physical ability to monitor and control the chamber to the necessary parameters.

The proposed test should also include an analysis of particulate size distribution, (since it is generally known that some gas treatment systems have different removal efficiencies for different particulate sizes).

As there are no known ways to exactly predict the performance of burning configurations of the type and size of these incinerators, it may be necessary to take a final step to add a flue gas treatment system. This final step is recommended only when the

burner replacement and control improvements are shown to be insufficient to comply with FDEP standards.

As noted above, depending on how close the post burner replacement test results are to compliance with FDEP standards, and depending on an analysis and review of the particle size distribution, either a wet scrubber or a dry electrostatic precipitator gas treatment system would be appropriate.

An electrostatic precipitator would probably be an appropriate recommendation should the particles prove to consist of a significant amount of very small size distribution. Otherwise, a wet scrubber type gas treatment system would be more effective, and nominally less costly, (should the particle size distribution be dominated by mid-range values). In any case, the ultimate decision to select one or another type of gas treatment system would rest on a careful evaluation of manufacturers data for removal efficiencies against the tested values of particle size distribution. The existing staff appear to be knowledgeable and capable of making this type of evaluation should it become necessary.

This step-wise approach is recommended in either case relative to the potential of the FDEP to reduce the particulate emission standards.

Cost Summary *(materials, labor, and equipment)*

Burner replacement with full control capability costs $92,672.00

A wet scrubber system costs $857,302.00 and would provide basic removal capabilities.

A dry flue gas treatment would be more effective than wet scrubbing costs $1,147,281.00 if electrostatic precipitation is utilized.

A new replacement unit of the same type with wet scrubber treatment would cost $1,620,775.00 while a cyclone type incinerator with electrostatic precipitation would cost $2,706,109.00.

These cost estimates do not represent firm manufacturers quotes (see cost estimate methodology).

INCINERATOR STUDY

USDA-APHID vs HARRY S. TRUMAN ANIMAL IMPORT CENTER

KEY WEST, FLORIDA

EXISTING CONDITION DESCRIPTION

Lowell Snow and Tadashi Nakashima conducted a site visit to the Harry S. Truman Animal Import Center (Import Center) located in Key West Florida on November 16 and 17 19994 to visually inspect the three *Environmental Control Products, Inc.* Model T-2000 controlled air incinerators. These units are rated at 1600 pounds per hour operate using number 2 diesel fuel and are designed to incinerate Type O and Type 4 biological wastes. The units do not now have any type of off gas treatment system.

The units were placed in service in 1979 and except for intermediate down time between burnings, maintenance, routine refractory replacement and such, have been in continuous service since that time. There initially were plans for four incinerators at this site, but only three were installed. The units are considered to be large in capacity, (there has yet to be an occasion for all three units to be at capacity at the same time).

By definition, Type O wastes are typically 8500 BTU/# trash consisting of a mixture of highly combustible waste, such as paper, cardboard, wood and floor sweepings from commercial and industrial activities. Type O may contain up to 10% by weight of petrochemical waste, 10% moisture and 5% non-combustible solids.

Type 4 wastes are typically 1000 BTU/# human and animal remains consisting of carcasses, organs, and solid organic wastes from hospitals, laboratories, abattoirs (from animal pounds and similar sources). Type 4 wastes may contain up to 85% moisture and 5% non combustible solids.

The materials historically fed to these incinerators and will continue to be fed are class Type O and Type 4 respectively.

The primary function of the incineration of animal bedding and the occasional function of incineration of animal carcass is necessary to support the Import Center's activities. The large capacity is reportedly due to an originally perceived need to accommodate a significant outbreak of disease in a large herd of imported animals. This need may still be an Import Center requirement, but it should be noted that an outbreak of this kind would challenge the capacity of these units and has fortunately not occurred. The units under present use conditions appear to have excess capacity.

This study has developed five areas of inspection and discussion. Each of these areas and the corresponding observations are presented below:

1. The Current Regulatory Basis of the Units

Status of the current license

The units are currently licensed to operate in the State of Florida under a Department of Environmental Regulation Permit to Operate Air Pollution Source(s). (A copy

of FDEP Standards for stationary sources is attached as Appendix B). It is well known by the FDEP that the units to not meet standards for particulate emissions. Typically, the FDEP would receive a request for a variance from an operator who was unable for what ever reason to comply with the standards but who had compelling reasons to continue to operate.

In the case of these incinerators, it is reported in discussion with Mr.Michael Hewett of FDEP, that correspondence between the Import Center and the then head of FDEP in the 1991 time frame exist to the effect that some allowances are made so that the Import Center may continue to perform its important and necessary work including operation of these incinerators. It is also reported that this allowance does not carry the force of a variance but does recognize the special needs of the Import Center and recognizes the ongoing efforts to fund and execute a remedy to the particulate emission problem.

There is an expectation that the US EPA will complete rule-making that may affect the FDEP standards in the future. This follows from a recent effort to revise the Human Crematory rule which was changed by FDEP in 1992 and which sets standards somewhat less stringent that those found in the Biological Waste Rule. Unfortunately, although the US EPA will begin to articulate their anticipated changes early in 1995, it is likely that the Federal Rule will not be promulgated until March of 1996 at the earliest.

The practical impact of this continuing rule-making appears to be that the FDEP is not contemplating enforcement actions due to the efforts of the Import Center to

make progress on the particulate emission issue and due to the somewhat uncertain and uneven regulatory requirements.

Status of Discussion with FDEP

The dialogue between the Import Center and FDEP is reported by both parties to be cordial, continuous and kept at a high state of information flow. A healthy dialogue and mutual respect has been established which should continue to support an appropriate level of understanding and support as the issues of compliance are successfully resolved.

Status of License if Units are Modified

Since the units now operate under permit and by "allowance", the licensing process should not be difficult when making the necessary modifications.

2. Evaluation of Operations History

Changes in Operation

Discussions with Dennis Smallbone and Todd Orman did not identify any significant operational changes in the long history of the units. It should be noted that the past successful operation, maintenance and general condition of the units is strong evidence of there having been an internal operational culture of learning and excellence and that the units have not been operated at full capacity (no full-scale disease outbreak occurrence).

The units as configured are not capable of obtaining the nominal 1600#/hr rating of the manufacturer. This seems to be a result of limitations associated with the burners about which more is noted and recommended later in this study. The rated capacity of the units would in any case be physically challenging to support. This is due to observations about the generation of the potential waste rather than a commentary on the feed mechanisms.

Changes in Regulations

The state of regulatory flux, anticipated rule-making, and the Clean Air Act of 1990 continues to drive the process. The regulatory environment, while not especially relaxed, does seem to be going in the direction of good practice and reasoned comparisons between various segments of clean air considerations. This observation follows from the discussion with FDEP wherein the Biological standards are expected to be revised in the same manner as the Human Crematory standards. Standards are becoming more consistent.

Changes in the Design, Facility, or Physical Condition of the Units

The original design provided for four identical incinerators. However, only three units were installed and apparently there has been no need to consider the addition of a fourth unit. Other than routine maintenance, and the routine replacement of refractory, there have been no apparent changes in the facility. There is no discernable deterioration of the units or any of the supporting systems. The operations and maintenance activities have resulted in a clean and apparently well operated facility.

3. Description of Existing Problems

Feed System

The manure, bedding, and straw feed systems appear to be in good working condition (no maintenance problems were noted). The direct feed area appears to be in good working condition (no maintenance problems were noted). In discussion with the operators, there were no problems or issues raised about any portion of the feed system for any of the units.

Burning

There are burners in the upper and lower chambers of each of the three units. These burners have been in service since the installation of the units. The burners are fired by # 2 diesel fuel. The burners appear to be in good working condition and have been well maintained. A major problem associated with the burners has been noted. The blowers for each burner operate in a continuous fashion, this continuous introduction of air into the chambers, especially in the lower chamber having the effect of negating the operational configuration necessary for a controlled-air incinerator. (Apparently considerable vendor information has been compiled internally on this subject and should be utilized during the final decision and implementation process.) Recommendations about the burner condition are made later in this study.

Refractory

The refractory material appears to be in good condition. The refractory has been routinely replaced with excellent results. This replacement is considered a maintenance expense to be expected from time to time. Experience with refractory replacement is uneven across the full spectrum of incinerator users. These incinerators have obviously been repaired by skilled refractory specialists.

Controls

The existing controls appear to work as designed. The recent addition of a temperature control panel to the number 2 unit (physically the one in the middle) is noted. The control panel addition included oxygen recording of the flue gas in the stack, a temperature recorder in the secondary chamber and modulation of the combustion air supplied to the secondary combustion chamber. These additions have not improved the particulate emissions of the unit. Presently, there is no way to control the amount of air introduced into either lower or upper chamber of either unit via the burner blowers. Oxygen monitoring in the lower chambers does not exist. Temperature monitoring exists but positive temperature control does not exist. Recommendations about monitoring and controls are provided later in this study.

Compliance

As noted in the Regulatory Basis (item 1), a major problem of compliance exists with respect to meeting the FDEP particulate emissions standards. Considerable

discussion focused on the need for an operationally on line method to control the air introduced especially into the lower chamber, and the associated monitoring and control devices.

Ash Handling

The ash handling is a manual function. The ash has historically been found to consist of inert material. There were no problems observed or noted in the ash handling portion of the overall operation. There are no known regulatory changes which would tend to affect ash handling.

Off Gas

The incinerators do not have an off-gas treatment system for any of the three units. Recommendations about off-gas treatment are made later in this study.

Maintenance

As noted previously on other issues, there exists an obvious commitment to maintenance of the facility as reflected in the excellent condition of the units. There were no problems noted or discussed in maintenance category.

4. Visual Inspection

General Condition of the Units

Each of the three units are in excellent visual condition with no apparent areas of deterioration. Discussion of the operational history of the units did not reveal any thing

other than that the units are each in excellent working condition. The manner of operation wherein a proper controlled air combustion process should be maintained is the only item, (but this is a separate issue from "condition").

Obvious Problems Noted

This category was provided in order to identify any other issue not already discussed. There is a non-functional heat recovery system attached to each unit. As originally defined, some utilization of the heat from the off-gas was intended. This heat recovery system did not function in a satisfactory manner. The existing recovery system's piping and apparatus does not interfere with the continuous operation of the incinerator units.

Extent of Anticipated Modifications

The condition of the units and the available space around the units would in no obvious way interfere with the range of proposed modifications.

5. Summary Discussion

The three incinerator units each appear to be in such excellent physical condition as to be considered fully operational. There are no obvious signs of poor operation or maintenance practice, the only issues noted are those associated with FDEP compliance. There appear to be no physical barriers to making the necessary modifications to achieve compliance with FDEP.

INCINERATOR STUDY

USDA-APHIS vs HARRY S. TRUMAN ANIMAL IMPORT CENTER

KEY WEST, FLORIDA

ANALYSIS

Nothing was noted visually, verbally or in the review of the available test materials which would suggest that a replacement of the three incinerators would be a necessary step. The condition of the units and the relatively straight forward proposals to comply with FDEP standards argue strongly for modification rather than replacement as a prudent course of action.

1. Burner Replacement Options

There is nothing more basic to the successful operation of a controlled air incinerator than the maintenance of "starved air" in the lower chamber and "excess air" in the upper chamber. A two chamber controlled air incinerator takes advantage of the two stage process that is characteristic of hydrocarbon burning. It is found that if a hydrocarbon is raised in temperature enough to become volatile, but with an insufficient amount of oxygen to complete the combustion process, (and if the volatile gases are at sufficient temperature for an appropriate amount of time in the presence of more than enough oxygen) then an exceptionally efficient combustion process will ensue. The two chamber incinerator is designed to produce conditions where these two separate and distinct processes can be

maintained. The use of the term "controlled air" is frequently assigned to this type of incinerator.

If on the other hand, too much air is allowed to be present in the lower chamber, several things occur which tend to reduce the overall efficiency of the combustion process. Excess air in the lower chamber will produce conditions where there is incomplete volatilization of the hydrocarbons, entrainment of particulate matter, and temperature quenching. All three of these conditions can lead directly or indirectly to combustion inefficiency and especially particulate carry over into the upper chamber and thence to the stack.

Under the circumstances (no real starved air condition in the lower chamber and excess air in the upper chamber) and with the concurrent inability to obtain and maintain recommended chamber temperature, there is little to wonder about why the incinerators exhibit an uncharacteristically large amount of particulate emissions. A well-controlled incinerator of this type might be expected to operate below 0.05 grains per dry standard cubic foot of flue gas per hour corrected to 7% Oxygen.

Therefore, the recommendation is made to correct the air intake control problem as the first order of business along a multi-step path toward full compliance with FDEP standards.

It is recommended that the burners in the lower chambers be modified to allow the operator the ability to continuously monitor and control air intake, temperature and

Oxygen level. From discussion with Import Center personnel, it is understood that the vendors have approved recommendations that range from modification of the existing burners to modulate air intake using any of the three fuels available (#2 diesel fuel, LPG, and natural gas) up to and including full replacement of the burners with new "state of the art" burners.

Upper chamber burner replacement should also be considered. Although the upper chamber should operate in an "excess air" condition, it is still possible to have too much air intake which would lower temperature and reduce the residence time for burning. The reviewed test information indicates that residence time is maintained properly. Thus continuous burner-blower operation does not appear to be a problem. However, since a fuel change is contemplated and since a continuous upper chamber blower is an operational anomaly, the ability to modulate upper chamber burner blower air in the same manner as in the lower chamber would be desirable.

2. Ancillary Equipment Modifications

As noted in the previous section on existing conditions, the semi-automatic loaders, the refractory and associated support apparatus are in excellent condition. There is no indication of problems with any of the support equipment. Modifications of burners and controls and modifications necessary for off-gas treatment systems would not adversely impact the existing equipment. Therefore no recommendations for modification of ancillary equipment is made.

3. Off-gas Treatment Options

Since so much is known about the burning process in general and especially about utilizing a two chamber controlled-air incinerator of the type inspected, it is natural to assume that predicting the behavior of a particular burning configuration would be straight forward. This assumption is reinforced in that almost everyone has been exposed to the High School chemistry version of combustion where hydrocarbons burn completely in an Oxygen-rich environment to produce carbon dioxide and water. Unfortunately this is not always the case. In fact, the burning of hydrocarbons is especially difficult to model, due to the complexity of the products of combustion, and has become politically significant in current times.

The process is complex both chemically and thermodynamically; results are in non-linear mathematical modeling. In most cases, the unpredictability of the nature, constituents, and uniformity of the feed makes any reasonable prediction of behavior problematic at best. As a result, the manufacturers of this type equipment are reluctant to guarantee the explicit performance of any configuration. The good news is that some things are known about the relative effectiveness of types of incinerators and about the relative effectiveness of types of off-gas treatment.

There are more than a dozen categories of gas treatment systems and more dozens of variations in each category considering all the makes, manufacturers, models and applications available. For simplicity, five categories of types of equipment can be used.

These are; mechanical collectors, wet scrubbers, electrostatic precipitators, fabric filters, and gas incinerators and absorbers.

A typical review of treatment removal efficiencies might look at removal of particles greater than 50 microns in size, from 5 to 50 microns, from 1 to 5 microns and below 1 microns as an arbitrary classification.

Since there is such a magnitude of devices, and since many could be eliminated based on the type of incinerators being evaluated and their size, a smaller focus on types is in order. Fabric filters are typically difficult to handle and hard to dispose of. Gas incinerators might be applied to a coal-fired incinerator while a mechanical collector might be applied where gross or rough treatment would be more adequate.

By a process of elimination, an examination of wet scrubbing or electrostatic precipitation is in order. As it happens, both wet scrubbing and electrostatic precipitation have been successfully used on incinerators of the type under review and many manufacturers offer "package" sets of equipment tailored for this type of incinerator.

With wet scrubbing, there is a range of energy costs, with a venturi-type scrubber being a high consumer of energy (pumping water). Also as the name implies, there is water introduced into the gas stream which must have a discharge rout from the site. The electrostatic precipitator, as the name implies, uses electrical energy to effect the removal of particles. Roughly, removal efficiencies of the electrostatic precipitator for the lower size particles can be higher than some kinds of wet scrubbers. Knowledge of the particle size

distribution is helpful in addition to the gross mass per hour discharged in choosing an appropriate system.

After the recommended burner and associated controls modifications are made, it is necessary to conduct a test for emission compliance which included a particle size distribution as part of the analysis. Armed with that data the next step could be taken, if necessary. Should the particulate emissions be dramatically reduced but still in excess of the FDEP standards, then consideration of wet scrubbers or electrostatic precipitation would be in order.

There appears to be sufficient electrical capacity for a wide range of possible options in that the motor control center serving the facility is over sized by 25%. This is due to the fact that it was designed for four incinerators and only three were installed. There is reported to be capacity for at least 5 large motors with the current electrical configuration.

Each incinerator is installed on a poured concrete foundation which appears to have sufficient excess capacity in that the loads associated with the type of gas treatment being contemplated would not be too large for these foundations. The poured-in-place concrete roof structure could be considered as a support for equipment should that type mounting be required. These options would be the subject of a very detailed selection of equipment.

It is recommended that consideration of gas treatment be sequenced after the burner modifications recommended above and subsequent to a test for compliance with

analysis of particle size distribution. The selection of gas treatment system should depend on vendor performance being compared to the particle size distribution, cost , and availability.

An exact prediction of performance to a 0.08 grain or a 0.02 grain numerical value being obtained is highly speculative. And in fact, it is well known that manufacturers are very reluctant to award guarantees of performance for gas treatment systems. It is also well known that many incinerators operate near or below the compliance values considered.

INCINERATOR STUDY

USDA-APHIS vs HARRY S. TRUMAN ANIMAL IMPORT CENTER

KEY WEST, FLORIDA

SUMMARY RECOMMENDATION

A step-wise approach is recommended to achieve compliance with the particulate emission standards of FDEP. As a first step, the burners and blowers should be reconfigured or replaced complete with adequate controls as previously described. This step is necessary due to the fact that the current configuration where the blowers are in continuous operation is the probable cause of most if not all of the particulate emissions in excess of the compliance value.

The next recommended step is a test to determine the effectiveness of the burner and controls modification. This test should also include an analysis of particulate size distribution, (since that is an important parameter in gas treatment should that step be found necessary).

The final step is the selection and installation of an appropriate gas treatment system should the burner modifications prove inadequate. The exact type of treatment should depend on an analysis of the remaining magnitude and size distribution of particles obtained in the test recommended above.

Taken in this order, and with reliance on the considerable information already available to the Import Center personnel, the issue of compliance should be resolved.

Not recommended is a replacement of the basic units nor of the ancillary equipment due to the excellent physical condition of these units.

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KEY WEST, FLORIDA

COST ESTIMATE

These cost estimates represent direct contact with vendors and do not reflect an exhaustive review of market availabilities. This study relies on fairly broad based estimates.

For the modifications associated with burner replacement and controls on air intake, temperature, and Oxygen monitoring, an installed cost of $92,672.00 is estimated as an outside value for each unit. This value would include the provision of LPG as a fuel source but would not include a major site revision to include natural gas. A modification of the existing burners to effect air modulation only would be speculatively less cost but might not be as effective as a full control modification.

For a modification including the installation of a wet scrubber package as might be recommended by the manufacturer of the unit tailored to the unit, an installed cost of $849,215.00.

For a modification including the installation of an electrostatic precipitator package as might be recommended by the manufacturer of the unit tailored to the unit, cost $1,147,281.00.

Although not recommended but for comparison, a new unit of 1000 #/hr capacity with a wet scrubber included of a similar nature to the current unit is estimated to cost $1,620,775.00.

A new incinerator of different design such as a cyclone incinerator complete with electrostatic precipitator is estimated to cost $2,706,109.00.

STUDY METHODOLOGY

Initially, the Bernard Johnson Young (BJY)/ADTECHS Project Team individually reviewed existing facility reports, design criteria, and applicable codes and regulations. The team then met to discuss the areas to be examined and to formulate an approach to the study. The on-site surveys of the existing facility conditions were performed by multi-discipline teams of architects and engineers. Survey procedures included notes, photographs of existing conditions,and review of the existing plans with facility administrators and staff.

After the site survey, each project team member examined and investigated his particular discipline's findings in terms of:

1. Code/Criteria Compliance
2. Operations and Maintenance Efficiency

The project team met to examine all preliminary studies and further refined them.

Costs were developed by taking base numbers from industry sources. Base numbers include demolition costs unless otherwise noted. Base numbers were then escalated as follows:

- Material was escalated by 6% sales tax and 10% subcontractor mark-up.

- Labor was escalated by 46% labor burden and 23% subcontractor OH & P based on the small size of the individual phases.
- Subtotals were combined and escalated by 3% permit, insurance, and bond.
- The subtotal was escalated by 16% for General Condition Requirements and General Contractor mark-up.
- The subtotal was multiplied by a 89% location factor from Means Construction Cost Data 1995.
- Inflation was accounted for by escalating the subtotal construction cost by 5% (1 year).
- The subtotal was escalated by 6% design contingency.

NOTE: Architectural engineering fees of 17% and 7.5% construction contingency are not included and should be considered for final budgeting considerations.

Architectural Engineering is broken down as follows:

Pre-design	=	4%
Design	=	6%
Design Review	=	1-2%
Bidding	=	1%
Construction Administration	=	4%
TOTAL	=	17%

TABLE 1

Construction Budget Estimate
USDA-APHIS vs
Harry S. Truman Animal Import Center Incinerators

Burner and Blower Replacement

Description	Material Amount	Labor Amount	Equipment Amount	Total Cost
Summary of Divisions				
Demolition				
Civil				
Architectural				
Structural				
Mechanical/Plumbing	$3,790	$11,830	$26,750	
Electrical	$1,311	$8,520	$6,250	
Total Direct Cost	$5,101	$20,180	$33,000	
Sales Tax / Subs Markup 6% / 10% = 16%	$816		$5,280	
Work comp & FDCP OH & OH&P 29.2%+16.8%+13%+10% = 69%		$13,924		
Subtotal	$5,917	$34,104	$38,280	78301.36
Insurance/Permit/Bond - 3%				$2,349
Subtotal				$80,650
GC markup & General Cond. - 16%				$12,904
Subtotal				$93,554
City Cost Index - 89%				$83,263
Escalation (1 year) - 5%				$4,163
Subtotal				$87,427
Contingency - 6%				$5,246
TOTAL PROJECT COST				$92,672

TABLE 2

Construction Budget Estimate
USDA-APHIS vs
Harry S. Truman Animal Import Center Incinerators

Wet Scrubber Addition Only

Description	Material Amount	Labor Amount	Equipment Amount	Total Cost
Summary of Divisions				
Demolition	$0			
Civil	$2,800	$8,600		
Architectural	$1,500	$300		
Structural	$2,050	$1,975		
Mechanical/Plumbing	$4,900	$13,450	$521,000	
Electrical	$2,790	$11,550	$31,250	
Total Direct Cost	$14,040	$35,875	$552,250	
Sales Tax / Subs Markup 6% / 10% = 16%	$2,246		$88,360	
Work comp & FDCP OH & OH&P 29.2%+16.8%+13%+10% = 69%		$24,754		
Subtotal	$16,286	$60,629	$640,610	$717,525
Insurance/Permit/Bond - 3%				$21,526
Subtotal				$739,051
GC markup & General Cond. - 16%				$118,248
Subtotal				$857,299
City Cost Index - 89%				$762,996
Escalation (1 year) - 5%				$38,150
Subtotal				$801,146
Contingency - 6%				$48,069
TOTAL PROJECT COST				$849,215

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TABLE 3

Construction Budget Estimate
USDA-APHIS vs
Harry S. Truman Animal Import Center Incinerators

Electrostatic Precipitator Only

Description	Material Amount	Labor Amount	Equipment Amount	Total Cost
Summary of Divisions				
Demolition				
Civil	$2,800	$8,600		
Architectural	$1,500	$300		
Structural	$2,290	$2,610		
Mechanical/Plumbing	$3,200	$9,930	$746,000	
Electrical	$2,700	$10,150	$31,150	
Total Direct Cost	$12,490	$31,590	$777,150	
Sales Tax / Subs Markup 6% / 10% = 16%	$1,998		$124,344	
Work comp & FDCP OH & OH&P 29.2%+16.8%+13%+10% = 69%		$21,797		
Subtotal	$14,488	$53,387	$901,494	$969,370
Insurance/Permit/Bond - 3%				$29,081
Subtotal				$998,451
GC markup & General Cond. - 16%				$159,752
Subtotal				$1,158,203
City Cost Index - 89%				$1,030,800
Escalation (1 year) - 5%				$51,540
Subtotal				$1,082,340
Contingency - 6%				$64,940
TOTAL PROJECT COST				$1,147,281

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TABLE 4

Construction Budget Estimate
USDA-APHIS vs
Harry S. Truman Animal Import Center Incinerators

New Incinerator with Wet Scrubber

Description	Material Amount	Labor Amount	Equipment Amount	Total Cost
Summary of Divisions				
Demolition		$44,000		
Civil	$4,500	$12,000		
Architectural	$1,500	$300		
Structural	$5,200	$5,500		
Mechanical/Plumbing	$7,150	$28,750	$879,000	
Electrical	$3,760	$22,320	$115,000	
Total Direct Cost	$22,110	$112,870	$994,000	
Sales Tax / Subs Markup 6% / 10% = 16%	$3,538		$159,040	
Work comp & FDCP OH & OH&P 29.2%+16.8%+13%+10% = 69%		*$77,880*		
Subtotal	$25,648	$190,750	$1,153,040	$1,369,438
Insurance/Permit/Bond - 3%				$41,083
Subtotal				$1,410,521
GC markup & General Cond. - 16%				$225,683
Subtotal				$1,636,204
City Cost Index - 89%				$1,456,222
Escalation (1 year) - 5%				$72,811
Subtotal				$1,529,033
Contingency - 6%				$91,742
TOTAL PROJECT COST				$1,620,775

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TABLE 5

Construction Budget Estimate
USDA-APHIS vs
Harry S. Truman Animal Import Center Incinerators

New Incinerator with Electrostatic Precipitator

Description	Material Amount	Labor Amount	Equipment Amount	Total Cost
Summary of Divisions				
Demolition	$0	$44,000		
Civil	$4,500	$12,000		
Architectural	$1,500	$300		
Structural	$5,200	$5,500		
Mechanical/Plumbing	$7,900	$31,250	$1,694,000	
Electrical	$3,800	$27,200	$79,000	
Total Direct Cost	$22,900	$120,250	$1,773,000	
Sales Tax / Subs Markup 6% / 10% = 16%	$3,664		$283,680	
Work comp & FDCP OH & OH&P 29.2%+16.8%+13%+10% = 69%		$82,973		
Subtotal	$26,564	$203,223	$2,056,680	$2,286,467
Insurance/Permit/Bond - 3%				$68,594
Subtotal				$2,355,060
GC markup & General Cond. - 16%				$376,810
Subtotal				$2,731,870
City Cost Index - 89%				$2,431,364
Escalation (1 year) - 5%				$121,568
Subtotal				$2,552,933
Contingency - 6%				$153,176
TOTAL PROJECT COST				$2,706,109

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APPENDIX A

Record Data

ANIMAL CREMATORIUM
INCINERATOR TESTING PROGRAM
REPORT

FOR

HARRY S. TRUMAN ANIMAL IMPORT CENTER
ANIMAL & PLANT HEALTH INSPECTION SERVICES
U.S. DEPARTMENT OF AGRICULTURE
KEY WEST, FLORIDA

BY

S.E. ENVIRONMENTAL CONSULTANTS, INC.
7060 TAFT STREET
HOLLYWOOD, FLORIDA 33024

AND

SANDERS ENGINEERING AND ANALYTICAL SERVICES, INC.
1568 LEROY STEVENS ROAD
MOBILE, ALABAMA 36695

APRIL 28, 1992

TABLE OF CONTENTS

LIST OF FIGURES

SUMMARY AND RECOMMENDATIONS

The following report provides the results of tests conducted from 4/6/92 through 4/8/92 at the subject facility. The numerical data results of the compliance test are shown in the summary provided in *FIGURE #1*. Compliance with the FDER standards have been summarized as "Pass" or "Fail" as shown in FIGURE #2.

In summary, the following may be observed:

Visible Emissions

Tests conducted for Visible Emissions (% opacity) showed that compliance was achieved at the process rate of 600 lbs/hour but was not achieved at rates of 1000 lbs/hour or 1600 lbs/hour.

Odor

Observations made for odor showed that compliance was achieved at all process rate loadings.

Secondary Afterburner Temperature

Tests conducted for secondary afterburner temperatures showed that compliance with the 1800°F standard was achieved at the process rate of 600 lbs/hour but was not achieved at rates of 1000 lbs/hour or 1600 lbs/hour.

Secondary Residence Time

Tests conducted for secondary residence time showed that compliance with the 1.0 second minimum retention time standard was achieved at all process rate loadings.

Carbon Monoxide

Tests conducted for carbon monoxide emissions showed that compliance with the 100 ppm standard was achieved in all runs except one at the 1000 lbs/hour rate.

Hydrochloric Acid

Tests conducted for hydrochloric acid emissions showed that compliance with the 4.0 lbs/hour standard was achieved at all process rate loadings.

Particulate Matter

Tests conducted for particulate matter emissions (fly ash) showed that compliance with the 0.03 gr./dscf. standard was not achieved in any of the process weight test runs.

Composition of the Flue Gases

If combustion of the volatile fraction of the refuse is complete, the composition of the flue gas will be principally nitrogen, oxygen, and carbon dioxide. There will be small amounts of sulfur oxides, nitrogen oxides, and traces of mineral acids such as hydrochloric acid. Normally, the concentration of sulfur oxides, nitrogen oxides, and mineral acids will be low enough so that they will not cause significant air pollution. It is doubtful if it is necessary to treat flue gases to remove these materials. If combustion of the volatiles is not complete, the flue gases will contain significant amounts of carbon monoxide and other uncombusted or partly combusted organic materials. The first indication of the presence of these materials in high concentrations will be the appearance of black smoke from the incinerator stack, which may be followed by the detection of objectionable odors.

The presence of such unburned or partially burned materials is unnecessary and is caused by the poor operation of the incinerator. Their emissions should be controlled by the proper operation of the incinerator rather than the installation of control devices. Complete combustion can be assured by operating the incinerator at the proper temperatures; by providing sufficient air for combustion; by providing sufficient residence time for the combustion process to occur; and by inducing (either by gas passage design or overfire air jets) sufficient turbulence in the combustion space to mix the combustible gases and aerosols with the necessary air.

Such residence time and some mixing is provided for by ducting the flue gases to a secondary combustion chamber, where it is necessary to provide sufficient volume and vigorous induced mixing in the furnace to assure that the combustion process is completed.

Particulate matter (characterized by flue gas weight loading), generally referred to as fly ash, is generated in the combustion process and must be removed from the effluent gases. The amount of particulate matter which is generated is somewhat dependent upon the design and operation of the incinerator. If the combustion process is not complete, a sooty fly ash will result. The best way to control emissions of the latter type is operation at temperatures sufficiently high to assure complete combustion of these materials.

Studies have been made which indicate that there is a correlation between the amount of fly ash entrained in the effluent gases and the distribution and amount of overfire and underfire air and the type of grate employed. Proper operation will assure that large amounts of fly ash do not become entrained in the gas stream because of improper air distribution.

There will be, however, no matter how carefully the incinerator is operated, particulate matter entrained in the effluent gases. The extent to which the particulate matter is removed from the gases depends upon the type of emission control equipment which is used and the way it is operated and maintained. If abnormal amounts of particulate are being

emitted, it may be that the incinerator is being operated improperly. This happens, for example, when combustion is quenched by large amounts of air admitted to the incinerator in an uncontrolled manner, such as occurs in batch feed incinerators. Also, the emission control equipment may not be operating properly.

In a properly designed and operated incinerator, equipped with appropriate air pollution control equipment, the standards established by most states and the federal government can be met.

Although the flue gases from incinerators contain a number of pollutants, air pollution control equipment installed on these units are primarily directed at the problem of particulate removal. For this purpose, a number of devices are in use, ranging in particulate removal efficiency from 5 to 15% to upwards of 95%.

Settling or expansion chambers have been used in the breeching and flue gas ducts, and many of the older installations have employed refractory baffles across the breechings extending downward from the roof or upward from the bottom of the breeching to require the flue gases to pass under and over such baffles. In some instances, a coarse spray of water is directed into the flue gases and toward the baffles with most of the water falling to the floor of the chamber without vaporization. The wet floor and baffles improve particulate removal by preventing reentrainment of settled ash into the flue gas stream. At best, however, such systems only attain a control efficiency of 20 to 35%, far below modern requirements.

Mechanical collectors are usually "cyclones" in which the flue gas is rotated within the confines of a cylinder after entering tangentially at the periphery. The flue gas then leaves through an axial outlet. Solid particulate concentrates on the inside of the cylindrical wall (as a result of centrifugal force), and solids are discharged at the lower end and opposite to the cleaned gas outlet. Listed below in order of decreasing air pollution control effectiveness (and pressure drop) are three general types of such cyclones. The maximum efficiency to be expected with such units is 60 to 80%.

1. A multiple cyclone with many small-diameter (less than 30 cm) cyclone units installed in a tube sheet.

2. A multiple cyclone system of larger diameter (over 45 cm) installed in clusters with flue gas manifolded to the inlets of the individual cyclones and the outlet manifolded into a single duct.

3. Single or double cyclone units of larger diameter (over 1 m) with a single or split flue duct at the inlet and outlet.

Other devices used for particulate removal from flue gases include scrubbers, which may be open spray chambers, packed chambers, and most importantly, high pressure drop Venturi scrubbers. Fabric filters can, conceptually, be used in incinerator applications, but results

to date have been disappointing: although collection efficiency is high (>99%), maintenance and operating problems have plagued the units. Such filter materials are mainly those of high temperature fabrics, such as silicone-treated glass fiber cloth, arranged in bags or tubes.

A common, although only moderately efficient (say, 30-40%), type of air pollution control concept for cleaning incinerator flue gases is the use of vertical staffered baffles which may be employed in multiple stages in a group, or with groups of baffles in each stage. These baffles are commonly wetted with water. Although most of the staggered baffles which are wetted with a water spray are constructed with refractory firebrick, a few are installed with corrosion resisting metal baffles, such as special stainless steels. It should be noted, however, that wetted baffles in the secondary may lower the secondary temperature below the 1800°F minimum.

The electrostatic precipitator has received substantial attention for particulate removal from incinerator flue gases. These installations were originally employed on combination power plants and incinerator furnaces, although recently there have been electrostatic precipitators installed on steam boiler plants which are exclusively fueled with municipal refuse. Electrostatic precipitators used for cleaning incinerator flue gases are the vertical multiple-plate type. Reported efficiencies exceed 95%, and the resulting effluent quality exceeds federal regulations.

Smoke (characterized by flue gas opacity) may either be ash material, which is completely burned but is very finely divided, or an unburned or partly burned combustible material (tar aerosol). If the smoke is an ash material, control requires the use of very high efficiency emission control equipment. It may be lessened to some extent through improved operation by adjusting the air distribution in the primary furnace.

If the smoke is combustible, it can best be controlled by improved combustions efficiency. Longer residence time, better air distribution, gas mixing, and high operating temperatures will eliminate such pollution.

Recommendations

1. Clean and inspect all primary and secondary air ducts and inlet ports.

2. Design and install modulating adjustable control valves to reduce and control the total air supply, and improve the distribution of the air supply to the primary under fire parts and to the secondary afterburner chamber.

3. Design and install a sensing, recording and air supply control and burner control system utilizing carbon monoxide and temperature as control parameters for the primary and secondary operation.

4. Design and install an appropriate baffling system in the secondary chambers to knockdown flue gas particulates and improve the combustion of fly ash particulates.

5. Consider down sizing the units to a maximum process weight loading of 500 lbs/hour and additionally consider not operating more than one incinerator at a time. This restriction would potentially increase the allowable emission rate from 0.03 to 0.10 gr./dscf.

6. Provide design improvements to the mechanical ram feed mechanism such that the feed mechanism can not be operated unless the secondary temperature is at least 1800°F, that the original air-lock system integrity is functional, and that charge mechanism is unable to be operated at a frequency greater than once every one-half hour (possibly once every hour).

7. Provide control design improvements such that at least one of the two afterburner burners may continue to be operated in the event of failure of one unit so as to maintain the secondary combustion chamber temperature until the wastes are completely combusted from the primary chamber.

8. Evaluate and consider changing the burners from #2 Diesel fuel to LPG or natural gas although the potential fuel contributed particulate emission rate would only be reduced from 0.003 gr./dscf. (10% of allowable) to 0.0015 (5% of allowable).

The tests and report have been conducted, compiled and prepared under my direction, supervision, and control.

H.J. Bauch, P.E.
Executive Director
April 28, 1992

FIGURE #1

COMPLIANCE TEST DATA SUMMARY

	INCINERATOR 1				INCINERATOR 2				INCINERATOR 3			
	RUN 1	RUN 2	RUN 3	AVE	RUN 1	RUN 2	RUN 3	AVE	RUN 1	RUN 2	RUN 3	AVE
Total Mass burned in lbs/hr -	1570	1600	1600	1590.0	1000	980	1000	993.3	600	630	680	636.7
Average Primary Temperature in °F -	1892.5	1611.2	1856.4	1786.7	1853.2	1808.1	1743.0	1802.1	1656.8	1604.3	1624.8	1628.6
Average Secondary Temperature in °F -	1795.8	1528.4	1603.2	1642.5	1660.5	1520.5	1435.0	1538.7	1883.1	1856.4	1872.7	1870.7
Average Stack Temperature in °F -	1587.4	1333.5	1327.0	1416.0	1460.6	1358.3	1310.9	1376.6	1600.7	1649.9	1677.9	1642.8
Average Visible Emissions in % opacity -	9.79	2.50	4.79	5.69	5.63	3.33	1.87	3.61	2.29	2.92	1.88	2.36
Objectionable odor detected -	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Carbon Monoxide (CO) Emissions Standard in PPM -	65.0	60.0	7.0	43.7	31.0	109.0	44.0	61.1	25.0	21.0	6.0	17.6
Particulate Matter Emissions Standard in gr./dscf. -	0.347	0.214	0.163	0.241	0.659	0.511	1.015	0.728	0.552	0.429	0.412	0.465
Hydrochloric Acid (HCL) Emissions Standard in pounds/hour -	0.37	0.06	1.00	0.475	0.36	0.04	0.16	0.181	0.10	0.14	0.09	0.110
Secondary Residence Time Standard in seconds -	1.10	1.23	1.23	1.19	1.20	1.19	1.31	1.23	1.23	1.21	1.20	1.22

FIGURE #2

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
COMPLIANCE SUMMARY

	INCINERATOR 1				INCINERATOR 2				INCINERATOR 3			
	RUN 1	RUN 2	RUN 3	AVE	RUN 1	RUN 2	RUN 3	AVE	RUN 1	RUN 2	RUN 3	AVE
5% Opacity Visible Emission Standard - FDER 17-2.600(1)(a)1.	F	P	P	F	F	P	P	F	P	P	P	P
No Odor Standard - FDER 17-2.600(1)(a)2.	P	P	P	P	P	P	P	P	P	P	P	P
One Second Secondary Residence Time Standard - FDER 17-2.600(1)(d)4.a.	P	P	P	P	P	P	P	P	P	P	P	P
1800°F Secondary Temperature Standard - FDER 17-2.600(1)(d)4.a.	F	P	F	F	F	F	F	F	P	P	P	P
Carbon Monoxide (CO) Emissions Standard in PPM - FDER 17-2.600(1)(d)4.c.	P	P	P	P	P	F	P	P	P	P	P	P
Particulate Matter Emissions Standard in gr./dscf - FDER 17-2.600(1)(d)	F	F	F	F	F	F	F	F	F	F	F	F
Hydrochloric Acid (HCL) Emissions Standard in pounds/hour - FDER 17-2.600(1)(d)	P	P	P	P	P	P	P	P	P	P	P	P

NOTE: P means Passes standards
F means Fails standards.

BACKGROUND INFORMATION

An incinerator testing program was conducted on April 6, 7, and 8, 1992 on three (3) existing Environmental Control Products, Inc. (now a division of Joy Industries) Model T-2000 incinerators, rated at 1600 pounds per hour, #2D oil fired, type 0 and type IV pathological wastes operating as a semi-automatic ram fed animal and animal waste crematorium facility as shown in FIGURE #3.

The facility is located at the Harry S. Truman Animal Import Center near the northern end of Fleming Key and is operated by the Animal and Plant Health Inspection Services, U.S. Department of Agriculture, P.O. Box 4120, Key West, Florida, 33040.

An application to operate the facility, originally constructed in 1980, was submitted to FDER on August 19, 1982 as shown in FIGURE #4. The current FDER five year Operation Permit Number A044-155861 was issued on October 18, 1988 as shown in FIGURE #5. The facility was operating in accordance with the conditions of the subject permit.

In September 1990, FDER adopted new emission limiting and performance standards identified as DER 17-2.600 (1), to be complied with by July 1, 1992. These requirements are as shown in FIGURE #6.

The testing program was conducted as performance tests of the incinerators, to examine the performance requirements of each incinerator, based upon DER's new standards for incinerators having capacity of greater than 500 pounds per hour, but less than 2000 pounds per hour. In particular, the tests were conducted to evaluate the following parameters:

1. Opacity;
2. Particulate matter emissions in grains per dry standard cubic foot of flue gas, corrected to seven percent (7%) oxygen;
3. Hydrochloric acid (HCL) in pounds per hour;
4. Residence time in the secondary afterburner chamber in seconds;
5. The temperature in the secondary afterburner in degrees Fahrenheit;
6. Carbon Monoxide (CO) emissions, in parts per million, by volume, on a dry basis corrected to seven percent (7%) oxygen;
7. The outside skin temperature of the secondary afterburner chamber shell as an average of four thermocouples.

The tests were conducted at the approximate total process weights of 1600 pounds per hour, 1000 pounds per hour, and 600 pounds per hour with ratio of 80% bedding/20% tissue; 50% bedding/50% tissue; and 20% bedding/80% tissue conducted at each process weight rate. The bedding material was composed of coastal hay bales weighing approximately 50 pounds each. The tissue was composed of chicken parts in cardboard boxes weighing approximately 40 pounds each.

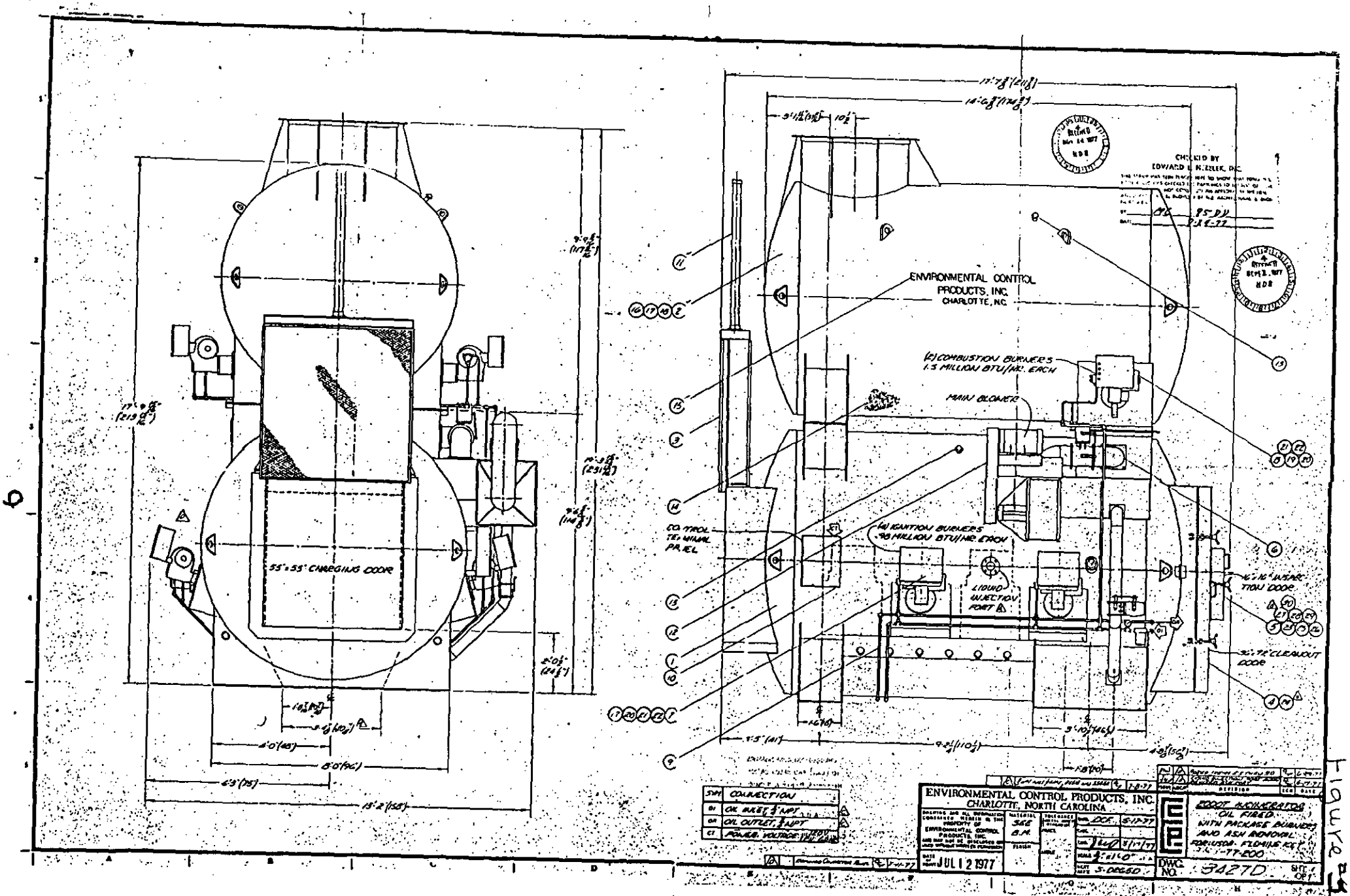

ENVIRONMENTAL CONTROL PRODUCTS, INC.
CHARLOTTE, NC.
(2) COMBUSTION BURNERS 1.5 MILLION BTU/HR. EACH
MAIN BLOWER
(4) IGNITION BURNERS .98 MILLION BTU/HR. EACH
LIQUID INJECTION PORT
55"x55" CHARGING DOOR
CONTROL PANEL
CHECKED BY EDWARD L. KESLER, P.E.
ENVIRONMENTAL CONTROL PRODUCTS, INC.
CHARLOTTE, NORTH CAROLINA
JUL 12 1977
DWG. NO. 3427D
ROOT INCINERATOR OIL FIRED WITH PACKAGE BURNERS AND ASH REMOVAL FOR USDB - FLORIDA KEYS -77-200

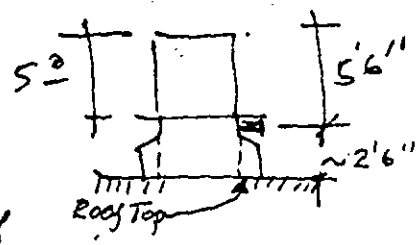
Figure 24

FIELD MEASUREMENTS

Figure #3.a

INCINERATORS(3), KEY WEST

23 MARCH 92



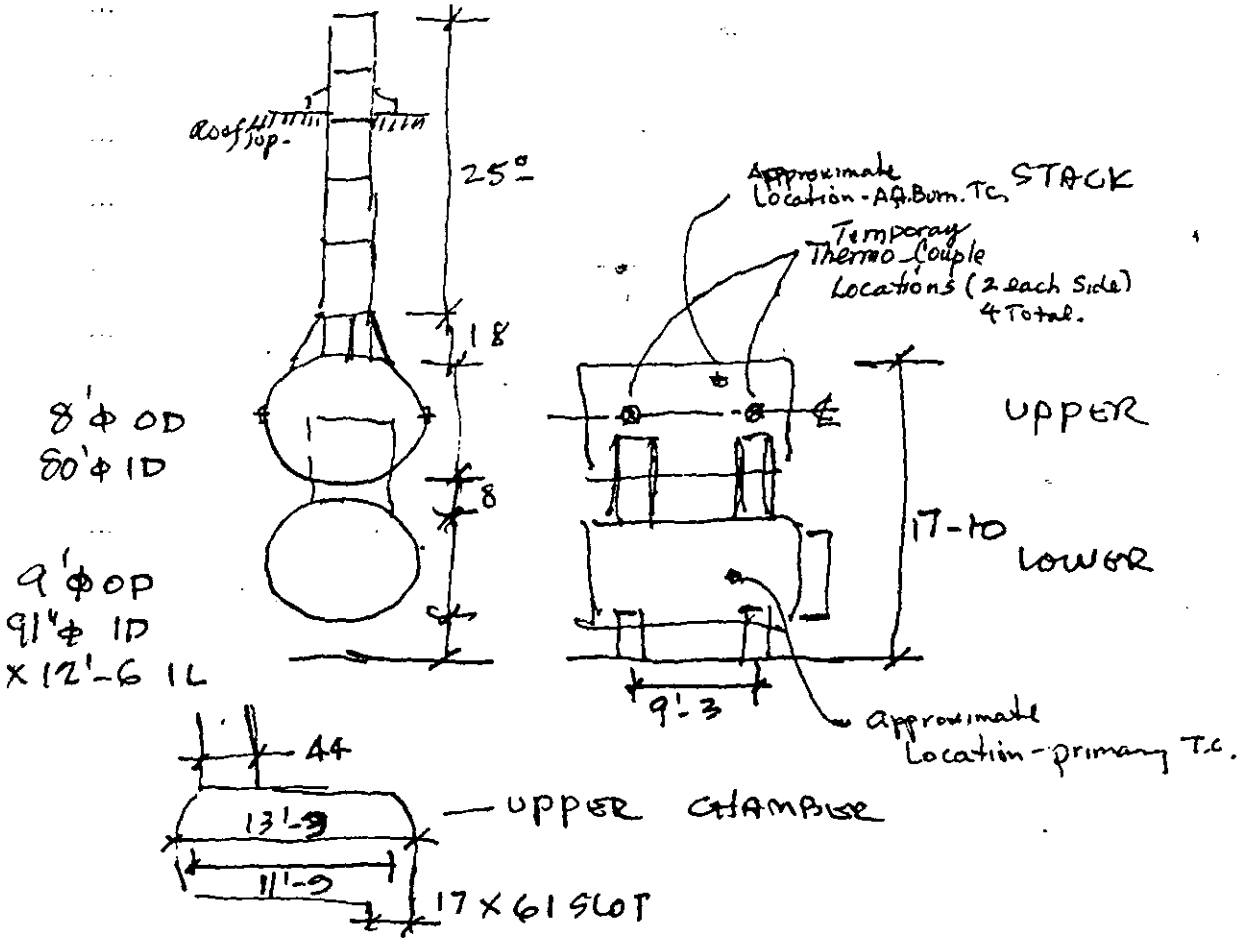


Figure #1b.

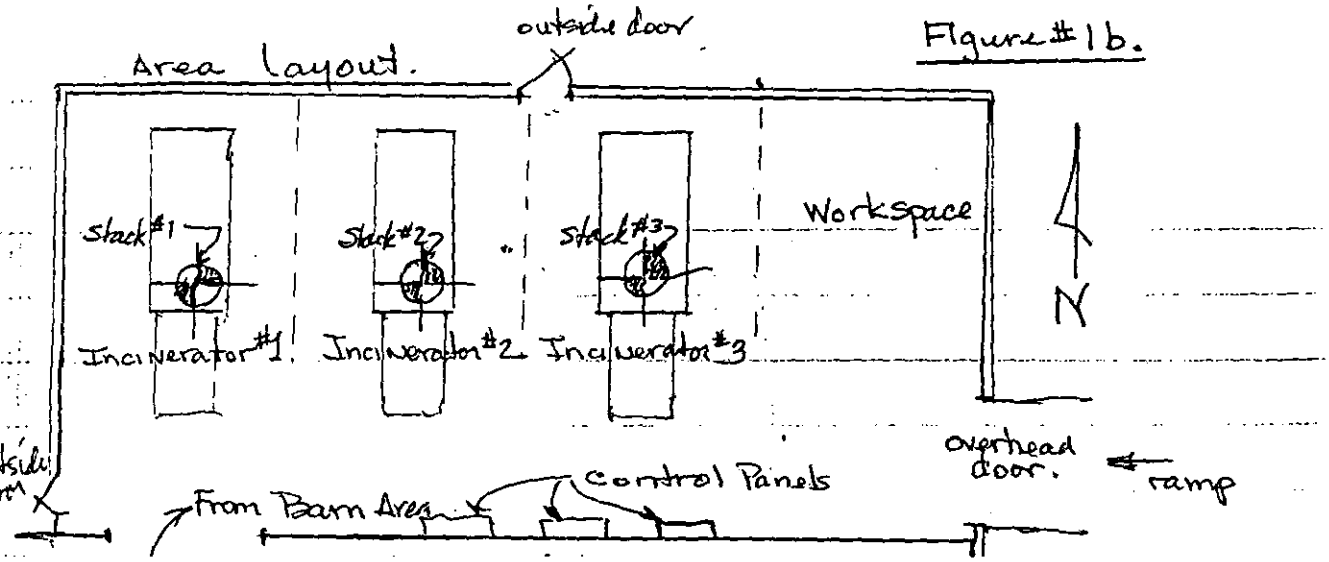


FIGURE* 4.

AUG 19 1982

D. E. R. SO. FLA. DISTRICT

AO-44-59280
10-7-82
PERMIT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

8799
8800
8801

SOURCE TYPE: Incinerator [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [ ] Modification

COMPANY NAME: Harry S Truman Animal Import Center COUNTY: Monroe

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking L No. 2, Gas Fired) three 1600 lb/hr oil fired pathological incinerators.

SOURCE LOCATION: Street Fleming Key City Key West,

UTM: East _____ North _____

Latitude 240 ° 35 ' 22 "N Longitude 81 ° 47 ' 43 "W

APPLICANT NAME AND TITLE: Animal and Plant Health Inspection Service, USDA

APPLICANT ADDRESS: 6505 Belcrest Road, Room 267, Hyattsville, MD 20782

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Animal and Plant Health Inspection Service

I certify that the statements made in this application for a operation permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate th pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 40 Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of th permitted establishment.

*Attach letter of authorization

Signed: Frank Kotulak

Frank Kotulak, Head, Energy & Environmental
Name and Title (Please Type)

Date: 7/27/82 Telephone No. (301) 436-8958

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found t be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in th permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when prop erly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and th rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the appli cant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollutio sources.

(Affix Seal)

FRANK M. KOTULAK No. 23548 Massachusetts

Signed: Frank M. Kotulak

Frank M. Kotulak
Name (Please Type)

USDA, APHIS, ASD
Company Name (Please Type)

6505 Belcrest Road, Hyattsville, MD 2078
Mailing Address (Please Type)

Florida Registration No. 23548 Date: 7/26/82 Telephone No. (301) 436-8958

[1] See Section 17-2.02(15) and (22), Florida Administrative Code, (F.

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Construction and operation of three 1600 lb/hr Environmental Control Products Model 2000 T oil fired pathological incinerators to burn animal wastes, bedding and carcasses.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction N.A. Completion of Construction N.A.

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

$842,000 (estimated)

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

Construction permit No. AC44-2648 issued February 20, 1979.

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? ____ Yes X No

F. Normal equipment operating time: hrs/day 8 ; days/wk 5 ; wks/yr 36 ; if power plant, hrs/yr ____.

If seasonal, describe: ____

G. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied? ____
   b. If yes, has "Lowest Achievable Emission Rate" been applied? ____
   c. If yes, list non-attainment pollutants. ____
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. No
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirements apply to this source? If yes, see Sections VI and VII. No
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

Other Fuel Contaminants (which may cause air pollution): _____

F. If applicable, indicate the percent of fuel used for space heating. Annual Average _____ Maximum _____

G Indicate liquid or solid wastes generated and method of disposal.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: _____ ft. Stack Diameter: _____ ft.

Gas Flow Rate: _____ ACFM Gas Exit Temperature: _____ °F.

Water Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated					1600 per unit		

Description of Waste Animal carcasses, animal waste and bedding

Total Weight Incinerated (lbs/hr) 1000 Design Capacity (lbs/hr) 1600 (per unit)

Approximate Number of Hours of Operation per day 8 days/week 5

Manufacturer Environmental Control Products, Inc.

Date Constructed January 1980 Model No. 2000 T

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber	625	2.08 M	oil	3.92 M	1600
Secondary Chamber	477	-	oil	3.00 M	1800

Stack Height: 37 ft. Stack Diameter 42 in Stack Temp. 1550

Gas Flow Rate: 13,000 ACFM 7120 DSCFM* Velocity NA FP

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% e cess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [X] Afterburner [ ] Other (specify) _____

Brief description of operating characteristics of control devices: Two secondary burners are controlled to maintain proper temperature in secondary chamber and to consume partially oxidized gases and particles from the primary chamber and rotary dryer.

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):
Sterile ash will be disposed of in a nearby landfill.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight – show derivation.
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.,) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.).
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

FIGURE #5

Florida Department of Environmental Regulation

South District • 2269 Bay Street • Fort Myers, Florida 33901-2896 • 813-332-266

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary
Philip Edwards, Deputy Assistant Secretary

PERMITTEE: United States Department of Agriculture
Animal & Plant Health Inspection Service
6505 Belcrest Road, Room 202
Hyattsville, Maryland 20782

I.D. Number: 52FTM440038(01)(02)(03)
Permit/Certification Number: A044-155861
Date of Issue: October 18, 1988
Expiration Date: October 18, 1993
County: Monroe
Latitude/Longitude:
24° 35' 22"
81° 47' 43"
Project: Harry S. Truman Animal Import Center

This permit is issued under the provisions of Chapter(s) 403.087, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

Operation of three oil-fired pathological incinerators, capacity 1600 lbs/hr each, with emissions controlled by afterburners.

Facility located on Fleming Key, Key West.

PERMITTEE: United States Department of Agriculture

I.D. Number: 52FTM440038(01)(02)(03)
Permit/Certification Number: AO44-155861
Date of Issue: October 18, 1988
Expiration Date: October 18, 1993

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Section 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

GENERAL CONDITIONS:

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

GENERAL CONDITIONS:

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD)
( ) Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)
( ) Compliance with New Source Performance Standards

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon Request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

___ the date, exact place, and time of sampling or measurements;
___ the person responsible for performing the sampling or measurements;
___ the date(s) analyses were performed;
___ the person responsible for performing the analyses;
___ the analytical techniques or methods used; and
___ the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

PERMITTEE: United States Department of Agriculture

I.D. Number: 52FTM440038(01)(02)(03)
Permit/Certification Number: AO44-155861
Date of Issue: October 18, 1988
Expiration Date: October 18, 1993

SPECIFIC CONDITIONS:

1. For each incinerator, visible emissions tests for a duration of at least one hour are required to show continuing compliance with the standards of the Department. The test results must provide reasonable assurance that the unit is capable of compliance at the permitted maximum operating rate. Test shall be conducted in accordance with EPA Method Nine as published in 40 CFR-60, Appendix A, or State approved equivalent method. Such tests shall be conducted once per year commencing before August 31, 1989. Results shall be submitted to the Department within 45 days after testing. The Department shall be notified at least 15 days prior to testing to allow witnessing.

2. Visible emissions shall not exceed 5% opacity under normal operation except for up to 3 minutes in any one hour at not more than 20% opacity.

3. All fugitive dust generated at this site shall be adequately controlled.

4. This facility shall be operated in such a fashion so as to preclude objectionable odors.

5. These incinerators shall not be used for the disposal of radioactive materials.

6. Each incinerator shall be used only for the combustion of Type 0 through IV waste, and shall not be loaded in excess of its capacity of 1600 pounds per hour.

7. An annual operation report (DER Form 17-1.202(6) attached) shall be submitted by March 1st each year. The attached form shall be reproduced by the permittee and used for future annual submittals.

8. There shall be no discharges of liquid effluents or contaminated runoff from the plant site.

9. Notification and reporting requirements of this permit shall also be sent to the DER, Marathon at 11400 Overseas Highway, Suites 219-224, Marathon, Florida 33050.

Issued this 18th day of October, 1988

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Philip R. Edwards
Deputy Assistant Secretary

PRE/PRC/jsw

4 Pages Attached

FIGURE #6

PART VI: EMISSION LIMITING AND PERFORMANCE STANDARDS

17-2.600 Specific Emission Limiting and Performance Standards. No person shall cause, let, permit, suffer or allow to be discharged into the atmosphere emissions from the following sources greater than the emission limiting standards specified below. Where work practice standards, including requirements for specific types of pollution control equipment, are provided for in this section, such standards shall be of the same force and effect as emission limiting standards. New source or facility emission limiting or performance standards shall be the federal "new source performance standards" adopted by reference in Rule 17-2.660, F.A.C., unless a different and more stringent standard is required by this Section.

(1) Incinerators.

(a) Any incinerator with a charging rate of less than 50 tons per day.

[1]1. No visible emission (5 percent opacity) except that 20 percent opacity is allowed for not more than three minutes in any one hour.

2. No objectionable odor allowed.

(b) Existing incinerators, other than those which are operated or utilized for the disposal or treatment of biological waste, with a charging rate equal to or greater than 50 tons per day.

1. Particulate matter - 0.1 grains per standard cubic foot dry gas corrected to 50 percent excess air.

2. No objectionable odor allowed.

(c) New incinerators, other than those which are operated or utilized for the disposal or treatment of biological waste, with a charging rate equal to or greater than 50 tons per day.

1. Particulate matter - .08 grains per standard cubic foot dry gas corrected to 50 percent excess air.

2. No objectionable odor allowed.

(d) Biological Waste Incineration Facilities. The following requirements apply to all new, modified, and existing biological waste incineration facilities. Any new facility or modification for which a complete application for a permit to construct is received by the Department after the effective date of this rule shall comply with these requirements before operation may commence. All other facilities shall comply with these requirements by July 1, 1992.

1. Facilities with a capacity equal to or less than 500 pounds per hour.

a. Particulate matter emissions shall not exceed 0.100 grains per dry standard cubic foot of flue gas, corrected to 7% O_2.

b. Hydrochloric acid (HCl) emissions shall not exceed 4 pounds per hour.

2. Facilities with a capacity greater than 500 pounds per hour, but less than or equal to 2,000 pounds per hour.

a. Particulate matter emissions shall not exceed 0.030 grains per dry standard cubic foot of flue gas, corrected to 7% O_2.

b. Hydrochloric acid (HCl) emissions shall not exceed 4 pounds per hour; or shall be reduced by 90% by weight on an hourly average basis.

3. Facilities with a capacity greater than 2000 pounds per hour.

a. Particulate matter emissions shall not exceed 0.020 grains per dry standard cubic foot of flue gas, corrected to 7% O_2.

b. Hydrochloric acid (HCl) emissions shall not exceed 50 parts per million by volume, dry basis, corrected to 7% O_2 on a three hour average basis; or shall be reduced by 90% by weight on an hourly average basis.

4. All facilities unless otherwise noted are subject to the following design, operating, monitoring and operator training requirements.

a. The incinerator(s) shall be designed to provide for a residence time of at least one second in the secondary (or last) combustion chamber only, at no less than 1800°F for the combustion gases. Primary chamber and stack shall not be utilized in calculating this residence time.

b. Mechanically fed facilities shall incorporate an air lock system to prevent opening the incinerator to the room environment. The volume of the loading system shall be designed to prevent overcharging thereby assuring complete combustion of the waste.

c. Carbon monoxide (CO) emissions shall not exceed 100 parts per million by volume, dry basis, corrected to 7% O_2 on an hourly average basis.

d. Incineration or ignition of waste shall not begin until the secondary (or last) combustion chamber temperature requirement is attained. All air pollution control and continuous emission monitoring equipment shall be operational and functioning properly prior to the incineration or ignition of waste and until all the wastes are incinerated. During shutdowns, the secondary (or last) combustion chamber temperature requirement shall be maintained using auxiliary burners until the wastes are completely combusted.

e. Radioactive waste may not be burned in an incinerator subject to this rule unless the incinerator has been issued a permit or the waste is of such quantity to be exempt in accordance with Department of Health and Rehabilitative Services (HRS) Rule 10D-91 or 10D-104.003, F.A.C.

f. Hazardous waste may not be burned in an incinerator subject to this rule unless the incinerator has been issued a permit or the waste is of such quantity to be exempt in accordance with Department Rule 17-30, F.A.C.

g. All biological waste incinerator operators shall be trained by the equipment manufacturer's representatives or another qualified organization as to proper operating practices and procedures. The content of the training program shall be submitted to the Department for approval. The applicant shall submit a copy of a certificate verifying the satisfactory completion of a Department approved training program prior to issuance or renewal of the operating permit. The owner shall not allow the incinerator to be operated unless it is operated by an operator who has satisfactorily completed the required training program.

PROCESS WEIGHT LOADING

The process weight loadings for the various tests were composed of various quantities of 50 pound bales of coastal hay bedding material and 40 pound boxes of chicken parts and tissue all as shown in the summary and worksheets provided in FIGURE #7. Note, also, that the #2D oil use rate is approximately 25 gph (177 lbs/hr) to the secondary burners and up to 25 gph (177 lbs/hr) to the primary burners.

FIGURE #7

PROCESS WEIGHT LOADING SUMMARY

INC. #	RUN #	LBS BEDDING	LBS TISSUE	LBS TOTAL
1	1	1250	320	1570
1	2	800	800	1600
1	3	400	1200	1600
1	AVE.			1590 #/HR
2	1	800	200	1000
2	2	500	480	980
2	3	200	800	1000
2	AVE.			993.3 #/HR
3	1	500	100	600
3	2	350	280	630
3	3	200	480	680
3	AVE.			636.7 #/HR

The materials incinerated may be expected to have typical characteristics as follows:

Materials	Coastal Hay Bedding Material	Chicken Parts Tissue
Classification of wastes	Trash, type 0	Pathological, type IV
Principal Components	Highly combustible trash	Animal solids
Approximate Composition	100% trash	100% tissue
Moisture Content	10%	85%
Incombustible Solids	5%	5%
Kcal/kg of refuse as fired	4700	550
Kcal of auxiliary fuel necessary	0	800
Recommended minimum Kcal/hr burner input per pound of waste	0	4500 (2800 primary & 1700 secondary)

UNIT Nº 1

INCINERATOR TEST — 4 APR 91

CHARGES.

TEST Nº 1:

25 BALES + 8 BOXES	1 PRECHARGE
5 BALES + 1.5 BOXES EACH CHARGE	4 CHARGES
5 BALES + 2 BOXES LAST CHARGE	1 CHARGE

TIME / CHARGE: 12 MINUTES

TEST Nº 2:

16 BALES + 20 BOXES	
3 BALES + 4 BOXES EACH CHARGE	5 CHARGES

TIME / CHARGE: 12 MINUTES

TEST Nº 3

8 BALES + 30 BOXES	
1.5 BALES + 6 BOXES EACH CHARGE	4 CHARGES
2 BALES + 6 BOXES LAST CHARGE	1 CHARGE

TIME / CHARGE: 12 MINUTES

TEST ~~SEQUENCE~~ =

UNIT Nº 1

UNIT Nº 2

UNIT Nº 3

UNIT Nº 2 INCINERATOR TEST TAPE 52

CHARGES

TEST Nº 1:	4 BALES + 2 BOXES	1 CHARGE
	4 BALES + 1 BOX	3 CHARGES
	TIME/CHARGE: 15 MINUTES	1000 LBS
TEST Nº 2:	4 BALES + 4 BOXES	1 CHARGE
	3 BALES + 4 BOXES	2 CHARGES
	TIME/CHARGE: 20 MINUTES	980 LBS
TEST Nº 3:	1 BALE + 5 BOXES	4 CHARGES
	TIME/CHARGE: 15 MINUTES	1000 LBS

UNIT Nº 3 INCINERATOR TEST 7 APR 97

CHARGES

TEST Nº 1:

2 BALES + 0.5 BOX — 5 CHARGES

TIME / CHARGE: 12 MINUTES 600 LBS

TEST NO. 2:

2 BALES + 2 BOXES 2 CHARGES

2 BALES + 3 BOXES 1 CHARGE

TIME / CHARGE: 20 MINUTES 630 LBS

TEST NO. 3:

1 BALE + 3 BOXES 4 CHARGES

TIME / CHARGE: 15 MINUTES 680 LBS

PRIMARY AND SECONDARY TEMPERATURE

The primary and secondary temperatures for the various tests were derived from multiple manual readings of the installed type R thermocouple indicators located in the control panels. The summary and recorded data is provided in FIGURE #8. Note that the design temperatures were given as 1600°F for the primary and 1800°F for the secondary.

FIGURE #8

PRIMARY AND SECONDARY TEMPERATURE SUMMARY

PRIMARY TEMPERATURE IN °F

INC. #	RUN #	MINIMUM	MAXIMUM	AVERAGE
1	1	1750	2100	1892.5
1	2	1200	1840	1611.2
1	3	1710	1950	1856.4
2	1	1780	2000	1853.2
2	2	1680	1950	1808.1
2	3	1600	1810	1745.0
3	1	1460	1800	1656.8
3	2	1400	1800	1604.3
3	3	1420	1740	1624.8

AFTERBURNER TEMPERATURE IN °F

INC. #	RUN #	MINIMUM	MAXIMUM	AVERAGE
1	1	1540	1970	1795.8
1	2	1250	1840	1528.4
1	3	1490	1760	1603.2
2	1	1480	1950	1660.5
2	2	1330	1810	1520.5
2	3	1260	1600	1435.0
3	1	1720	1890	1883.1
3	2	1740	1920	1856.4
3	3	1740	1940	1872.7

KEY WEST INCINERATOR TEST DATA

DATE 6 APR 1992 UNIT NO. 1 SHT 1 OF 3

START TIME 2:09 PM FINISH TIME 3:54 PM

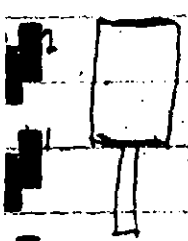
CHARGE NO	RDG NO	TIME	THERMOCOUPLE TEMP. °F LOWER	THERMOCOUPLE TEMP. °F UPPER	BURNERS o/x L1	L2	L3	L4	U1	U
TEST P1	1	2:19	1900	1550	o	o	o	o	o	o
P1	2	2:20	1900	1500	o	o	o	o	o	o
P1	3	2:30	1850	1400	x	x	x	x	o	o
P1	4	2:35	1830	1400	x	x	x	x	o	o
P2	5	2:36	1830	1400	x	x	x	x	o	o
P2	6	2:38	1850	1600	o	o	o	o	o	o
P2	7	2:40	1850	1600	o	o	o	o	o	o
P2	8	2:43	1850	1600	o	o	o	o	o	o
P2	9	2:46	1850	1550	x	x	x	x	o	o
P2	10	2:49	1850	1490	x	x	x	x	o	o
C1	11	2:51	1850	1560	x	x	x	x	o	o
C1	12	2:54	1790	1850	o	o	o	o	o	o
C1	13	2:57	1860	1750	x	x	x	x	o	o
C1	14	3:00	1850	1550	x	x	x	x	o	o
C1	15	3:03	1850	1550	x	x	x	x	o	o
C2	16	3:04	1840	1860	o	o	o	o	o	o
C2	17	3:07	1750	1950	o	o	o	o	o	o
C2	18	3:10	1820	1970	o	o	o	o	o	o
C2	19	3:13	1840	1950	o	o	o	o	o	o
C2	20	3:15	1850	1810	x	x	x	x	o	o
C3	21	3:16	1840	1960	x	x	x	x	o	o
C3	22	3:19	1940	1780	x	x	x	x	o	o

KEY WEST INCINERATOR TEST DATA

DATE 6 APR 1992 UNIT Nº 1 SHT 2 OF 3

START TIME 2:09 PM FINISH TIME 4:00 PM

	CHARGE Nº	RDG Nº	TIME	THERMOCOUPLE TEMP. °F LOWER	UPPER	BURNERS o/x L1	L2	L3	L4	U1	U2
TEST	C3	23	3:22	2000	1650	X	X	X	X	O	O
1	C3	24	3:25	1960	1590	X	X	X	X	O	
	C3	25	3:27	1940	1540	X	X	X	X	O	O
	C4	26	3:28	1850	1850	X	X	X	X	O	O
	C4	27	3:30	1780	1940	O	O	O	O	O	O
	C4	28	3:33	1790	1970	O	O	O	O	O	O
	C4	29	3:37	1860	1950	O	O	O	O	O	O
	C4	30	3:40	1900	1710	X	X	X	X	O	O
	C5	31	3:41	1960	1960	X	X	X	X	O	O
	C5	32	3:44	1940	1900	X	X	X	X	O	O
	C5	33	3:47	2060	1760	X	X	X	X	O	O
	C5	34	3:50	2100	1740	X	X	X	X	O	O
3:54 → END	C5	35	3:55	2100	1300	X	X	X	X	O	O
TEST	C5	36	4:00	2040	1140	X	X	X	X	O	O
Nº1	C5	37	4:10	1860	1120	O	O	O	O	O	O



KEY WEST INCINERATOR TEST DATA

DATE 6 APR 1992 UNIT Nº 1 SHT 3 OF 3

START TIME 5:40 PM FINISH TIME 6:09*

CHARGE Nº	RDG Nº	TIME	THERMOCOUPLE TEMP. °F LOWER	THERMOCOUPLE TEMP. °F UPPER	BURNERS o/x L1	L2	L3	L4	U1	U2
C1	1	540	1750	1300	x	x	x	x	o	o
C1	2	541	1650	1450	x	x	x	x	o	o
C1	3	542	1740	1500	o	o	o	o	o	o
C1	4	543	1830	1500	o	o	o	o	o	o
C1	5	545	1850	1570	o	o	o	o	o	o
C1	6	549	1550	1450	o	o	o	o	o	
C2	7	552	1850	1400	x	x	x	x	o	o
C2	8	553	1780	1560	o	o	o	o	o	o
C2	9	556	1900	1710	o	o	o	o	o	o
C2	10	600	2100	1340	o	o	o	o	o	o
C2	11	603	2400	1350	o	o	o	o	o	o
C3	12	604	2100	1300	o	o	o	o	o	x
	13	607	2100	1250	o	o	o	o	o	x
* STOP TEST	14	609	TEST ABORTED							

KEY WEST INCINERATOR TEST DATA

DATE 8 APR 1992 UNIT NO. 1 SHT 1 OF ..

START TIME 11:55 A.M FINISH TIME

CHARGE NO	RDG NO	TIME	THERMOCOUPLE TEMP °F LOWER	THERMOCOUPLE TEMP °F UPPER	BURNERS L1	L2	L3	L4	U1
TEST 2 PC	1	1150	550	900	O	O	O	O	O
PC	2	1154	1300	1250	O	O	O	O	O
BEGIN → C1	3	1155	1200	1250	X	X	X	X	O
C1	4	1156	1250	1250	O	O	O	O	O
C1	5	1158	1300	1460	O	O	O	O	O
C1	6	1200	1450	1450	O	O	O	O	O
C1	7	1205	1550	1310	O	O	O	O	O
C1	8	1206	1540	1400	O	O	O	O	O
* C2	9	1207	1550	1340	X	X	X	X	O
C2	10	1208	1520	1380	X	X	X	X	O
C2	11	1210	1560	1500	O	O	O	O	O
C2	12	1215	1640	1440	O	O	O	O	O
C2	13	1218	1640	1440	O	O	O	O	O
C3	14	1219	1510	1400	O	O	O	O	O
C3	15	1220	1540	1620	O	O	O	O	O
C3	16	1225	1650	1610	O	O	O	O	O
C3	17	1230	1750	1610	O	O	O	O	O
* C4	18	1231	1710	1490	X	X	X	X	O
C4	19	1232	1690	1490	X	X	X	X	O
C4	20	1235	1710	1710	O	O	O	O	O
C4	21	1240	1790	1700	O	O	O	O	O

O = ON X = OFF

KEY WEST INCINERATOR TEST DATA

DATE 8 APR 92 UNIT NO. 1 SHT 2 OF _

START TIME 11:55 AM FINISH TIME ______

CHARGE NO	RDG NO	TIME	THERMOCOUPLE TEMP °F LOWER	THERMOCOUPLE TEMP °F UPPER	BURNERS L1	L2	L3	L4	L
TEST NO. C4	22	1242	1800	1700	O	O	O	O	O
* C5	23	1243	1780	1590	X	X	X	X	O
	24	1244	1740	1620	X	X	X	X	O
	25	1250	1510	1840	O	O	O	O	O
	26	1256	1810	1800	O	O	O	O	O
	26	1258	[illegible]	1900	O	O	O	O	O
END TEST →	27			1790	O	O	O	O	O
	28	100	1890						

Windows open 3 minutes

O = ON X = OFF

KEY WEST INCINERATOR TEST RUN

DATE 8 APR 92 UNIT NO. 1 SHT 3 OF 4

START TIME 2:40 PM FINISH TIME 3:50 PM

CHARGE NO	RDG NO	TIME	THERMOCOUPLE TEMP °F LOWER	THERMOCOUPLE TEMP °F UPPER	BURNERS L1	L2	L3	L4	U1
TEST NO 3 PC	1	2:30	1640	1560	O	O	O	O	O
PC	2	235	1840	1500	O	O	O	O	O
PC	3	239	1810	1450	X	X	X	X	O
* BEGIN TEST C1 →	4	240	1740	1650	O	O	O	O	O
C1	5	241	1800	1740	O	O	O	O	O
C1	6	245	1870	1600	O	O	O	O	O
C1	7	251	1860	1540	O	O	O	O	O
* C2	8	255	1760	1490	O	O	O	O	O
C2	9	253	1760	1760	O	O	O	O	O
C2	10	258	1900	1600	O	O	O	O	O
C2	11	303	1890	1610	O	O	O	O	O
* C3	12	309	1850	1550	X	X	X	X	O
C3	13	312	1810	1560	X	X	X	X	O
C3	14	316	1900	1660	X	X	X	X	O
C3	15	319	1900	1650	O	O	O	O	O
C4	16	316	1810	1610	X	X	X	X	O
C4	17	317	1710	1500	O	O	O	O	O
C4	18	320	1900	1560	O	O	O	O	O
C4	19	325	1900	1650	X	X	X	X	O
C4	20	327	1890	1550	X	X	X	X	O
* C5	21	328	1900	1580	X	X	X	X	O
* C5	22	329	1860	1600	X	X	X	X	O

PROGRAMED OUTAGE

O = ON X = OFF

KEY WEST INCINERATOR TEST DATA

DATE 8 APR 92 UNIT NO. 1 SHT 4 OF 4

START TIME 240 PM FINISH TIME 350 PM

CHARGE NO	RDG NO	TIME	THERMOCOUPLE TEMP °F LOWER	THERMOCOUPLE TEMP °F UPPER	BURNERS L1	L2	L3	L4	U1
*C5	23	330	1820	1550	X	X	X	X	O
C5	24	337	1870	1550	O	O	O	O	O
C5	25	340	1910	1540	X	X	X	X	O
C5	26	345	1920	1600	O	O	O	O	O
C5 →	27	350	1950	1600	O	O	O	O	O
	28	355	1920	1550	O	O	O	O	O
	29	400							

END TEST 23

* 6 MINUTE CHARGE - OPENED FOR 4 MINUTES

O = ON X = OFF

KEY WEST INCINERATOR TEST DATA

DATE 7APR92 UNIT NO. 2 SHT 1 OF 5

START TIME 335/405 PM FINISH TIME 458 PM

CHARGE NO	RDG NO	TIME	THERMOCOUPLE TEMP °F LOWER	THERMOCOUPLE TEMP °F UPPER	BURNERS o/x L1	L2	L3	L4	U1	U
PRECHARGE	1	334	1650	1650	o	o	o	o	o	o
C1	2	385	1500	1500	x	x	x	x	o	o
C1	3	336	1440	1440	o	o	o	o	o	o
ABORT TEST	4	340	GUILLOTINE MALFUNCTIONING							
	5	SHUT DOWN UNIT 2 FOR REPAIRS								
RE CHARGE	6	400	1670	1600	x	x	x	x	o	o
TEST NO 1	7	404	1810	1650	o	o	o	o	o	o
BEGIN C1 →	8	405	1820	1640	x	x	x	x	o	o
C1	9	406	1780	1780	o	o	o	o	o	o
C1	10	408	1880	1950	o	o	o	o	o	o
C1	11	412	1840	1880	o	o	o	o	o	o
C1	12	415	1850	1550	o	o	o	o	o	o
C1	13	419	1780	1540	o	o	o	o	o	o
C2	14	420	1850	1700	x	x	x	x	o	o
C2	15	421	1840	1700	o	o	o	o	o	o
C2	16	422	1870	1950	o	o	o	o	o	o
C2	17	425	1850	1750	x	x	x	x	o	o
C2	18	430	1870	1560	o	o	o	o	o	o
C2	19	434	1870	1600	x	x	x	x	o	o
C3	20	435	1870	1480	x	x	x	x	o	o
C3	21	436	1800	1640	x	x	x	x	o	o
C3	22	437	1800	1990	o	o	o	o	o	o

O = ON X = OFF

KEY WEST INCINERATOR TEST DATA

DATE. 7APR92 UNIT NO. 2 SHT 1 OF 5

START TIME 335/405 PM FINISH TIME 458 PM

CHARGE NO	RDG NO	TIME	THERMOCOUPLE TEMP. °F LOWER	THERMOCOUPLE TEMP. °F UPPER	BURNERS O/ L1	L2	L3	L4	U1	L
TEST NO/ C3	23	440	1900	1650	X	X	X	X	O	E
C3	24	445	1850	1540	O	O	O	O	O	C
C3	25	449	1860	1510	X	X	X	X	O	E
C4	26	450	1850	1530	X	X	X	X	O	E
C4	27	451	1810	1480	X	X	X	X	O	E
C4	28	455	2000	1600	X	X	X	X	O	C
END TEST → C4	29	458	1990	1510	X	X	X	X	O	E
C4	30	505	1860	1400	X	X	X	X	O	E

O = ON X = OFF

KEY WEST INCINERATOR TEST DATA

DATE 7 APR 92 UNIT NO. 2 SHT 3 OF 5

START TIME 540 PM FINISH TIME 640 PM

CHARGE NO	RDG NO	TIME	THERMOCOUPLE TEMP °F LOWER	THERMOCOUPLE TEMP °F UPPER	BURNERS L1	L2	L3	L4	U1	U2
BT NO 2 PC	1	533	1800	1380	X	X	X	X	O	O
BGIN C1	2	540	1850	1570	X	X	X	X	O	O
C1	3	543	1850	1540	X	X	X	X	O	O
C1	4	545	1850	1450	X	X	X	X	O	O
C1	5	550	1680	1330	X	X	X	X	O	O
C1	6	555	1690	1380	X	X	X	X	O	O
C1	7	559	1760	1400	O	O	O	O	O	O
C2	8	600	1760	1380	X	X	X	X	O	O
C2	9	601	1660	1470	O	O	O	O	O	O
C2	10	602	1730	1810	O	O	O	O	O	O
C2	11	605	1760	1440	X	X	X	X	O	O
RAIN) C2	12	610	1700	1350	X	X	X	X	O	O
C2	13	615	1820	1500	X	X	X	X	O	O
C2	14	619	1900	1600	X	X	X	X	O	O
C3	15	620	1790	1440	X	X	X	X	O	O
* C3	16	621	1780	1500	X	X	X	X	O	O
C3	17	622	1800	1660	O	O	O	O	O	O
C3	18	625	1900	1800	X	X	X	X	O	O
C3	19	630	1860	1540	O	O	O	O	O	O
C3	20	635	1940	1650	X	X	X	X	O	O
D TOT C3	21	640	1950	1600	O	O	O	O	O	O
→ C3	22	645	1940	1530	O	O	O	O	O	O

O = ON X = OFF * GUILLOTINE NIT WORKING TOO GOOD

KEY WEST INCINERATOR TEST DATA

DATE 8 APR 92 UNIT NO. 2 SHT 4 OF 5

START TIME 9:30 AM FINISH TIME 10:33 AM

CHARGE NO		RDG NO	TIME	THERMOCOUPLE TEMP. °F LOWER	THERMOCOUPLE TEMP. °F UPPER	BURNERS O/ L1	L2	L3	L4	U1	U
TEST NO 3	PC	1	925	1660	1360	o	o	o	o	o	o
	PC	2	929	1780	1380	o	o	o	o	o	o
BEGIN TEST NO 3	* C1	3	930	1730	1300	x	x	x	x	o	o
	C1	4	931	1600	1260	o	o	o	o	o	o
	C1	5	932	1640	1600	o	o	o	o	o	o
	C1	6	935	1760	1500	o	o	o	o	o	o
	C1	7	940	1790	1440	o	o	o	o	o	o
	C1	8	944	1790	1400	o	o	o	o	o	o
WEIDOWN GUILLOTINE	C2	9	945	1790	1390	x	x	x	x	o	o
	C2	10	946	1610	1350	o	o	o	o	o	o
	C2	11	950	1700	1600	o	o	o	o	o	o
	C2	12	955	1710	1500	o	o	o	o	o	o
	C2	13	959	1790	1400	o	o	o	o	o	o
	* C3	14	1000	1760	1390	x	x	x	x	o	o
" "	C3	15	1001	1660	1360	o	o	o	o	o	o
	C3	16	1005	1800	1500	o	o	o	o	o	o
	C3	17	1010	1800	1500	o	o	o	o	o	o
	C3	18	1014	1810	1460	o	o	o	o	o	o
	* C4	19	1015	1750	1400	x	x	x	x	o	o
	C4	20	1016	1660	1380	o	o	o	o	o	o

O = ON X = OFF

KEY WEST INCINERATOR TEST DATA

DATE 8 APR 92 UNIT NO. 2 SHT 5 OF

START TIME 930 AM FINISH TIME 1033 AM

CHARGE NO	RDG NO	TIME	THERMOCOUPLE TEMP. °F LOWER	UPPER	BURNERS L1	L2	L3	L4	L
C4	21	1020	1800	1500	o	o	o	o	c
C4	22	1025	1810	1460	x	x	x	x	c
C4	23	1030	1800	1440	x	x	x	x	c
END C4 →	24	1033	1800	1440	o	o	o	o	c
TEST C4	25	1035	1800	1400	x	x	x	x	c
NO 3	26	1040	1800	1400	o	o	o	o	o

BURNERS: #1 - U_1
#2 - U_2
#3 - L_4
#4 - L_3
#5 - L_2
#6 - L_1

O = ON X = OFF

KEY WEST INCINERATOR TEST DATA

DATE 7 APR 92 UNIT Nº 2 SHT 1 OF 4

START TIME 945 AM FINISH TIME 1050 AM

CHARGE Nº	RDG Nº	TIME	THERMOCOUPLE TEMP. °F LOWER	THERMOCOUPLE TEMP. °F UPPER	BURNERS o/x L1	L2	L3	L4	U1	U2
PRECHARGE	1	943	1640	1740	o	o	o	o	o	o
BEGIN C1	2	945	1750	1750	x	x	x	x	o	o
TEST C1	3	947	1700	1760	o	o	o	o	o	o
C1	4	948	1720	1760	o	o	o	o	o	o
C1	5	952	1680	1600	o	o	o	o	o	o
C1	6	955	1680	1840	o	o	o	o	o	o
C2	7	957	1540	1720	o	o	o	o	o	o
C2	8	958	1800	1810	x	x	x	x	o	o
C2	9	1002	1750	1850	o	o	o	o	o	o
C2	10	1006	1620	1840	o	o	o	o	o	o
C3	11	1009	1540	1740	o	o	o	o	o	o
C3	12	1010	1770	1850	o	o	o	o	o	o
C3	13	1013	1820	1880	o	o	o	o	o	o
C3	14	1016	1700	1860	o	o	o	o	o	o
C3	15	1018	1660	1850	o	o	o	o	o	o
C3	16	1020	1600	1840	o	o	o	o	o	o
C4	17	1021	1480	1740	x	x	x	x	o	o
C4	18	1022	1660	1790	o	o	o	o	o	o
C4	19	1025	1760	1880	o	o	o	o	o	o
C4	20	1028	1720	1850	o	o	o	o	o	o
C4	21	1032	1600	1840	o	o	o	o	o	o
C5	22	1033	1480	1740	x	x	x	x	o	

KEY WEST INCINERATOR TEST DATA

DATE 7APR92 UNIT NO. 3 SHT 2 OF 4

START TIME 945 AM FINISH TIME

	CHARGE NO	RDG NO	TIME	THERMOCOUPLE TEMP °F LOWER	THERMOCOUPLE TEMP °F UPPER	BURNERS O/ L1	L2	L3	L4	U1	U
TEST	C5	23	1034	1660	1800	O	O	O	O	O	O
NO1	C5	24	1037	1780	1870	O	O	O	O	O	O
	C5	25	1040	1710	1890	O	O	O	O	O	O
	C5	26	1043	1590	1860	O	O	O	O	O	O
	C5	27	1045	1560	1840	O	O	O	O	O	O
	C5	28	1048	1540	1840	O	O	O	O	O	O
END → TEST	C5	29	1050	1540	1840	O	O	O	O	O	O
	C5	30	1055	1490	1810	O	O	O	O	O	O

O = ON X = OFF

KEY WEST INCINERATOR TEST DATA

DATE 7 APR 92 UNIT Nº 3 SHT 4 OF 4

START TIME 105 PM FINISH TIME

	CHARGE Nº	RDG Nº	TIME	THERMOCOUPLE TEMP °F LOWER	THERMOCOUPLE TEMP °F UPPER	BURNERS L1	L2	L3	L4	U1
SET	PRECHARGE	1	101	1470	1800	O	O	O	O	O
3 → BEGIN	C1	2	105	1590	1850	X	X	X	X	O
	C1	3	106	1540	1800	O	O	O	O	O
	C1	4	110	1620	1860	O	O	O	O	O
	C1	5	114	1590	1850	O	O	O	O	O
	C1	6	119	1570	1850	O	O	O	O	O
	C2	7	120	1540	1870	X	X	X	X	O
	C2	8	121	1420	1740	O	O	O	O	O
	C2	9	122	1470	1900	O	O	O	O	O
	C2	10	125	1650	1870	X	X	X	X	O
	C2	11	130	1700	1940	O	O	O	O	O
	C2	12	134	1640	1860	O	O	O	O	O
	C3	13	135	1610	1890	X	X	X	X	O
	C3	14	136	1480	1790	O	O	O	O	O
	C3	15	140	1690	1860	O	O	O	O	O
	C3	16	145	1720	1940	O	O	O	O	O
	C3	17	149	1740	1940	O	O	O	O	O
	C4	18	150	1700	1900	X	X	X	X	O
	C4	19	151	1600	1820	X	X	X	X	O
	C4	20	155	1740	1950	O	O	O	O	O
	C4	21	201	1600	1880	O	O	O	O	O
	C4	22	205	1640	1840	O	O	O	O	O
END →	C4	23	209	1640	1940	O	O	O	O	O

O = ON X = OFF

KEY WEST INCINERATOR TEST DATA

DATE 7APR92 UNIT Nº. 3 SHT 3 OF 4

START TIME 1125 AM FINISH TIME 1228 PM

CHARGE Nº	RDG Nº	TIME	THERMOCOUPLE TEMP. °F LOWER	THERMOCOUPLE TEMP. °F UPPER	BURNERS L1	L2	L3	L4	U1	
TEST Nº 2	1	1123	1720	1890	o	o	o	o	o	
START → C1	2	1125	1610	1850	x	x	x	x	o	
C1	3	1126	1500	1750	x	x	x	x	o	
C1	4	1127	1750	1870	o	o	o	o	o	
C1	5	1130	1800	1910	x	x	x	x	o	
C1	6	1135	1600	1860	o	o	o	o	o	
C1	7	1139	1510	1840	o	o	o	o	o	
C1	8	1142	1480	1840	o	o	o	o	o	
C1	9	1144	1470	1840	o	o	o	o	o	
C2	10	1145	1450	1820	x	x	x	x	o	
C2	11	1146	1400	1740	x	x	x	x	o	
C2	12	1147	1760	1890	o	o	o	o	o	
C2	13	1153	1760	1910	o	o	o	o	o	
C2	14	1157	1610	1890	o	o	o	o	o	
C2	15	1200	1540	1860	o	o	o	o	o	
C2	16	1205	1410	1800	x	x	x	x	o	
C3	17	1206	1600	1850	o	o	o	o	o	
C3	18	1210	1790	1840	o	o	o	o	o	
C3	19	1216	1720	1920	o	o	o	o	o	
C3	20	1220	1680	1910	o	o	o	o	o	
C3	21	1225	1640	1900	o	o	o	o	o	
END → C3	22	1228	1610	1890	o	o	o	o	o	
C3	23	1232	1570	1860	o	o	o	o	o	

SECONDARY SKIN TEMPERATURE

The secondary skin temperature for the various tests were composed of the average of four type K thermocouples taped to the outside of the horizontal centerline vertically above each of the four supports. The summary and recorded data is provided in FIGURE #9.

FIGURE #9

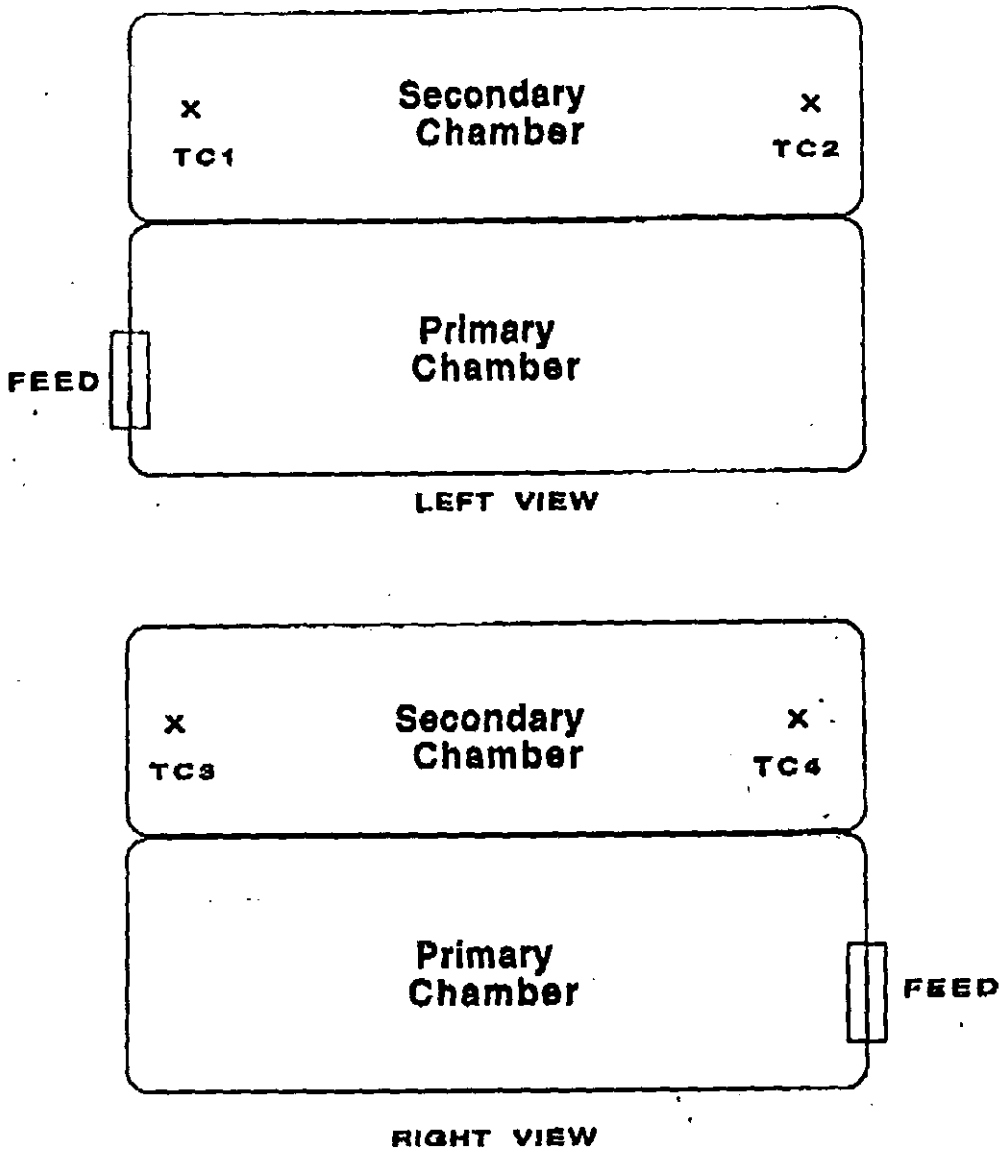
SECONDARY SKIN TEMPERATURE SUMMARY

Secondary Skin Temperature in °F

INC #	RUN #	T1	T2	T3	T4	AVERAGE
1	1	101.45	99.09	107.91	103.09	102.89
1	2	148.75	139.92	134.75	141.58	141.25
1	3	184.08	173.00	170.33	181.67	177.27
2	1	153.00	149.33	141.75	145.58	147.42
2	2	185.33	190.08	175.75	186.42	184.40
2	3	133.33	136.42	132.58	140.92	135.81
3	1	113.58	118.25	114.75	116.42	115.75
3	2	169.83	177.83	175.92	183.08	176.67
3	3	190.25	194.67	201.92	215.50	200.58

Figure #9

USDA Animal Import Center
Key West Florida
Thermocouple Locations



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Key West, FL

Skin Temperature Measurements

Incinerator 1

Run 1

Temperature (F°)

TIME	T1	T2	T3	T4
02:50	88	89	89	89
02:55				
03:00	97	95	96	98
03:05	95	93	96	98
03:10	95	94	100	96
03:15	97	103	103	100
03:24	103	100	109	106
03:29	102	106	99	104
03:34	107	101	113	110
03:39	104	98	111	105
03:44	112	104	133	116
03:49	116	107	138	112
Average	101.45	99.09	107.91	103.09

Total Average	102.89
Maximum Value	138

Run 2

Temperature (F°)

TIME	T1	T2	T3	T4
11:55	117	108	103	107
12:00	127	120	116	122
12:05	149	140	137	144
12:10	150	142	137	143
12:15	159	149	147	153
12:20	155	144	139	145
12:28	149	141	136	144
12:33	152	143	135	142
12:38	153	144	139	147
12:43	156	146	141	149
12:48	159	151	144	152
12:53	159	151	143	151
Average	148.75	139.92	134.75	141.58

Total Average	141.25
Maximum Value	159

Run 3

Temperature (F°)

TIME	T1	T2	T3	T4
02:44	193	183	169	179
02:49	181	171	164	176
02:54	181	173	169	180
02:59	180	168	170	182
03:04	178	165	172	183
03:09	181	172	166	176
03:20	180	170	168	182
03:25	188	174	173	185
03:30	187	177	174	185
03:35	183	172	169	180
03:40	186	172	173	185
03:45	191	179	177	187
Average	184.08	173.00	170.33	181.67

Total Average	177.27
Maximum Value	193

USDA Animal Import Center
Key West, FL

Skin Temperature Measurements

Incinerator 2

Run 1

Temperature (F°)

TIME	T1	T2	T3	T4
03:35	132	129	113	119
03:40	141	136	120	125
04:05	145	140	127	131
04:10	150	144	129	135
04:15	151	147	134	138
04:20	157	155	143	147
04:28	156	157	143	149
04:33	158	157	143	149
04:38	156	150	164	164
04:43	171	166	150	157
04:48	155	150	163	163
04:53	164	161	172	170
Average	153.00	149.33	141.75	145.58

Total Average	147.42
Maximum Value	172

Run 2

Temperature (F°)

TIME	T1	T2	T3	T4
05:40	147	151	137	147
05:45	171	175	161	170
05:50	181	188	171	181
05:55	184	190	175	185
06:00	208	216	200	210
06:05	189	197	180	190
06:15	189	191	180	192
06:20	199	202	188	198
06:25	189	195	186	200
06:30	188	191	175	186
06:35	191	193	179	190
06:40	188	192	177	188
Average	185.33	190.08	175.75	186.42

Total Average	184.40
Maximum Value	216

Run 3

Temperature (F°)

TIME	T1	T2	T3	T4
09:30	114	116	111	120
09:35	130	132	127	135
09:40	133	137	133	143
09:45	134	137	133	140
09:50	135	140	136	145
09:55	139	143	139	148
10:03	135	138	136	143
10:08	131	135	131	140
10:13	141	143	139	146
10:18	131	135	132	140
10:23	138	138	134	142
10:28	139	143	140	149
Average	133.33	136.42	132.58	140.92

Total Average	135.81
Maximum Value	149

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Key West, FL

Skin Temperature Measurements

Incinerator 3

Run 1
Temperature (F°)

TIME	T1	T2	T3	T4
09:45	92	96	96	98
09:50	97	99	99	99
09:55	101	105	103	105
10:00	105	108	108	109
10:05	109	113	111	110
10:10	118	122	118	120
10:15	117	122	118	119
10:24	120	125	120	121
10:29	121	127	121	124
10:34	125	131	124	128
10:39	127	133	128	129
10:44	131	138	131	135
Average	113.58	118.25	114.75	116.42

Total Average	115.75
Maximum Value	138

Run 2
Temperature (F°)

TIME	T1	T2	T3	T4
11:25	145	152	146	152
11:30	155	163	159	163
11:35	171	167	170	162
11:40	168	178	174	179
11:45	173	181	178	184
11:50	171	180	177	184
11:57	167	176	175	183
12:02	176	186	184	194
12:07	177	186	185	196
12:12	178	188	186	199
12:17	177	188	187	198
12:23	180	189	190	203
Average	169.83	177.83	175.92	183.08

Total Average	176.67
Maximum Value	203

Run 3
Temperature (F°)

TIME	T1	T2	T3	T4
01:05	181	186	191	207
01:10	187	193	197	211
01:15	193	198	203	218
01:20	194	197	205	219
01:25	195	200	206	220
01:30	195	202	208	221
01:39	187	189	199	214
01:44	193	195	206	217
01:49	192	198	205	219
01:54	192	195	203	216
01:59	187	192	201	213
02:04	187	191	199	211
Average	190.25	194.67	201.92	215.50

Total Average	200.58
Maximum Value	221

VISIBLE EMISSIONS TEST

The visible emissions tests were conducted in accordance with U.S.E.P.A. Method #9. Ten tests were conducted, although the 4/6/92 Incinerator #1 - Run #2 test was an aborted test run, due to equipment malfunctions and interruptions and was replaced by a Run #2A conducted on 4/8/92. The summary and recorded data is provided in FIGURE #10.

FIGURE #10

VISIBLE EMISSION TEST SUMMARY

INC. #	RUN #	VISIBLE EMISSIONS (% OPACITY)	MAXIMUM OPACITY REQUIREMENTS FOR EMISSION LIMIT 17-2.600(1)(a)1.	PASS (P) OR FAIL (F)
1	1	9.79%	5.0%	F
1	2	2.50%	5.0%	P
1	3	4.79%	5.0%	P
2	1	5.63%	5.0%	F
2	2	3.33%	5.0%	P
2	3	1.87%	5.0%	P
3	1	2.29%	5.0%	P
3	2	2.92%	5.0%	P
3	3	1.88%	5.0%	P

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VISIBLE EMISSION OBSERVATION FORM

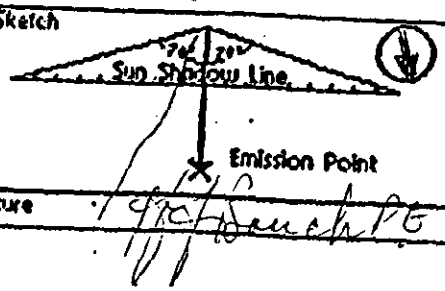
Source Name: U.S.D.A. - Animal Import Center
Address: Fleming Key
State: Fla. | Zip: 33041 | Telephone: (305) 294-4681
Source ID Number: AC44-155961
Observation Date: 4/1/92
Process: Animal & Animal Waste Incinerator
Observation Mode: Continuous
Control Equipment: Water Barrier
Observation Mode: Continuous
Describe Emission Point: Stack Outlet - 42" ϕ
Height Above Ground Level: 45'
Height Relative to Observer: 8'
Distance From Observer: 30'
Direction From Observer: NE
Describe Emissions: White/grey smoke with heat Waves
Emission Color: white / grey
Plume Type: Intermittent ☐ Continuous ☑ Fugitive ☐
Water Droplets Present: No ☑ Yes ☐
If Yes is Plume: Attached ☐ Detached ☐
Point Where Opacity Determined: 1' above Center Line End of Stack
Describe Background: Dark Forest - Vertical Structure (steel)
Background Color: Dark Brown
Sky Conditions: 5% Cloudy
Wind Speed: 25-30 mph
Wind Direction: East
Ambient Temperature: 65°F
Relative Humidity: 75%
Comments:

Observer's Name: H.J. Bauch PE
Organization: S.E. Environmental Consultants Inc
Certified By: CTH-FDEL | Date: 1/92
Start Time: 2:56 '00 | Stop Time: 3:56

	0	15	30	45		0	15	30	45
1	5	5	5	5	31	10	10	10	5
2	5	5	10	10	32	5	10	5	0
3	10	10	10	10	33	0	0	5	5
4	10	5	5	5	34	0	0	0	0
5	5	10	10	10	35	0	5	0	0
6	5	5	5	5	36	0	0	5	0
7	5	10	10	5	37	0	5	0	0
8	5	5	0	5	38	5	0	0	5
9	5	0	0	0	39	5	10	10	5
10	0	0	0	5	40	5	0	0	0
11	0	5	0	0	41	5	10	5	5
12	0	0	0	5	42	0	5	0	0
13	5	5	0	0	43	5	5	5	10
14	0	0	0	0	44	10	10	10	10
15	0	5	0	5	45	10	10	10	10
16	5	0	5	5	46	10	5	10	5
17	0	0	0	5	47	10	10	5	5
18	0	0	5	5	48	5	10	10	10
19	0	5	0	0	49	10	10	10	10
20	5	5	5	5	50	10	10	10	10
21	5	10	10	5	51	5	10	5	10
22	10	10	5	10	52	10	10	10	10
23	0	5	10	10	53	10	10	10	10
24	10	10	10	10	54	10	10	10	10
25	10	10	5	5	55	5	10	10	10
26	10	10	10	10	56	10	15	15	15
27	10	10	10	10	57	15	10	10	10
28	5	10	5	5	58	10	10	10	10
29	10	5	0	10	59	10	10	10	5
30	5	5	5	5	60	5	5	5	10

Average Opacity for Highest Period: 9.9%
Number of Readings Above were: 5 / 100
Range of Opacity Readings Minimum: 0% Maximum: 15%

Layout Sketch



Observer's Signature: H.J. Bauch PE. 4/6/92
Read By

I have received a copy of these Opacity Observations
Signature
Title
Date

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VISIBLE EMISSION OBSERVATION FORM

ce Name: SDA – Animal Import Center

ddress: Fleming Key

ate: Fla. | Zip: 33041 | Telephone: (305) 294-4680

ce ID Number: A044-155861 | Observation Date: 4/6/92

Process: oil Fired / ...inal Waste ... | Observation Mode: Continuous

ntrol Equipment: ... | Observation Mode: Continuous

ribe Emission Point: Stack Outlet – 42"ϕ

t Above Ground Level: 45' | Height Relative to Observer:

tance From Observer: 200' | Direction From Observer: NW

ribe Emissions: ... & Heat Waves

n Color: ... Grey/Black | Plume Type: ☑ Continuous ☑ Intermittent ☐ Fugitive ☐

Droplets Present: ☐ Yes ☐ | If Yes is Plume: NA Attached ☐ Detached ☐

What Point Has Opacity Determined: Stack Outlet.

Background: Sky / Vertical Strut.

ound Color: Blue Grey / Brown | Sky Conditions: 50% Cloudy

Speed: 20-25' | Wind Direction: SE

nt Temperature: 65°F | Relative Humidity: 75%

... Stop @ 6:19 ... @ 6:10 due to plugged eye sensor line
Restart @ 6:31 ... @ 6:50 Primary Chamber door ...

Layout Sketch — Draw North Arrow

Sun Shadow Line — Emission Point

ver's Signature: [signature] P.E. -- 4/6/92

By

Observer's Name: H.J. Bauch P.E.

Organization: S.E. Environmental Consultants, Inc.

Certified By: EPA-FDER | Date: 1/92

Start Time: 5:41 | Stop Time: 6:5

	0	15	30	45		0	15	30	45
1	5	5	5	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	5	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	5	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	5	0	43	0	0	0	0
14	0	0	0	5	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	5	5	50	0	0	0	0
21	5	0	5	5	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	5	53	0	0	0	5
24	5	0	0	0	54	5	5	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	5	0	57	0	0	0	0
28	0	5	0	5	58	0	0	0	0
29	0	0	5	0	59	0	0	0	10
30	0	10	15	20	60	5	5	10	0

Average Opacity for Highest Period: 2.71% | Number of Readings Above 5% were: 5

Range of Opacity Readings — Minimum: 0% | Maximum: 20%

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1-2A

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VISIBLE EMISSION OBSERVATION FORM

Source Name: U.S.D.A - Animal Import Center

Address: Florida Keys

State: Fla. Zip: 33041 Telephone: 1305 294-4681

Source Id Number: A044-155861 Observation Date: 4/8/92

Process: #2 Oil Fired Animal & Animal Waste Incinerator Observation Mode: Continuous

Control Equipment: Afterburner Observation Mode: Continuous

Describe Emission Point: Stack outlet - 42" ϕ

Height Above Ground Level: 45' ± Height Relative to Observer: 40' ±

Distance From Observer: 350' Direction From Observer: NNW

Describe Emissions: Puffs & Wisps Warm

Emission Color: Blue/Gray Plume Type: Intermittent ☐ Continuous ☒ Fugitive ☐

Water Droplets Present: No ☒ Yes ☐ If Yes is Plume: Attached ☐ Detached ☐

At What Point Was Opacity Determined: Stack Outlet

Describe Background: Sky

Background Color: Blue Sky Conditions: 10% Cloudy

Wind Speed: 5-10 mph Wind Direction: N

Ambient Temperature: 76°F Relative Humidity: 85%

Comments:

Plume Layout Sketch: Draw North Arrow; Sun Shadow Line; Emission Point

Observer's Signature: [signature] 4/8/92

Observer's Name: M. J. Fouch PE.

Organization: S.E. Environmental Consultants

Certified By: EPA - FDER Date: 7/92

Start Time: 12:00 Stop Time: 1:00

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	5	0	0
3	0	0	0	0	33	5	5	0	5
4	0	0	0	0	34	0	5	5	5
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	5	5	5	5
17	5	5	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	5	5	0	0	49	0	0	0	0
20	0	5	5	5	50	0	0	0	0
21	5	0	5	10	51	0	0	0	0
22	5	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Average Opacity for Highest Period: 2.50% Number of Readings Above 5% were: 1

Range of Opacity Readings Minimum: 0% Maximum: 10%

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Signature: Title: Date:

1-3A

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VISIBLE EMISSION OBSERVATION FORM

Source Name: U.S.D.A. - Animal Import Center
Address: Fleming Key
State: Fla. Zip: 33041
Telephone: (305) 294-4688
Source ID Number: AO 44-155861
Observation Date: 4/8/92
Process #2 (Incinerator) Animal & Plant Waste Inc.
Observation Mode: Continuous
Control Equipment: Afterburner
Observation Mode: Continuous
Describe Emission Point: Stack Outlet - 42" ϕ
Height Above Ground Level: 45' ±
Height Relative to Observer: 40' ↓
Distance From Observer: 300
Direction From Observer: NNE
Describe Emissions: Puffs & Heat Waves
Emission Color: Silver Gray
Plume Type: Intermittent ☐ Continuous ☒ Fugitive ☐
Water Droplets Present: No ☒ Yes ☐
If Yes is Plume: Attached ☐ Detached ☐ NA
Point Which Opacity Determined: Stack Outlet
Describe Background: Sky
Background Color: Blue
Sky Conditions: 15% Cloudy
Wind Speed: 5-8
Wind Direction: N
Ambient Temperature: 85°F
Relative Humidity: 85%
Comments:

Observer's Name: H.J. Rauch P.E.
Organization: S.E. Environmental Consultants Inc.
Certified By: EPA-FDER Date: 1/92
Start Time: 2:40 PM Stop Time: 3:40

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	5	5	5	5
2	0	0	0	0	32	5	0	5	0
3	0	0	0	0	33	5	10	10	5
4	0	0	0	0	34	5	0	5	5
5	0	0	0	0	35	5	0	5	5
6	0	0	0	0	36	5	5	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	5	5	5	5
12	0	0	0	0	42	5	0	0	10
13	0	0	0	0	43	5	5	5	5
14	0	0	0	0	44	5	5	10	5
15	0	0	0	0	45	5	0	5	5
16	0	0	0	0	46	5	5	5	5
17	0	0	0	0	47	10	5	5	0
18	0	0	0	0	48	0	0	5	0
19	0	0	0	5	49	0	0	0	0
20	5	0	0	5	50	0	0	0	0
21	0	0	0	0	51	0	5	5	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	5	5	0	0
24	0	0	0	0	54	0	5	5	5
25	0	0	0	0	55	5	5	5	5
26	0	0	0	0	56	5	5	0	0
27	0	0	0	0	57	0	5	5	5
28	0	0	0	0	58	0	0	5	0
29	0	0	0	0	59	5	5	0	5
30	5	5	5	5	60	5	5	0	5

Average Opacity for Highest Period: 4.79%
Number of Readings Above were: 5
Range of Opacity Readings Minimum: 0% Maximum: 10%
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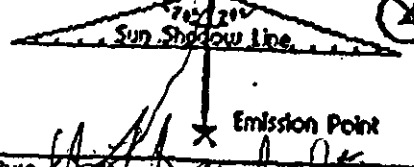
Signature:

Layout Sketch



Observer's Signature: H.J. Rauch P.E. 4/8/92
Title:

2-d

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VISIBLE EMISSION OBSERVATION FORM

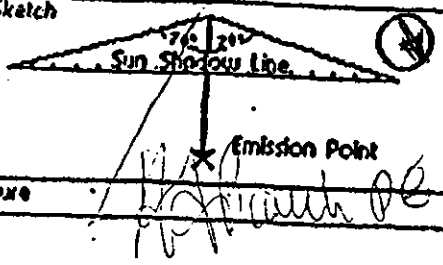
Source Name: U.S.D.A. - Animal Import Center
Address: Fleming Key
State: Fla. Zip: 33041
Telephone: (305) 294-4688
Source ID Number: PO 44-155861
Observation Date: 4/7/92
Process #2D Oil Fired Animal & Animal Waste Incinerator
Observation Mode: Continuous
Control Equipment: After burner
Observation Mode: Continuous
Describe Emission Point: Stack Outlet - 42"ϕ
Height Above Ground Level: 45' ±
Height Relative to Observer: 40'
Distance From Observer: 250'
Direction From Observer: NNE
Describe Emissions: Puffs & Heat Waves
Emission Color: White/Clear
Plume Type: Continuous ☒ Intermittent ☐ Fugitive ☐
Water Droplets Present: No ☒ Yes ☐
If Yes is Plume: Attached ☐ Detached ☐ N/A
At What Point This Opacity Determined: Stack Outlet
Describe Background: Sky
Background Color: Blue/Clear
Sky Conditions: Overcast
Wind Speed: 8-10
Wind Direction: E to SE
Ambient Temperature: 75°F
Relative Humidity: 80%
Comments: Ht @ 3Hr. changing drum malfunction
Start @ 3:59

Observer's Name: H. J. Rauch PE
Organization: S. E. Environmental Consultants Inc
Certified By: ETA - PDEG
Date: 1/92
Start Time: 3:35
Stop Time: 4:55

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	5
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	5	5	5	37	0	0	0	0
8	5	10	5	5	38	0	0	0	0
9	0	0	0	0	39	0	0	5	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	5	5
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	5	5	5
15	0	0	0	0	45	5	0	0	0
16	0	0	5	0	46	5	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	5	5	5	5	54	0	0	0	0
25	5	10	10	10	55	0	0	0	0
26	10	5	5	5	56	0	0	0	0
27	5	10	5	5	57	0	0	0	0
28	5	5	5	5	58	0	0	0	0
29	5	5	0	0	59	0	0	0	0
30	5	5	5	0	60	0	0	5	5

Average Opacity for Highest Period: 5.63%
Number of Readings Above F/H were: 6
Range of Opacity Readings Minimum: 0% Maximum: 10%

Site Layout Sketch



Observer's Signature: H. J. Rauch PE 4/7/92
Witnessed By:

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VISIBLE EMISSION OBSERVATION FORM

Source Name: U.S.D.A - Animal Import Center
Address: Fleming Key
State: Fla. Zip: 33041
Telephone: (305) 294-4688
Source ID Number: A044-155861
Observation Date: 4/7/92
Process #20 oil Fired Animal & Animal Waste Inc.
Observation Mode: Continuous
Control Equipment: Afterburner
Observation Mode: Continuous
Describe Emission Point: Stack Outlet - 42"ø
Height Above Ground Level: 45' ±
Height Relative to Observer: 40' ±
Distance From Observer: 200' ±
Direction From Observer: E
Describe Emissions: Puffy - Heat Waves
Emission Color: Silver/Grey
Plume Type: Intermittent ☐ Continuous ☒ Fugitive ☐
Water Droplets Present: No ☒ Yes ☐
If Yes is Plume: Attached ☐ Detached ☐ N/A
At What Point Was Opacity Determined: Stack Outlet
Describe Background: Sky
Background Color: Blue/Grey
Sky Conditions: Overcast
Wind Speed: 5-8
Wind Direction: SE
Ambient Temperature: 75°F
Relative Humidity: 90%
Comments:

Source Layout Sketch: Draw North Arrow; Sun Shadow Line; Emission Point

Observer's Signature: H.J. Rauch P.E. 4/7/92
Certified By:

Observer's Name: H.J. Rauch P.E.
Organization: S.E. Environmental Consultants
Certified By: EPA - FDER Date: 4/92
Start Time: 2:38 Stop Time:

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	5	5	0	5
2	0	0	0	0	32	5	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	5	36	0	0	0	0
7	5	5	5	0	37	0	0	0	0
8	5	0	5	0	38	0	0	0	0
9	5	5	5	5	39	0	0	0	0
10	5	5	5	5	40	0	0	0	5
11	5	5	0	0	41	5	0	0	0
12	5	0	0	0	42	0	0	5	5
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	5	5	5	5
15	0	0	0	0	45	0	5	5	5
16	0	0	0	0	46	0	5	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	5	5	0	0
20	0	0	0	0	50	0	0	0	5
21	0	0	0	0	51	0	5	5	5
22	0	0	0	0	52	5	5	5	5
23	0	0	0	0	53	5	0	0	5
24	0	0	0	0	54	5	0	5	0
25	0	0	0	0	55	0	5	5	0
26	0	0	0	0	56	5	0	0	0
27	0	0	5	5	57	0	0	0	0
28	5	0	0	5	58	0	0	5	0
29	5	5	5	5	59	0	5	5	5
30	5	5	5	5	60	5	5	0	0

Average Opacity for Highest Period: 3.33
Number of Readings Above 5% were: 1
Range of Opacity Readings Minimum: 0% Maximum: 10%

I have received a copy of these Opacity Observations
Signature
Title Date

2-3

S.E. ENVIRONMENTAL CONSULTANTS, INC.

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VISIBLE EMISSION OBSERVATION FORM

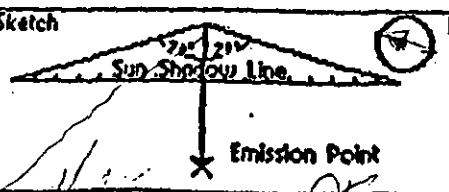
Source Name: USDA - Animal Import Center
Address: Fleming Key
State: Fla. Zip: 33041
Telephone: (305) 294-4688
Source ID Number: AD44-155861
Observation Date: 4/8/92
Process: #20 Oil Fired Incinerator E Animal Waste Incinerator
Observation Mode: Continuous
Control Equipment: Cyclone Burner
Observation Mode: Continuous
Describe Emission Point: Stack Outlet - 42"ϕ
Height Above Ground Level: 45' ±
Height Relative to Observer: 40' ±
Distance From Observer: 150'
Direction From Observer: WSW
Describe Emissions: Puffs & Heat Waves
Emission Color: Silver Grey
Plume Type: Continuous ☒ Intermittent ☐ Fugitive ☐
Water Droplets Present: No ☒ Yes ☐
If Yes is Plume: Attached ☐ Detached ☐ N/A
Point Where This Opacity Determined: Stack Outlet
Describe Background: Sky
Background Color: Blue
Sky Conditions: 5% Clouds
Wind Speed: 5-8 mph
Wind Direction: NNW
Ambient Temperature: 75°F
Relative Humidity: 80%
Comments:

Observer's Name: H. J. Rauch PE
Organization: S. E. Environmental Consultants
Certified By: EPA-FDER Date: 11/92
Start Time: 9:40 AM Stop Time: 10:40

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	5
7	0	5	5	5	37	0	5	5	5
8	5	5	5	0	38	0	0	0	0
9	0	0	0	5	39	0	0	0	0
10	5	0	0	5	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	5	5	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Average Opacity for Highest Period: 1.87%
Number of Readings Above 5% were: 0
Range of Opacity Readings Minimum: 0% Maximum: 5%
I have received a copy of these Opacity Observations
Signature
Title Date

Source Layout Sketch



Observer's Signature: [signature] 4/8/92
Verified By: [signature]

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VISIBLE EMISSION OBSERVATION FORM

Source Name: U.S.D.A - Animal Imprint Center
Address: Fleming Key
State: Fla. Zip: 33041 Telephone: (305) 294-4689
Source ID Number: A044-155861 Observation Date: 4/7/92
Process #200 Oil Fired Animal & Animal Waste Incinerator Observation Mode: Continuous
Control Equipment: afterburner Observation Mode: Continuous
Describe Emission Point: Stack Outlet - 42"ϕ
Height Above Ground Level: 45' Height Relative to Observer: 40'
Distance From Observer: 400'± Direction From Observer: NW
Describe Emissions: Puffs and Heat Waves
Emission Color: Grey Plume Type: Intermittent ☐ Continuous ☒ Fugitive ☐
Water Droplets Present: No ☒ Yes ☐ If Yes is Plume: N.A. Attached ☐ Detached ☐
At What Point Was Opacity Determined: Stack Outlet.
Describe Background: Sky
Background Color: Blue Grey Sky Conditions:
Wind Speed: 10-15 mph. Wind Direction: E.S.E.
Ambient Temperature: 74°F Relative Humidity: 80%
Comments:

Source Layout Sketch: Draw North Arrow; Sun Shadow Line; Emission Point

Observer's Name: H. J. Baech PE.
Organization: S.E. Environmental Consultants, Inc.
Certified By: ETA - FDER Date: 1/92
Start Time: 9:38 Stop Time: 10:38

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	5	0	5	5	32	0	0	0	0
3	0	5	5	0	33	0	0	0	0
4	5	5	0	0	34	0	5	0	5
5	0	0	5	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	5	5	5	5
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	5	5
28	0	0	0	0	58	5	0	5	5
29	0	0	0	0	59	5	5	5	5
30	0	0	0	0	60	5	5	0	0

Average Opacity for Highest Period: 2.29%
Number of Readings Above 5% were: 5%
Range of Opacity Readings Minimum: 0% Maximum: 5%
I have received a copy of these Opacity Observations
Signature:
Title: Date:

Observer's Signature: H. J. Baech PE 4/7/92
Verified By:

3-2

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VISIBLE EMISSION OBSERVATION FORM

Source Name: U S DA - Animal Import Center
Address: Fleming Key
State: FLA | Zip: 33041 | Telephone: (305)294-4688
Source ID Number: A044-155861 | Observation Date: 4/7/92
Process # 001 | Fuel: Animal & Animal Waste Incinerator | Observation Mode: Continuous
Control Equipment: After Burner | Observation Mode: Continuous
Describe Emission Point: Stack Outlet - 42" ϕ
Height Above Ground Level: 45' ± | Height Relative to Observer: 40'
Distance From Observer: 450 ± | Direction From Observer: NNW
Describe Emissions: Puffs and Heat Waves
Emission Color: Light Gray | Plume Type: Continuous ☒ Intermittent ☐ Fugitive ☐
Water Droplets Present: No ☒ Yes ☐ | If Yes is Plume: Attached ☐ Detached ☐ N/A
At What Point This Opacity Determined: Stack Outlet
Describe Background: Sky
Background Color: Blue Gray | Sky Conditions: One Cloud
Wind Speed: 10-15 mph | Wind Direction: ESE
Ambient Temperature: 75° F | Relative Humidity: 80%
Comments:

Observer's Name: H. J. Bauch P.E.
Organization: S.E. Environmental Consultants, Inc.
Certified By: EPA - FDER | Date: 1/92
Start Time: 11:21 | Stop Time: 12:21

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	5	5	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	5	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	5	5
18	0	0	0	0	48	5	5	5	5
19	0	0	0	0	49	5	5	5	5
20	0	0	0	0	50	10	5	5	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Average Opacity for Highest Period: 2.92%
Number of Readings Above 5% were: 1
Range of Opacity Readings — Minimum: 0% Maximum: 10%

Place Layout Sketch

Draw North Arrow

I have received a copy of these Opacity Observations
Signature
Title | Date

Observer's Signature
Certified By: H. J. Bauch P.E. 4/7/92
FDR

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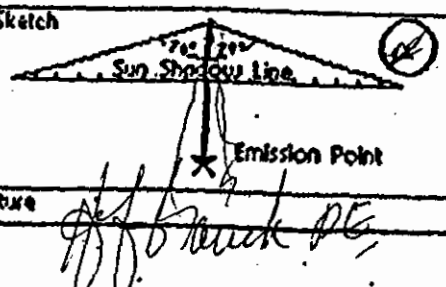
VISIBLE EMISSION OBSERVATION FORM

Source Name: U.S.D.A. - Animal Import Center
Address: Fleming Key
State: FLA | Zip: 33041 | Telephone: (305) 294-4688
Source ID Number: A044 - 155861 | Observation Date: 4/7/92
Process: #2 Oil Fired Animal & Animal Waste Incinerator | Observation Mode: 1. Continuous
Control Equipment: After Burner | Observation Mode: Condenser
Describe Emission Point: Stack Outlet - 42"ϕ
Height Above Ground Level: 45'± | Height Relative to Observer: 40'
Distance From Observer: 450'± | Direction From Observer: NNW
Describe Emissions: Visible and Heat Waves
Emission Color: White/Grey | Plume Type: Intermittent ☐ Continuous ☑ Fugitive ☐
Water Droplets Present: No ☒ Yes ☐ | If Yes is Plume: Attached ☐ Detached ☐ N/A
At What Point Was Opacity Determined: Stack Outlet
Describe Background: Sky
Background Color: Blue/Grey | Sky Conditions: Overcast
Wind Speed: 10-12 MPH | Wind Direction: ESE
Ambient Temperature: 75°F | Relative Humidity: 80%
Comments:

Source Layout Sketch



Observer's Signature: H.J. Bauch PE | Date: 4/7/92
Verified By:

Observer's Name: H.J. Bauch PE
Organization: S.E. Environmental Consultants, Inc.
Certified By: EPA-FDER | Date: 1/92
Start Time: 1:01 | Stop Time: 2:01

	0	15	30	45		0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	5	5	5	5	33	0	0	0	0
4	5	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	5	10	10	37	0	0	0	0
8	5	5	5	5	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	5	5	52	0	0	0	0
23	5	5	5	0	53	0	0	0	0
24	0	5	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Average Opacity for Highest Period: 1.88%
Number of Readings Above 5% were: 2
Range of Opacity Readings: Minimum 0% Maximum
I have received a copy of these Opacity Observations
Signature
Title | Date

AIRFLOW AND RETENTION TIME

The incinerator afterburner was measured on March 23, 1992 and found to have an inside refractory diameter of 80 inches and an inside refractory length of eleven (11) feet, nine (9) inches as shown in FIGURE #1. These dimensions provide for the calculation of the afterburner inside volume of 462.98 cubic feet.

The flue gas volumetric flows were measured and recorded in the various tests. The resultant retention time was derived from the division of the afterburner volume, by the flue gas volumetric flow rate to provide the retention time in seconds. The measured and derived data are summarized in FIGURE #11. Note that the design ACFM was given as 13,000 ACFM. The actual measured ACFM rates vary from 1.63 to 1.95 times the original design ACFM rate.

FIGURE #11

AIRFLOW AND RETENTION TIME SUMMARY

INC. #	RUN #	ACFM	ACFS	AFTERBURNER CU. FT. VOLUME	RETENTION TIME IN SECONDS
1	1	25300	421.7	462.98	1.10
1	2	22500	375.0	462.98	1.23
1	3	22500	375.0	462.98	1.23
	AVE.	23433	390.6	462.98	1.19
2	1	23200	386.7	462.98	1.20
2	2	23300	388.3	462.98	1.19
2	3	21200	353.3	462.98	1.31
	AVE.	22567	376.1	462.98	1.23
3	1	22200	370.0	462.98	1.25
3	2	23000	383.3	462.98	1.21
3	3	23200	386.7	462.98	1.20
	AVE.	22800	380.0	462.98	1.22

PARTICULATE EMISSIONS

The particulate emissions tests were conducted in accordance with U.S.E.P.A. Method #1 through #5. Ten tests were conducted although the 4/6/92 Incinerator #1 - Run #2 test was an aborted test run, due to equipment malfunctions and interruptions and was replaced by a Run #2A, conducted on 4/8/92. The summary and recorded data is provided in FIGURE #12.

FIGURE #12

PARTICULATE EMISSIONS SUMMARY

INC. #	RUN #	PARTICULATE EMISSIONS IN GR./DSCF.	MAXIMUM PARTICULATE EMISSION LIMIT PER 17-2.600(1)(d)	PASS (P) OR FAIL (F)
1	1	0.347	0.020	F
1	2	0.214	0.020	F
1	3	0.163	0.020	F
1	AVE	0.241	0.020	F
2	1	0.659	0.020	F
2	2	0.511	0.020	F
2	3	1.015	0.020	F
2	AVE	0.728	0.020	F
3	1	0.552	0.030	F
3	2	0.429	0.030	F
3	3	0.412	0.030	F
3	AVE	0.465	0.030	F

Figure #12

PARTICULATE EMISSIONS TESTING
USDA ANIMAL IMPORT CENTER
INCINERATOR 1
04-08-92

Title of Run		Run 1	Run 2	Run 3
Process	100lbs/hr	16.00	16.00	16.00
Static Pressure	IN. H2O	-0.15	-0.15	-0.15
Barometric Pressure	In. Hg.	31.02	29.98	29.98
Average ΔH	In. H2O	1.786	1.788	1.743
Meter Correction		0.997	0.997	0.997
Avg Meter Temp.	DEG F	89.1	93.8	91.3
% O2	%	11.1	11.6	13.1
% CO2	%	4.0	4.0	3.0
Volume Metered	ACF	45.080	47.803	44.518
Volume Water	ML	71.5	108.0	148.2
Sampling Time	MINUTES	60	60	60
Nozzle Diameter	INCHES	0.489	0.500	0.500
Avg. Stack Temp.	DEG F	1587.4	1333.5	1327.0
Area Of Stack	SQ. FEET	10.559	10.559	10.559
Wt. Of Part.	MG	718.0	424.0	255.0
Number Of Points		20	20	20
Avg. Sqrt. ΔP	In. H2O	0.364	0.338	0.335

RESULTS OF COMPUTATIONS

		RUN 1	RUN 2	RUN 3	AVERAGE
Volume of Gas Sampled	SDCF	44.981	45.709	42.761	44.484
Molecular Wt. Of St. Gas	LB/LB-MOLE	28.31	27.99	27.46	27.92
H2O Vapor in Gas Stream	PERCENT	7.0	10.0	14.0	10.3
Avg Stack Gas Velocity	FT/SEC	39.9	35.5	35.5	37.0
Volumetric Flow Rate	SDCFM	6300	6000	5700	6000
Volumetric Flow Rate	ACFM	25300	22500	22500	23433
Particulate Conc.	GRS/SDCF	0.246	0.143	0.092	0.160
Particulate Conc.	GRS/ACF	0.061	0.038	0.023	0.041
Particulate Mass Rate	LB/HR	13.2	7.3	4.5	8.4
Part Conc. corr to 7% O2	GRS/SDCF	0.347	0.214	0.163	0.241
Percent of Isokinetic		96.57	99.02	96.50	

PARTICULATE EMISSIONS TESTING
USDA ANIMAL IMPORT CENTER
INCINERATOR #2
04-07-92

Title of Run		Run 1	Run 2	Run 3
Process	100 LBS/HR	10.00	9.80	10.00
Static Pressure	IN. H2O	-0.15	-0.15	-0.15
Barometric Pressure	In. Hg.	30.02	30.02	29.98
Average ΔH	In. H2O	1.895	2.014	1.663
Meter Correction		0.997	0.997	0.997
Avg Meter Temp.	DEG F	101.3	100.6	87.9
% O2	%	10.0	12.5	15.5
% CO2	%	8.0	2.0	3.5
Volume Metered	ACF	43.553	48.733	44.902
Volume Water	ML	62.7	128.2	115.1
Sampling Time	MINUTES	60	60	60
Nozzle Diameter	INCHES	0.500	0.500	0.500
Avg. Stack Temp.	DEG F	1460.6	1358.3	1310.9
Area Of Stack	SQ. FEET	10.559	10.559	10.559
Wt. Of Part.	MG	1383.1	928.5	1123.0
Number Of Points		20	20	20
Avg. Sqrt. ΔP	In. H2O	0.338	0.345	0.321

RESULTS OF COMPUTATIONS

		RUN 1	RUN 2	RUN 3	AVERAGE
Volume of Gas Sampled	SDCF	41.156	46.125	43.389	43.556
Molecular Wt. Of St. Gas	LB/LB-MOLE	28.90	27.57	27.94	28.14
H2O Vapor in Gas Stream	PERCENT	6.7	11.6	11.1	9.8
Avg Stack Gas Velocity	FT/SEC	36.2	36.7	33.5	35.5
Volumetric Flow Rate	SDCFM	5900	6000	5600	5833
Volumetric Flow Rate	ACFM	22900	23300	21200	22467
Particulate Conc.	GRS/SDCF	0.518	0.310	0.399	0.409
Particulate Conc.	GRS/ACF	0.133	0.080	0.106	0.106
Particulate Mass Rate	LB/HR	26.1	15.9	19.3	20.4
Part Conc. corr to 7% O2	GRS/SDCF	0.659	0.511	1.015	0.728
Percent of Isokinetic		90.17	99.40	99.41	

PARTICULATE EMISSIONS TESTING
USDA ANIMAL IMPORT CENTER
INCINERATOR #3
04-07-98

Title of Run		Run 1	Run 2	Run 3
Process	100 LBS/HR	6.00	6.30	6.40
Static Pressure	IN. H2O	-0.15	-0.15	-0.15
Barometric Pressure	In. Hg.	30.02	30.02	30.02
Average ΔH	In. H2O	0.758	1.400	1.355
Meter Correction		0.997	0.997	0.997
Avg Meter Temp.	DEG F	91.2	104.4	106.6
% O2	%	10.5	11.5	11.5
% CO2	%	5.5	8.0	6.0
Volume Metered	ACF	29.328	40.284	40.823
Volume Water	ML	66.0	100.8	105.1
Sampling Time	MINUTES	60	60	60
Nozzle Diameter	INCHES	0.420	0.500	0.500
Avg. Stack Temp.	DEG F	1600.7	1649.9	1677.9
Area Of Stack	SQ. FEET	10.559	10.559	10.559
Wt. Of Part.	MG	756.9	715.5	693.0
Number Of Points		20	20	20
Avg. Sqrt. ΔP	In. H2O	0.313	0.321	0.320

RESULTS OF COMPUTATIONS

		RUN 1	RUN 2	RUN 3	AVERAGE
Volume of Gas Sampled	SDCF	28.144	37.811	38.166	34.707
Molecular Wt. Of St. Gas	LB/LB-MOLE	28.18	28.43	28.11	28.24
H2O Vapor In Gas Stream	PERCENT	9.9	11.1	11.5	10.9
Avg Stack Gas Velocity	FT/SEC	35.1	36.3	36.6	36.0
Volumetric Flow Rate	SDCFM	5100	5100	5100	5100
Volumetric Flow Rate	ACFM	22200	23000	23200	22800
Particulate Conc.	GRS/SDCF	0.414	0.291	0.280	0.328
Particulate Conc.	GRS/ACF	0.096	0.065	0.061	0.074
Particulate Mass Rate	LB/HR	18.3	12.8	12.2	14.4
Part Conc. corr to 7% O2	GRS/SDCF	0.552	0.429	0.412	0.465
Percent of Isokinetic		100.06	95.23	97.04	

CARBON MONOXIDE EMISSIONS

The carbon monoxide emissions tests were conducted in accordance with U.S.E.P.A. Method #10. Ten tests were conducted although the 4/6/92 Incinerator #1 - Run #2 test was an aborted test run due to equipment malfunctions and interruptions and was replaced by a Run #2A, conducted on 4/8/92. The summary and recorded data is provided in FIGURE #13.

FIGURE #13

CARBON MONOXIDE EMISSIONS SUMMARY

INC. #	RUN #	CARBON MONOXIDE EMISSIONS IN PPM	MAXIMUM CARBON MONOXIDE LIMIT PER 17-2.600(1)(d)	PASS (P) OR FAIL (F)
1	1	65	100	P
1	2	60	100	P
1	3	7	100	P
1	AVE	43.7	100	P
2	1	31	100	P
2	2	109	100	F
2	3	44	100	P
2	AVE	61.1	100	P
3	1	25	100	P
3	2	21	100	P
3	3	6	100	P
3	AVE	17.6	100	P

Figure #13

SUMMARY OF CARBON MONOXIDE TEST RESULTS

USDA ANIMAL IMPORT CENTER
KEY WEST, FLA.
INCINERATOR #1

04-6&9-92

RUN	$\bar{C}$	Co	Cma	Cm	C Gas	CO (CORR) PPM	O2 %	CO2 %
1	45.0	0.0	386.0	384.5	43.4	65	11.10	4.00
3	35.0	0.0	386.0	384.0	33.8	60	11.60	4.00
4	10.0	0.0	386.0	378.5	9.9	7	13.10	3.00
AVERAGE					29.0	43.7		

$$CO(CORR) = CGas\ (14(21-(21-\%O2))$$

$$CGas = \frac{(C - Co)\ Cma}{Cm - Co} \times (1-\%CO2)$$

Where:

CGas = Effluent Gas Concentration, Dry Basis, PPM

$\bar{C}$ = Average gas concentration indicated by analyzer, dry basis, PPM.

Co = Average of initial and final system calibration bias check response for the zero gas, PPM

Cm = Average of initial and final system calibration gas, PPM

Cma = Actual concentration of the upscale calibration gas, PPM

CO(CORR) = Carbon Monoxide concentration corrected to 7 percent oxygen, ppm

SUMMARY OF CARBON MONOXIDE TEST RESULTS

USDA ANIMAL IMPORT CENTER
KEY WEST, FLA.
INCINERATOR #2

04-07-92

RUN	$\bar{C}$	Co	Cma	Cm	C Gas	CO (CORR) PPM	O2 %	CO2 %
1	20.0	0.0	386.0	382.5	18.6	31	10.00	8.00
2	42.5	0.0	386.0	376.5	42.7	109	12.50	2.00
3	67.5	0.0	386.0	380.0	66.2	44	15.50	3.50
AVERAGE					42.5	61.1		

$$CO(CORR) = CGas\ (14(21-(21-\%O2))$$

$$CGas = \frac{(C - Co)\ Cma}{Cm - Co} \times (1-\%CO2)$$

Where:

CGas = Effluent Gas Concentration, Dry Basis, PPM

$\bar{C}$ = Average gas concentration indicated by analyzer , dry basis, PPM.

Co = Average of initial and final system calibration bias check response for the zero gas, PPM

Cm = Average of initial and final system calibration gas, PPM

Cma = Actual concentration of the upscale calibration gas, PPM

CO(CORR) = Carbon Monoxide concentration corrected to 7 percent oxygen, ppm

SUMMARY OF CARBON MONOXIDE TEST RESULTS

USDA ANIMAL IMPORT CENTER
KEY WEST, FLA.
INCINERATOR #3

04-07-92

RUN	$\bar{C}$	Co	Cma	Cm	C Gas	CO (CORR) PPM	O2 %	CO2 %
1	18.0	0.0	386.0	380.0	17.3	25	10.50	5.50
2	15.0	0.0	386.0	376.0	14.2	21	11.50	8.00
3	10.0	0.0	386.0	376.5	9.6	6	11.50	6.00
AVERAGE					13.7	17.6		

$$CO(CORR) = CGas\ (14(21-(21-\%O2))$$

$$CGas = \frac{(C - Co)\ Cma}{Cm - Co} \times (1-\%CO2)$$

Where:

CGas = Effluent Gas Concentration, Dry Basis, PPM

$\bar{C}$ = Average gas concentration indicated by analyzer , dry basis, PPM.

Co = Average of initial and final system calibration bias check response for the zero gas, PPM

Cm = Average of initial and final system calibration gas, PPM

Cma = Actual concentration of the upscale calibration gas, PPM

CO(CORR) = Carbon Monoxide concentration corrected to 7 percent oxygen, ppm

HYDROCHLORIC ACID EMISSIONS

The hydrochloric acid emissions tests were conducted in accordance with U.S.E.P.A. Method #26. Ten tests were conducted although the 4/6/92 Incinerator #1 - Run #2 test was an aborted test run, due to equipment malfunctions and interruptions and was replaced by a Run #2A, conducted on 4/8/92. The summary and recorded data is provided in FIGURE #14.

FIGURE #14

HYDROCHLORIC ACID EMISSIONS SUMMARY

INC. #	RUN #	HYDROCHLORIC ACID EMISSIONS IN LBS/HR	MAXIMUM HYDROCHLORIC ACID LIMIT PER 17-2.600(1)(d)	PASS (P) OR FAIL (F)
1	1	0.37	4.00	P
1	2	0.06	4.00	P
1	3	1.00	4.00	P
1	AVE	0.475	4.00	P
2	1	0.34	4.00	P
2	2	0.04	4.00	P
2	3	0.16	4.00	P
2	AVE	0.181	4.00	P
3	1	0.10	4.00	P
3	2	0.14	4.00	P
3	3	0.09	4.00	P
3	AVE	0.110	4.00	P

Figure # 14

USDA Animal Import Center
Key West, Florida
Incinerator #3 April, 1992

		RUN 1	RUN 2	RUN 3
BAROMETRIC PRESSURE	IN. Hg	30.02	30.02	30.02
PRESSURE DROP ACROSS ORIFICE	IN. H2O	0.00	0.00	0.00
METER CORRECTION FACTOR	DIMENSIONLESS	1.001	1.001	1.001
AVERAGE DRY GAS METER TEMPERATURE	DEG. F	83.4	84.9	85.2
GAS VOLUME METERED	ACF	4.178	4.131	4.182
TOTAL VOLUME OF CL SAMPLE	ml	67.00	70.00	52.00
CONCENTRATION OF SAMPLE	ug/ml	8.55	11.82	10.28
CONCENTRATION OF BLANK	ug/ml	0.05	0.05	0.05
FLOWRATE	SDCFM	5147	5126	5078
PRODUCTION RATE	100 LBS/HR	6	6	6

RESULTS

		RUN 1	RUN 2	RUN 3	AVERAGE
VOLUME OF GAS SAMPLED	SDCF	4.078	4.021	4.068	4.056
HCl CONCENTRATION	LBS/SDCF	3.17E-07	4.65E-07	2.96E-07	3.592E-07
HCl MASS RATE	LBS/HR	0.10	0.14	0.09	0.110
HCl EMISSIONS	LBS/ 100 LBS	0.02	0.02	0.01	0.018
HCl EMISSIONS	PPM	3.34	4.91	3.13	3.794

USDA Animal Import Center
Key West, Florida
Incinerator #2 April, 1992

		RUN 1	RUN 2	RUN 3
BAROMETRIC PRESSURE	IN. Hg	30.02	30.02	29.98
PRESSURE DROP ACROSS ORIFICE	IN. H2O	0.00	0.00	0.00
METER CORRECTION FACTOR	DIMENSIONLESS	1.001	1.001	1.001
AVERAGE DRY GAS METER TEMPERATURE	DEG. F	85.1	79.5	89.1
GAS VOLUME METERED	ACF	4.104	4.102	4.103
TOTAL VOLUME OF CL SAMPLE	ml	68.00	34.00	78.00
CONCENTRATION OF SAMPLE	ug/ml	25.29	5.57	10.69
CONCENTRATION OF BLANK	ug/ml	0.05	0.05	0.05
FLOWRATE	SDCFM	5893	5991	5635
PRODUCTION RATE	100 LBS/HR	10	10	10

RESULTS

		RUN 1	RUN 2	RUN 3	AVERAGE
VOLUME OF GAS SAMPLED	SDCF	3.993	4.033	3.958	3.995
HCl CONCENTRATION	LBS/SDCF	9.74E-07	1.06E-07	4.75E-07	5.185E-07
HCl MASS RATE	LBS/HR	0.34	0.04	0.16	0.181
HCl EMISSIONS	LBS/100 LBS	0.03	0.00	0.02	0.018
HCl EMISSIONS	PPM	10.29	1.11	5.02	5.475

USDA Animal Import Center
Key West, Florida
Incinerator #1 April, 1992

		RUN 1	RUN 2	RUN 3
BAROMETRIC PRESSURE	IN. Hg	30.02	29.98	29.98
PRESSURE DROP ACROSS ORIFICE	IN. H2O	0.00	0.00	0.00
METER CORRECTION FACTOR	DIMENSIONLESS	1.001	1.001	1.001
AVERAGE DRY GAS METER TEMPERATURE	DEG. F	87.3	87.7	80.4
GAS VOLUME METERED	ACF	3.968	4.048	4.125
TOTAL VOLUME OF CL SAMPLE	ml	70.00	47.00	71.00
CONCENTRATION OF SAMPLE	ug/ml	23.54	6.58	73.00
CONCENTRATION OF BLANK	ug/ml	0.05	0.05	0.05
FLOWRATE	SDCFM	6287	5960	5721
PRODUCTION RATE	LBS/100 LBS	16	16	16

RESULTS

		RUN 1	RUN 2	RUN 3	AVERAGE
VOLUME OF GAS SAMPLED	SDCF	3.845	3.915	4.043	3.934
HCI CONCENTRATION	LBS/SDCF	9.69E-07	1.78E-07	2.90E-06	1.351E-06
HCI MASS RATE	LBS/HR	0.37	0.06	1.00	0.475
HCI EMISSIONS	LBS/100 LBS	0.02	0.00	0.06	0.030
HCI EMISSIONS	PPM	10.24	1.88	30.67	14.263

1. INTRODUCTION

Sanders Engineering & Analytical Services, Inc., (SEAS) performed a particulate, hydrochloric acid, carbon monoxide, oxygen,and skin temperature test on the incinerators at the USDA Animal Import Center, Key West, Florida, on April 6-8,1992. The testing was performed in accordance with the applicable U.S. Environmental Protection Agency procedures specified at **40 CFR, Part 60, Appendix A.**

The purpose of the tests was to demonstrate compliance with the rules and regulations of the Florida Department of Environmental Regulation, and to meet the necessary requirements contained in the permit to operate issued by the Florida Department of Environmental Regulation.

The tests were conducted by Mr. Joseph C. Sanders, Mr. Kevin Kirkendall, and Mr. Mike Griggs of Sanders Engineering & Analytical Services, Inc. and were coordinated with Mr. Jim Bauch of Southeast Environmental Consultants, Inc.

The tests were conducted in accordance with the guidelines of the U. S. Environmental Protection Agency. Further discussion of the test methods are included later in the report.

2. SUMMARY AND DISCUSSION OF RESULTS

The results of the series of tests for Incinerators 1, 2, and 3 are summarized in Table I. The completed field data sheets, summaries of the runs, and the equations used in the calculations of the results are presented in Appendix A. The skin temperature results are presented in Appendix B. The initial and final calibrations of the equipment used in the sampling program and other quality control data are included in Appendix C.

During the performance of the second run on Incinerator #1, there was a problem with the closing mechanism of the feed door of the incinerator. This run was aborted, and due to the severity of the problem the remaining two runs were postponed until April 9, 1992. In the testing on Incinerator #2, there was a problem with the feed mechanism which occurred approximately ten (10) minutes into the first run. This run was postponed for approximately 30 minutes at which time testing was resumed.

TABLE I: SUMMARY OF RESULTS

USDA ANIMAL IMPORT CENTER

KEY WEST, FLORIDA

	Particulate GRS/SDCF Corr to 7% O_2	Hydrogen Chloride LBS/HR.	Carbon Monoxide PPM
INCINERATOR #1	0.241	0.475	43.7
INCINERATOR #2	0.728	0.181	61.1
INCINERATOR #3	0.465	0.110	17.6
DER ALLOWABLE	0.030	4.0	100.0

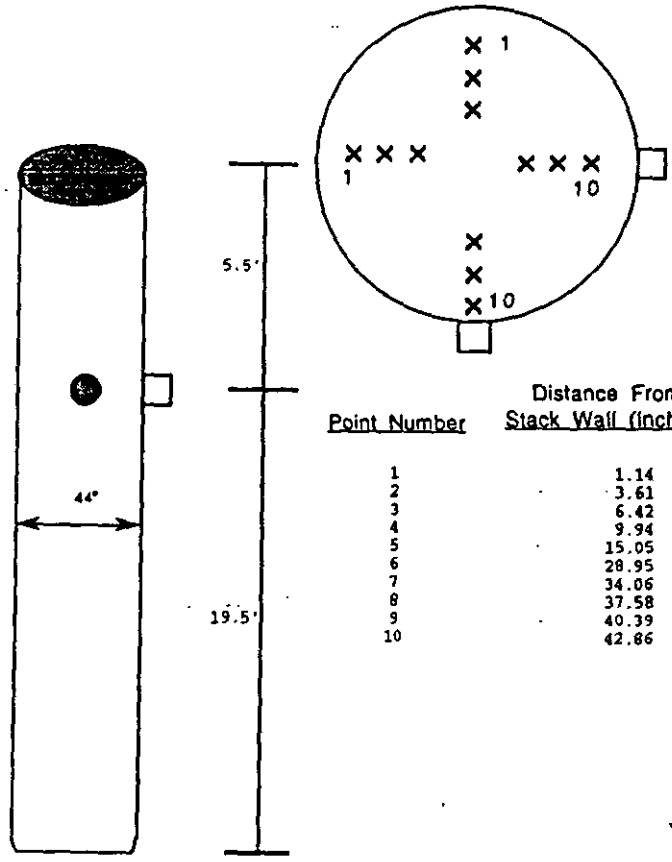
3. PROCESS DESCRIPTION

The process consisted of a multi-chambered pathological incinerator for the incineration of pathological waste. This waste is designated as Type 4 by the Incinerator Institute of America. The secondary chamber contains afterburners for control of particulate emissions and complete combustion of the solid and gaseous pollutants.

4. SAMPLE POINT LOCATION

The sample point locations and outlet duct schematic for the three (3) incinerators are presented in Figure

FIGURE
SAMPLE POINT LOCATIONS
USDA ANIMAL IMPORT CENTER
KEY WEST,FL
INCINERATORS 1,2,3



Point Number	Distance From Stack Wall (inches)
1	1.14
2	3.61
3	6.42
4	9.94
5	15.05
6	28.95
7	34.06
8	37.58
9	40.39
10	42.86

5. PARTICULATE SAMPLING PROCEDURE (EPA METHOD 5)

The sampling procedure utilized is that specified in **40 CFR, Part 60, Appendix A, Method 5** as modified by the governing regulatory agency.A brief description of this procedure is as follows:

The first impingers were partially filled with 100 milliliters of water. The next impinger was left empty to act as a moisture trap, and preweighed silica gel was added to the last impinger. The sampling train was assembled, as shown in the attached drawing, and leak checked by plugging the inlet to the nozzle and pulling a 15 inch mercury vacuum. A leakage rate not in excess of 0.02 cubic feet per minute was considered acceptable.

The inside dimensions of the stack liner were measured and recorded. The required number of sampling points were marked on the probe for easy visibility. The range of velocity pressure, the percent moisture, and the temperature of the effluent gases were determined. From this data, the correct nozzle size and the nomograph multiplication factor were determined.

The probe and hotbox heaters were adjusted to provide a temperature of 248 degrees fahrenheit (± 25). Crushed ice was placed around the impingers. The nozzle was placed on the first traverse point with the tip pointing directly into the gas stream. The pump was started immediately and the flow was adjusted to isokinetic sampling conditions. After the required time interval had elapsed, the probe was repositioned to

the next traverse point and isokinetic sampling was re-established. This was performed for each point until the run was completed. Readings were taken at each point and recorded on the field data sheet. At the conclusion of each run, the pump was turned off and the final readings were recorded.

5.1. Particulate Sample Recovery

Care was exercised in moving the collection train to the sample recovery area to minimize the loss of collected sample, or the gain of extraneous particulate matter. The volume of water in the impingers was measured, the silica gel impinger was weighed and recorded on the field data sheet. The probe, nozzle, and all sample-exposed surfaces were washed with reagent grade acetone into a clean sample container. A brush was used to loosen any adhering particulate matter and subsequent washings were placed into the container. The filter was carefully removed from the fritted glass support and placed in a clean separate sample container. A sample of the acetone used in the washing was saved for a blank laboratory analysis.

5.2. Particulate Analytical Procedures

The filter and any loose particulate matter were transferred from the sample container to a clean, tared weighing dish. The filter was placed in a desiccator for a least 24 hours and then weighed to the nearest 0.1 milligram until a constant weight

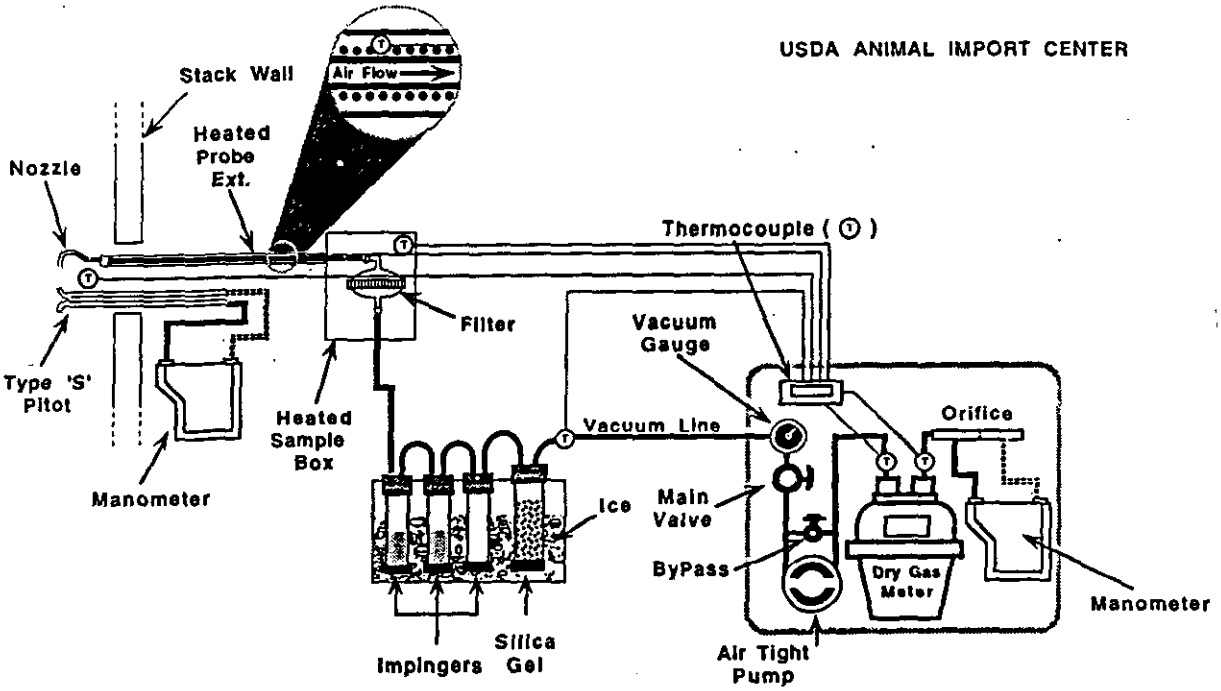
was obtained. The original weight of the filter was deducted, and the weight gain was recorded to the nearest 0.1 milligram.

The wash solution was transferred to a clean, tared beaker. The solution was evaporated to dryness, desiccated to a constant weight, and the weight gain was recorded to the nearest 0.1 milligram.

Figure # 16

SANDERS ENGINEERING & ANALYTICAL SERVICES **MOBILE, AL**

PARTICULATE SAMPLING TRAIN



PARTICULATE SAMPLING TRAIN (EPA METHOD 5)

USDA ANIMAL IMPORT CENTER **KEY WEST, FL**

6. CARBON MONOXIDE SAMPLING PROCEDURE (EPA Method 10)

The sampling procedure utilized is that specified in **40 CFR, Part 60, Appendix A, Method 10** as modified by the governing regulatory agency.A brief description of this procedure is as follows:

The sample was removed from the stack through a stainless steel probe and passed through a 3-way valve and an impinger moisture removal system. Teflon line was used to transport the sample through a sample transport pump and a sample flow control valve. From this point the sample was routed into a manifold with a bypass valve, then to an analyzer sample flow control valve and on to a Horiba Model PIR 2000 Carbon Monoxide analyzer. The analyzer uses a chopped infer red absorption measurement process to provide a voltage analogue output proportional to the concentration of carbon monoxide present in the sample. A schematic of the sampling train is presented in the attached Figure.

The instrument was allowed to warm up for at least 30 minutes before it was initially calibrated. A high range calibration gas, between 80 to 90 percent of the span value, was introduced directly to the instrument. The instrument was allowed to fully respond to the calibration gas and the analyzer was adjusted to the correct value. Next, a mid- range calibration gas, between 50 to 60 percent of the span, was introduced directly to the instrument. Next zero air was introduced directly to the instrument to check the zero reading of the instrument. If any of the readings indicated

a difference of more than ±2% of the span, the analyzer was recalibrated. The high, middle and zero gasses were then introduced to the system at the 3-way valve. The response value for each of these gases was recorded.

To begin sampling, the 3-way valve was switched to allow the instrument to sample the stack gas. Twice the system response time was allowed to elapse before the chart was marked for the beginning of the run. After the required sampling time, the chart was marked for the end of the run. At the end of each run the 3-way valve was switched to allow introduction of the calibration gas which was closest in value to the exhaust gas CO concentration. Zero air was introduced to the system. The zero and calibration drift were recorded. If the drift values were greater than ±5% of the span, the run was invalidated. The 3-way valve was switched to allow sampling of the stack gas, and the next run was begun. This procedure was repeated until all runs were completed.

6.1. Carbon Monoxide Sample Recovery & Analysis

After the tests were completed, the chart recorder data was reduced to give an average carbon monoxide concentration in ppm for each run. This average concentration was then corrected for the analyzer zero and span drift using the equation:

$$C\ gas = \frac{(C - Co)\ \ Cma}{(Cm - Co)}$$

Where:

C gas = Effluent gas Concentration, dry basis, ppm.

C = Average gas concentration indicated by the gas analyzer, dry basis, ppm.

Co = Average of Initial and final system calibration responses for the zero gas, ppm.

Cm = Average of initial and final calibration responses for the upscale calibration gas, ppm.

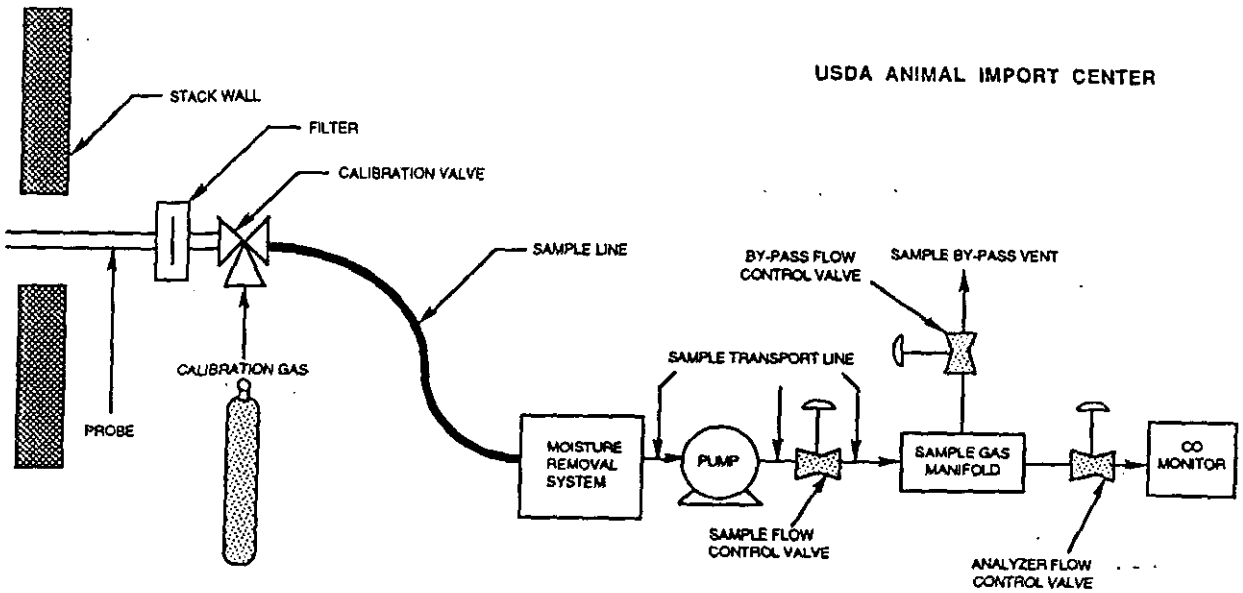
Cma = Actual concentration of the scale calibration gas, ppm.

Figure #17

SANDERS ENGINEERING & ANALYTICAL SERVICES **MOBILE, AL**

CARBON MONOXIDE SAMPLING TRAIN

USDA ANIMAL IMPORT CENTER



CARBON MONOXIDE SAMPLING TRAIN (EPA METHOD 10)

USDA ANIMAL IMPORT CENTER **KEY WEST, FL**

7. HYDROGEN CHLORIDE SAMPLING PROCEDURE (EPA Method 26)

The sample procedure utilized was that approved by the U. S. Environmental Protection Agency. A brief description of the sampling procedure is as follows.

The sample train was prepared in the following manner: A knockout impinger was placed at the beginning of the collection system. 15 ml of absorbing solution (0.1 N sulfuric acid) was placed in the second and third impingers. 15 ml of scrubber solution (0.1 N sodium hydroxide) was placed in the fourth and fifth impingers. Preweighed silica gel was added to the sixth impinger. The first impingers was then connected by a three-way valve to a heated filter. The heated filter was then connected to a heated quartz glass lined probe. The temperature in the heated glass liner and box containing the filter were maintained at a temperature of 248 degrees F. The train, with the probe, as shown in the following schematic, was leak checked by plugging the inlet and pulling a 10 inch Hg vacuum. This vacuum was maintained for 30 seconds. If the vacuum gauge showed a decrease in vacuum indicating a leak, the sample run was voided (see the attached Figure).

Crushed ice was then placed around the impingers. The tip of the probe was placed at the sampling site. The pump was started immediately and the flow was

adjusted to a rate equal to 2 liters per minute. During sampling, readings were taken at five minute intervals. After sixty minutes sampling time had elapsed, the pump was turned off, the final readings recorded, the probe removed from the stack, and a final leak rate was determined.

7.1. Sample Recovery

After the completion of each run, the collection train was moved to the sample recovery area. The contents of the impingers were emptied into a leak-free glass bottle. The impingers and connecting tubes were rinsed with distilled water and these washings were added to the storage container.

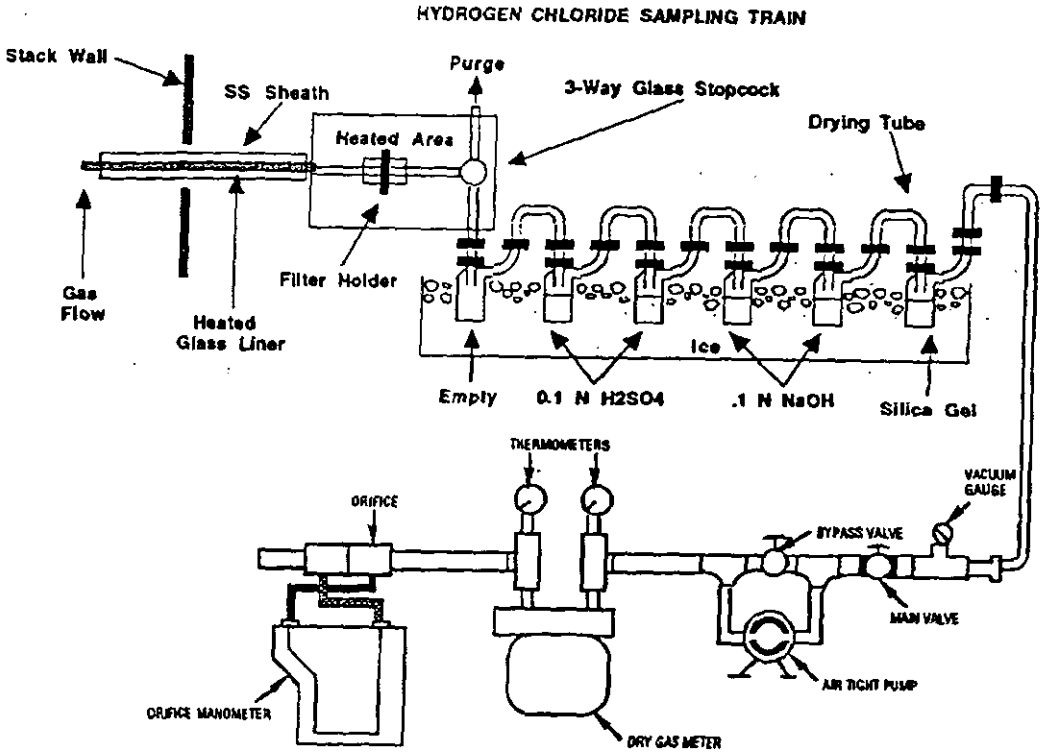
7.2. Analytical Procedure

Upon receipt by the laboratory the liquid level in each sample is checked to assure that no spillage has occurred. The sample is quantitatively transferred to a 100-ml volumetric flask and diluted to 100 ml with water. The chloride ion concentration is then determined by ion chromatograph. A sample of the absorbing solution is also analyzed for determination of any background chloride present. This value is referred to as concentration of blank.

Figure # 18

SANDERS ENGINEERING & ANALYTICAL SERVICES MOBILE, AL

HYDROGEN CHLORIDE SAMPLING TRAIN



USDA ANIMAL IMPORT CENTER KEY WEST, FL

APPENDIX A FIELD DATA SHEETS AND EQUATIONS

SANDERS ENGINEERING & ANALYTICAL SERVICES, Inc.
1568 Leroy Stevens Rd.
Mobile, AL 36695
Office: (205) 633-4120
FAX#: (205) 633-2285

EQUATIONS

1. $P_g = P_{bar} + \frac{P_g}{13.6}$

2. $P_m = P_{bar} + \frac{\overline{\Delta H}}{13.6}$

3. $Vs = KpCp \sqrt{\Delta P} \sqrt{\frac{\overline{T}_s}{M_s P_s}}$

4. $V_{m(std)} = 17.64\ V_m Y \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{\overline{T}_m} \right]$

5. $V_{mc} = V_m - (L_p - L_a)$

6. $V_{w(std)} = 0.04707\ V_{lc}$

7. $B_{ws} = \frac{V_{w(std)}}{V_{m(std)} + V_{w\ (std)}}$

8. $M_d = 0.44\ (\%CO_2) + 0.32\ (\%O_2) + 0.28\ (\%N2 - \%\ CO)$

9. $M_s = M_d\ (1 - B_{ws}) + 18\ B_{ws})$

10. $$EA = \frac{(\%O_2 - 0.5(\%CO))\ 100}{0.264(\%N_2) - (\%O_2) + 0.5(\%CO)}$$

11. $$Q_a = (V_s)\,(A_s)\,(60)$$

12. $$Q_s = Q_a(1 - B_{ws})\,\frac{(528)}{T_s}\,\frac{(P_s)}{29.92}$$

13. $$W_a = \frac{M_a\ V_{aw}}{V_a}$$

14. $$C_s = 0.0154\ \frac{Mn}{V_{m\,(std)}}$$

15. $$C_{50} = \frac{21\ C_S}{1 - ((1.5)\,(\%O_2) - 0.133(N_2) - 0.75\,(\%CO))}$$

16. $$C_{12} = \frac{C_S\ 12}{\%CO_2}$$

17. $$PMR = (C_s)\,(Q_3)\,\frac{(60)}{7000}$$

18. $$V_n = \left[(0.002669)\,(V_{lc}) + \frac{V_m\,Y}{T_m}\ P_{bar} + \frac{\Delta H}{13.6}\right]\frac{T_S}{P_S}$$

19. $$I = \frac{100V_n}{60\,O\,V_sA_n}$$

SANDERS ENGINEERING & ANALYTICAL SERVICES, INC.

NOMECLATURE

A_n = Cross-sectional area of nozzle. ft^2

A_s = Area of stack, ft^2

B_{ws} = Water vapor in the gas stream proporation by volume (dimensionless)

C_p = Pitot tube coefficient (dimensionless)

Cs = Particulate concentration, grains/SDCF

I = Percent of isokinetic sampling

K_m = Orifice correction factor (dimensionless)

K_p = Pitot tube constant, 85.49 ft/sec. [(lb/lb-mole) (in. Hg) / (°R) (inc. H_2O)] 1/2

Mn = Total amount of particulate matter collected, mg

M_d = Molecular weight of stack gas; dry basis, lb/lb-mole

M_s = Molecular weight of stack gas/wet basis, lb/lb-mole

P_{bar} = Barometric pressure at the sampling site, in. Hg

P_m = Meter pressure, in. Hg.

P_g = Stact static pressure, in. H_2O

P_{std} = Standard absolute pressure, 29.92 in. Hg

PMR = Particulate mass rate, lb/hr

Q_a = Volumetric flow rate, ACFM

Q_s = Volumetric flow rate, SDCFM

T_m = Average temperature of meter, °F

T_s = Average temperatur eof stack, °F

T_{std} = Standard temperature, 68 °F

NOTE: Capital T denotes degrees Rankin

V_s = Average stack gas velocity ft/sec

V_{ls} = Total volume of liquid collected in impingers and silica gel, ml

V_m = Volume of gas sample as measured by dry gas meter, ACF

$V_{m\,(std)}$= Volme of gas sample as measured by the dry gas meter, corrected to standard conditions. SDCF

$V_{w(std)}$= Volume of water vapor in the gas sample, corrected to standard conditions, SCF

V_n = Volme collected at stack conditions through nozzle, ACF

Y = Dry gas meter calibration factor (dimensionless)

E = Emission in lbs/mm BTU

ΔH = Average pressure difference of orifice, in. H_2O

ΔP = Velocity head of stack gas, in. H_2O

$\sqrt{\Delta P}$ = Average of the square roots of the velocity pressure, in H_2O 1/2

= Total sampling time, minutes

$\%CO_2$, $\%O_2$, $\%N_2$, %CO = Number % by volume, dry basis from gas analysis

K_1 = 17.64 °R/in. Hg

F = Oxygen based F factor (9820) SDCF/mmBTU for bituminous coal)

0.5700
0.459

SANDERS ENGINEERING & ANALYTICAL SERVICES, Inc.
1568 Leroy Stevens Rd.
Mobile, AL 36695
Office: (205) 633-4120
FAX#: (205) 633-2285

FIELD DATA SHEET

COMPANY USDA. Animal Import Center DATE 4-6 DGM# C-175

PLANT ~~USDA - Animal Import Center~~ Key West OPERATOR Key West KwK ΔHa 0.7250 cu. ft. /min.

UNIT Incin #1 METHOD 5 PROBE Stainless Steel liner 5 ft length

	RUN 1	RUN 2	RUN 3
NOZZLE CALIBRATION PRE	0.489	0.420	0.42
	0.489	0.420	0.42
	0.489	0.420	0.42
	0.489	0.420	0.420
AVERAGE	0.489		
NOZZLE CALIBRATION POST	0.489		
	0.489		
	0.489		
	0.489		
AVERAGE	0.489	AVERAGE	AVERAGE
FILTER NUMBER	98	[redacted] ~~97~~	~~57~~
METER READING FINAL	820.375	[redacted]	837.715
INITIAL	775.295		
Net	45.080		
LEAK CHECK SYSTEM Pre	16 in. Hg	19 in. Hg	19 in. Hg
Post	22 in. Hg	in. Hg	in. Hg
PITOT Pre impact	~~impact~~	impact	impact
Post impact	~~impact~~	impact	impact
Pre static	~~static~~	~~static~~	static
Post static	~~static~~	static	static
Pre cfm	0.012	0.000	0.010
Post cfm	0.012	cfm	cfm
VOLUME OF LIQUID WATER COLLECTED IMP. 1 FINAL	34	[redacted]	100
INITIAL	100	~~100~~	100
NET	-66		
IMP. 2 FINAL	222	[redacted]	100
INITIAL	100	~~100~~	100
NET	122		
IMP. 3 FINAL	0	[redacted]	0
INITIAL	0	~~0~~	0
NET	0		
IMP. 4 FINAL	1570.0	[redacted]	1575.2
INITIAL	1554.5	~~1554.5~~	
NET	15.5		
TOTAL	71.5	TOTAL	TOTAL
GAS ANALYSIS O_2	11.0%	14.5%	
CO_2	4	5.5%	
CO			
STATIC in. H_2O			
BAROMETRIC in. Hg	31.02	31.02	31.02

93

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F						VAC. in. H_g
					STACK	PROBE	HOT BOX	IMP.	GAS METER IN	GAS METER OUT	
1-1	14:50	775.295	0.10	1.5406	1575	—	238	67	86	81	4
2	14:53	777.45	0.12	1.380	1500	—	—	—	76	81	4
3	14:56	779.68	0.13	1.7757	1522	—	—	—	76	83	4
4	14:59	781.76	0.13	1.381	1400	—	—	—	78	86	4
5	15:02	783.61	0.13	1.9528	1345	—	230	69	79	89	4
6	15:05	786.05	013	1.7211	1580	—	—	—	80	90	5
7	15:08	788.25	0.14	1.8409	1602	—	—	—	85	91	7
8	15:11	790.52	0.16	2.0512	1655	—	—	—	83	93	7
9	15:14	792.88	0.17	2.195	1641	—	—	—	84	94	8.5
10	15:17	795.39	0.12	1.635	1530	—	—	—	86	96	10
2-1	15:24	797.37	0.12	1.7731	1375	—	—	—	87	94	8
2	15:27	799.68	0.14	1.9123	1525	—	—	—	87	94	16
3	15:30	802.15	0.14	1.8374	1506	1600V —	—	—	88	95	12.5
4	15:33	804.36	0.15	1.9507	1625	—	—	—	89	96	13.0
5	15:36	806.84	0.12	1.5546	1633	—	—	—	90	97	13.0
6	15:39	808.90	0.12	1.6567	1504	—	—	—	91	98	11.5
7	15:42	811.22	0.15	1.9331	1644	—	—	—	91	98	12.5
8	15:45	813.49	0.15	2.0154	1558	—	—	—	91	98	13
9	15:48	815.26	0.14	2.0541	1520	—	—	—	92	98	16
10	15:51	818.13	0.11	1.5681	1442	—	—	—	92	98	17
FINAL	—	820.375	—	—	1258	—	—	—	92	98	—
					1516.57		AVERAGE		85.38	92.75	
				1.7864	1516.57					89.46	

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-6

SITE Key West Inc #1 RUN # 1 PAGE 2 OF ____

M-5

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F						VAC. in. H_g
					STACK	PROBE	HOT BOX	IMP.	GAS METER IN	GAS METER OUT	
1-1	17:39	821.245	0.10	~~0.1322~~ 1.110	1140	—	230	70	78	78	2
2	17:42	823.18	0.13	1.127	1242	—	245	68	79	84	2
3	17:45	824.68	0.12	1.1384	1225	—	—	—	79	85	2
4	17:48	826.2	0.12	1.0515	1224	—	—	—	79	87	2
5	17:51	828.58	0.11	0.9459	1256	—	—	—	80	88	3
6	17:54	829.95	0.11	0.8736	1396	—	—	—	81	89	3
7	17:57	831.69	0.12	1.0680	1198	—	—	—	82	90	3
8	18:00	833.35	0.13	1.1570	1198	—	—	—	83	92	3
9	18:03	835.05	0.12	1.0540	1220	—	—	—	84	93	4
10	18:06	837.05	0.11	0.9570	1168	—	—	—	85	94	4
2-1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

VOID

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-6

SITE Key West RUN # 2 PAGE 3 OF ____

SANDERS ENGINEERING & ANALYTICAL SERVICES, Inc.
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FAX#: (205) 633-2285

FIELD DATA SHEET

COMPANY USDA Animal Import Center DATE 4-8-92 DGM# C-175

PLANT KEY WEST OPERATOR KWK ΔHa 0.7250 cu. ft. /min.

UNIT Insin #1 METHOD 5 PROBE SS liner 5ft length

	RUN 3	RUN 4	RUN
NOZZLE CALIBRATION PRE	0.500 / 0.500 / 0.500 / 0.500 / AVERAGE 0.500	0.500 / 0.500 / 0.500 / 0.500 / AVERAGE 0.500	/ / / / AVERAGE
NOZZLE CALIBRATION POST	0.500 / 0.500 / 0.500 / 0.500 / AVERAGE 0.500	/ / / / AVERAGE	/ / / / AVERAGE
FILTER NUMBER	63	64	
METER READING FINAL	139.955	185.090	
METER READING INITIAL	92.152	140.572	
METER READING NET	47.803	44.518	
LEAK CHECK SYSTEM Pre	18 in. Hg	18 in. Hg	in. Hg
LEAK CHECK SYSTEM Post	19 in. Hg	18 in. Hg	in. Hg
LEAK CHECK PITOT Pre	impact / static	0.001 cfm	cfm
LEAK CHECK PITOT Post	impact / static	0.002 cfm	cfm
VOLUME OF LIQUID WATER COLLECTED IMP. 1	74 / 100 / -26	84 / 100 / 168	
VOLUME OF LIQUID WATER COLLECTED IMP. 2	212 / 100 / 112	122 / 100 / 145	
VOLUME OF LIQUID WATER COLLECTED IMP. 3	0 / 0 / 0	0 / 0 / 0	
VOLUME OF LIQUID WATER COLLECTED IMP. 4	1524.5 / 1502.5 / 22.0	1666.8 / 1647.6 / 19.200	
TOTAL	108.0g	148.2	
GAS ANALYSIS O_2	11.64	13.125	
GAS ANALYSIS CO_2	4%	3%	
GAS ANALYSIS CO			
STATIC in. H_2O	-0.15	-0.15	
BAROMETRIC in. Hg	29.98	29.98	

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F						VAC. in. H_g
					STACK	PROBE	HOT BOX	IMP.	GAS METER IN	GAS METER OUT	
1-1	11:55	92.153	0.11	1.974	1430	—	242	66	84	86	4
2	11:58	94.59	0.11	1.8252	1260	—	—	—	84	89	4
3	12:01	96.98	0.11	1.8359	1250	—	—	—	84	91	5
4	12:04	99.37	0.11	1.9111	1230	—	—	—	84	92	5
5	12:07	101.72	0.11	1.9457	1200	—	—	—	85	94	6
6	12:10	104.22	0.11	1.8403	1295	—	—	—	86	95	6
7	12:13	107.12	0.14	2.3557	1255	—	—	—	88	97	8
8	12:16	107.37	0.12	2.0557	1254	—	—	—	85	98	8
9	12:19	111.41	0.13	2.2322	1250	—	—	—	88	98	8
1-10	12:22	113.95	0.06	0.9847	1329	—	—	—	90	100	4
2-1	12:28	116.068	0.11	1.9518	1300	—	—	—	90	95	5
2	12:31	118.65	0.12	1.9574	1320	—	—	—	91	100	5
3	12:34	120.97	0.13	2.0187	1448	—	—	—	92	102	5
4	12:37	123.34	0.12	1.8634	1436	—	—	—	93	102	9
5	12:40	125.71	0.16	1.5514	1440	—	—	—	93	102	8
6	12:43	128.07	0.12	1.9535	1360	—	—	—	93	102	10
7	12:46	130.47	0.15	2.2446	1520	—	—	—	94	104	11
8	12:49	132.94	0.15	2.256	1510	—	—	—	94	103	12
9	12:52	135.45	0.11	1.6603	1503	—	—	—	94	103	10
2-10	12:55	137.81	0.08	1.3861	1350	1350	—	—	95	103	8
FINAL		139.955	—	—	—	—	—	—	95	103	
				1.7876	1395.5				93.67		

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-8-92

SITE Key West Incin #1 RUN # 3 PAGE 2 OF ____

M-5 07

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F						VAC. in. H_g
					STACK	PROBE	HOT BOX	IMP.	GAS METER IN	GAS METER OUT	
1-1	14:44	140.572	0.10	1.5607	1350	—	230	65	79	85	2
2	14:47	141.86	0.10	1.551	1361	—	245	—	79	85	4
3	14:50	143.18	0.12	1.8626	1360	—	—	—	80	86	5
4	14:53	144.80	0.12	1.7564	1470	—	—	—	80	90	6
5	14:56	146.94	0.12	1.8225	1480	—	—	—	80	90	6
6	14:59	149.21	0.12	1.7736	1430	—	—	—	82	92	6
7	15:02	151.58	0.15	2.254	1420	—	—	—	82	93	8
8	15:05	154.04	0.15	2.1488	1512	—	—	—	83	94	9
9	15:08	156.56	0.10	1.45	1485	—	—	—	84	95	6
10	15:11	158.80	0.04	0.6091	1395	—	—	—	86	96	2
2-1	15:20	161.30	0.11	1.7507	1315	—	—	—	85	94	7
2	15:23	163.90	0.12	1.8729	1350	—	—	—	90	100	8
3	15:26	166.13	0.12	1.8729	1350	—	—	—	91	101	8
4	15:29	168.32	0.11	1.7263	1340	—	—	—	91	101	9
5	15:32	171.20	0.10	1.5026	1420	—	—	—	92	101	9
6	15:35	173.05	0.10	1.5428	1371	—	—	—	93	101	9
7	15:38	176.60	0.14	2.1494	1380	—	—	—	94	103	11
8	15:41	177.60	0.14	2.1850	1350	—	—	—	94	103	12
9	15:44	180.37	0.12	1.8423	1380	—	—	—	94	104	12
2-10	15:47	182.62	0.10	1.6051	1300	—	—	—	94	104	11
FINAL		185.090									
				1.7429	1369				91.3		

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-8-92

SITE Key West Incin #1 RUN # 4 PAGE ____ OF ____

C1

SANDERS ENGINEERING & ANALYTICAL SERVICES, Inc.
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FAX#: (205) 633-2285

FIELD DATA SHEET

COMPANY USDA Animal Insect Cntl DATE 4-6-92 METER BOX C-133

PLANT/(UNIT) Inc# 9 (one) OPERATOR JCS ΔHa ______ cu. ft./min.

LOCATION Key West METHOD 1/5 PROBE ______ liner/length

	RUN 1	RUN 2	RUN 3
NOZZLE CALIBRATION PRE / POST (AVERAGE)			
NOMOGRAPH (Km, Cm, Noz, Ts, ..., Ps/Pm)			
FILTER			
METER READING FINAL	427.748		
METER READING INITIAL	423.780	428.114	429.693
METER READING NET	3.968		
LEAK CHECK SYSTEM Pre (in. Hg / cfm)			
LEAK CHECK SYSTEM Post (in. Hg / cfm)			
LEAK CHECK PITOT Pre (impact / static)			
LEAK CHECK PITOT Post (impact / static)			
VOLUME OF LIQUID WATER COLLECTED IMP. 1–4 (FINAL / INITIAL / NET)			
TOTAL			
GAS ANALYSIS O_2			
GAS ANALYSIS CO_2	4		
GAS ANALYSIS CO			
STATIC (in. H_2O)			
BAROMETRIC (in. Hg)	30.02		

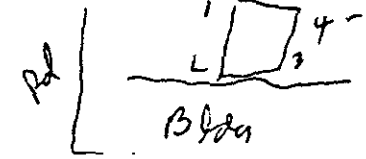
Barnes Mall

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD Δp in.H_2O	ORIFICE HEAD ΔH in.H_2O	TEMPERATURE °F STACK T_1	PROBE T_2	HOT BOX T_3	IMP. T_4	GAS METER IN	GAS METER OUT	VAC. in. Hg
1-1	2:50	473.780	2.0	10.9	88	88	89	89	85	84	(
	255	474.0	2.0	10.9					85	84	(
	3:00	474.3	2.0	13.4	97	95	96	98	85	84	(
	3:05	474.7	2.0	9.0	95	93	96	95	87	85	1
	3:10	475.1	2.0	9.7	95	94	100	96	90	87	1
	3:15	475.4	2.0	10.2	97	103	103	100	90	87	1
2-1	3:24	475.7	2.0	13.8	103	100	109	106	90	87	1
2-1	3:29	476.1	2.0	9.3	102	106	99	104	90	87	1
-1	3:34	476.4	2.0	9.8	107	101	113	110	90	87	1
-1	3:39	476.7	2.0	12.6	104	98	111	95	90	87	1
-1	3:44	477.1	2.0	11.0	112	104	133	116	90	87	1
-1	3:49	477.4	2.0	12.3	116	107	138	112	90	87	1
	3:54	477.788									
Total Time 60 min											
				11.183							

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-6-92

SITE Inc. I - Key West. RUN # 1 PAGE 2 OF 45



C1

100

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD ~~ΔH~~ in. H_2O	TEMPERATURE °F STACK T_1	PROBE T_2	HOT ~~BOX~~ T_3	~~IMP.~~ T_4	GAS METER IN	GAS METER OUT	VAC. in. Hg
2-1	5:40	478.114	2.0	11.7	134	122	120	135	90	90	1
-2	5:45	478.4	2	10.9	134	124	130	140	91	90	1
-3	5:50	478.7	2	11.1	140	131	132	141	91	90	1
-4	5:55	479.0	2	10.6	140	133	131	144	91	90	1
-1	6:00	479.3	2	14.7	152	141	146	151	91	90	1
-1	6:05	479.6	2	13.2	153	139	147	151	90	89	1

Test Aborted

Burner Malfunction

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA AIC DATE 4-6-92

SITE Inc #1 Key West RUN # 2 PAGE 3 OF #5

C1

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FIELD DATA SHEET

COMPANY USDA Animal Import Center DATE 4-8-92 DGM# G133
PLANT Key West Fla. OPERATOR JCS ΔHa _____ cu. ft. /min.
UNIT Inc #1 METHOD C1 PROBE _____ liner _____ length

	RUN 3	RUN 4	RUN
NOZZLE CALIBRATION PRE			
NOZZLE CALIBRATION POST			
FILTER NUMBER			
METER READING FINAL	509.065	513.432	
METER READING INITIAL	505.017	509.307	
METER READING NET	4.048	4.125	
LEAK CHECK SYSTEM Pre (in. Hg)			
LEAK CHECK SYSTEM Post (in. Hg)			
LEAK CHECK PITOT Pre			
LEAK CHECK PITOT Post			
VOLUME OF LIQUID WATER COLLECTED IMP. 1			
VOLUME OF LIQUID WATER COLLECTED IMP. 2			
VOLUME OF LIQUID WATER COLLECTED IMP. 3			
VOLUME OF LIQUID WATER COLLECTED IMP. 4			
VOLUME OF LIQUID WATER COLLECTED TOTAL			
GAS ANALYSIS O_2			
GAS ANALYSIS CO_2	4.0	3.0	
GAS ANALYSIS CO			
STATIC (in. H_2O)	-.17		
BAROMETRIC (in. Hg)	29.88	29.99	

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in H_2O Ref 2	ORIFICE HEAD ΔH in H_2O Qi	TEMPERATURE °F STACK T_1	PROBE T_2	HOT BOX T_3	IMP. T_4	GAS METER IN	GAS METER OUT	VAC. in. Hg
1-1	11:55	505.017	2.0	12.1	117	108	103	107	88	88	0
-2	12:00	505.3	2.0	11.9	127	120	116	122	89	89	0
-1	12:05	505.4	2.0	12.6	149	140	137	144	89	89	0
-1	12:10	506.0	2.0	11.7	150	142	137	143	89	89	0
-1	12:15	506.4	2.0	12.3	159	149	147	153	89	89	0
-1	12:20	506.7	2.0	10.8	155	144	139	145	88	88	0
2-1	12:28	507.1	2.0	11.7	149	141	134	144	88	88	0
-1	12:33	507.4	2.0	12.7	152	143	135	142	88	88	0
-1	12:38	507.7	2.0	11.2	153	144	139	147	88	88	0
-1	12:43	508.1	2.0	11.4	156	146	141	149	87	87	0
-1	12:48	508.4	2.0	10.6	159	151	144	152	86	86	0
-1	15:53	508.7	2.0	10.7	159	151	143	151	84	84	0
Off	12:58	509.065									1
				11.4-1	148.75	139.917	134.75	141.583	87.75		

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-8-92

SITE Inc #01 Key West RUN # 3 PAGE ____ OF ____

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O Rod 2	ORIFICE HEAD ΔH in H_2O	TEMPERATURE °F STACK T_1	PROBE T_2	HOT BOX T_3	IMP. T_4	GAS METER IN	GAS METER OUT	VAC. in. H_g
1-1	2:44	509.307	2.0	13.7	193	183	169	179	79	79	0
-1	2:49	509.6	2.0	11.0	181	171	164	176	79	79	0
-1	2:54	510.0	2.0	13.8	181	173	169	180	79	79	0
-1	2:59	510.3	2.0	13.0	180	168	170	182	79	79	0
-1	3:04	510.7	2.0	12.5	175	165	172	183	79	79	0
-1	3:09	511.0	2.0	13.0	181	172	166	176	80	80	0
2-1	3:20	511.4	2.0	13.3	180	170	164	182	81	81	0
-1	3:25	511.7	2.0	13.2	188	174	173	185	82	82	0
-1	3:30	512.1	2.0	14.5	187	177	174	185	82	82	0
-1	3:35	512.4	2.0	13.1	183	172	169	180	82	82	0
-1	3:40	512.7	2.0	13.8	186	172	173	185	82	82	0
-1	3:45	513.1	2.0	12.6	191	179	177	187	81	81	0
Off	3:50	513.432									
				13.125	184.083	173.00	170.333	181.667			

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-8-92

SITE Inc #1 Key West RUN # 4 PAGE ____ OF ____

SANDERS ENGINEERING & ANALYTICAL SERVICES, Inc.

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FIELD DATA SHEET

COMPANY: USDA Animal Import Center DATE: 4-7 DGM#: C-175

PLANT: Key West OPERATOR: KWR ΔHa: 0.0250 cu. ft./min.

UNIT: Incin #2 METHOD: 5 PROBE: SS liner, 5 ft length

	RUN 1	RUN 2	RUN 3
Nozzle calibration date	4-7	4-7	4-8
Nozzle PRE	0.500, 0.500, 0.500, 0.500	0.500, 0.500, 0.500, 0.500	0.500, 0.500, 0.500, 0.500
Nozzle POST	0.500, 0.500, 0.500, 0.500	0.500, 0.500, 0.500, 0.500	
Filter number	62	60	61
Meter reading FINAL	~~953.000~~ 996.553	1046.583	~~46.973~~ 91.875
Meter reading INITIAL	~~953.000~~ 953.000	997.850	46.973
Meter reading NET	43.553	48.733	44.902
Leak check system Pre (in. Hg)	18	18	18
Leak check system Post (in. Hg)	21	20	18
Leak check system Pre (cfm)	0.018	0.018	0.005
Leak check system Post (cfm)	0.008	0.008	0.005
IMP. 1 FINAL / INITIAL / NET	220 / 100 / 120	112 / 100 / 12	46 / 100 / -54
IMP. 2 FINAL / INITIAL / NET	40 / 100 / -60	178 / 100 / 78	186 / 100 / 86
IMP. 3 FINAL / INITIAL / NET	0 / 0 / 0	2 / 0 / 2	66 / 0 / 66
IMP. 4 FINAL / INITIAL / NET	1581.0 / 1578.3 / 2.7	1559.2 / 1543.0g / 16.2	1647.6 / 1630.5g / 17.1
TOTAL	62.70	128.2	115.10
O_2	10%	12.5%	15.5%
CO_2	8%	2.0%	3.5%
CO			
STATIC (in. H_2O)	-0.15	-0.15	-0.15
BAROMETRIC (in. Hg)	30.02	30.02	~~30.02~~ 29.98

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PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in. H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F						VAC. in. H_g
					STACK	PROBE	HOT BOX	IMP.	GAS METER IN	GAS METER OUT	
1-1	15:35	953.00	0.07	1.1898	1382	—	—	—	97	97	2
2	15:38	954.81	0.10	1.7728	1306	—	—	—	98	102	2
3	15:41	956.58	0.12	2.2349	1221	—	—	—	96	106	2
4	16:05	957.56	0.13	2.1567	1427	—	—	—	97	96	5
5	16:08	959.91	0.15	2.1741	1700	—	—	—	97	102	6
6	16:11	962.51	0.09	1.4088	1546	—	—	—	97	104	8
7	16:14	964.58	~~0.08~~	2.1952	1536	—	—	—	98	105	7
8	16:17	967.10	~~0.09~~ 0.07	1.4231	1520	—	—	—	98	106	11
9	16:20	969.32	0.16	2.3658	1525	—	—	—	99	106	8
1-10	16:23	971.73	0.15	2.2257	1650	—	—	—	100	108	15
2-1	16:26	973.58	0.15	2.2257	1642	—	—	—	100	105	13
2	16:31	975.82	0.14	2.2081	1525	—	—	—	100	105	14
3	16:34	978.40	0.12	1.9984	1420	—	—	—	100	105	17
4	16:37	980.79	0.15	2.2470	1530	1530	—	—	100	105	17
5	16:40	963.95	0.12	1.7688	1664	—	—	—	99	103	17
6	16:43	985.73	0.12	1.9577	1459	1459	—	—	100	104	17
7	16:46	987.58	0.05	1.5422	1387	—	—	—	100	104	17
8	16:49	~~988.~~ 990.00	0.10	1.7015	1386	—	—	—	100	104	15
9	16:52	991.92	0.09	1.5076	1409	—	—	—	100	104	16
2-10	16:55	993.87	0.09	1.607	1300	—	—	—	100	104	15
FINAL	16:58	996.553	0.09	—	1470	—	—	—	100	104	15
				1.8953	1460.62					104.09	

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-7-92

SITE Key West Tech #7 RUN # 1 PAGE 2 OF 4

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F						VAC. in. H_g
					STACK	PROBE	HOT BOX	IMP.	GAS METER IN	GAS METER OUT	
1-1	17:40	997.850	0.11	1.8358	1382	—	247	67	93	95	4
2	17:43	999.71	0.16	1.7319	1315	—	—	—	93	98	4
3	17:46	1002.44	0.10	1.7790	1268	—	—	—	94	103	5
4	17:49	1004.53	0.09	1.588	1282	—	—	—	95	104	6
5	17:52	1006.89	0.08	1.3981	1259	—	—	—	95	104	6
6	17:55	1009.10	0.13	2.2388	1325	—	—	—	96	105	6
7	17:58	1011.42	0.15	2.6654	1270	—	—	—	96	106	9
8	18:01	1014.04	0.14	2.3134	1381	—	—	—	97	107	12
9	18:04	1016.88	0.12	2.1274	1274	—	—	—	98	108	13
1-10	18:07	1019.63	0.08	1.4543	1231	—	—	—	98	106	9
2-1	18:15	1021.927	0.11	1.9325	1290	—	—	—	98	99	8
2	18:18	1024.08	0.15	2.4436	1427	—	—	—	98	105	12
3	18:21	1026.42	0.16	2.6906	1368	—	—	—	99	106	15
4	18:24	1029.64	0.17	2.554	1586	—	—	—	99	106	17
5	18:27	1031.69	0.13	3.0452	1494	—	—	—	99	104	15
6	18:30	1034.32	0.13	2.1613	1389	—	—	—	99	104	16
7	18:33	1037.0	0.11	1.7235	1502	—	—	—	99	105	15
8	18:36	1039.39	0.12	1.9415	1440	—	—	—	99	104	14
9	18:39	1041.84	0.10	1.6509	1402	—	—	—	99	104	14
2-10	18:42	1043.89	0.16	1.6872	1362	—	—	—	99	105	14
Final		1046.583			1257	—	—	—	99	104	
				2.0141	1358.285				100.57		

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-7-92

SITE Key West Incin #2 RUN # 2 PAGE 3 OF 4

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F STACK	PROBE	HOT BOX	IMP.	GAS METER IN	GAS METER OUT	VAC. in. H_g
1-1	9:30	46.973	0.10	[illegible]	[illegible] 1230	—	222	70	74	75	6
2	9:33	49.20	0.11	1.75	1330	—	248	60	73	77	5
3	9:36	51.35	0.11	1.7587	1325	—	—	—	74	81	5
4	9:39	53.82	0.09	1.4933	1260	—	—	—	75	84	5
5	9:41	55.95	0.09	1.4864	1268	—	—	—	77	86	5
6	9:44	58.34	0.11	1.8912	1200	—	—	—	78	87	5
7	9:47	60.37	0.10	1.9801	1453	—	—	—	79	89	6
8	9:50	62.49	0.14	2.2321	1330	—	—	—	81	91	7
9	9:53	65.12	0.11	1.7061	1360	—	—	—	82	92	6
1-10	9:56	67.56	0.11	1.8104	1275	—	—	—	83	93	7
2-1	10:03	69.775	0.12	1.9502	1462	—	—	—	85	95	7
2	10:06	72.05	0.16	1.5681	1360	—	—	—	87	96	6
3	10:09	74.29	0.12	1.93	1315	—	—	—	87	97	8
4	10:12	76.68	0.11	1.7441	1340	—	—	—	88	98	8
5	10:15	78.97	0.12	1.9705	1278	—	—	—	89	99	8
6	10:18	81.73	0.10	1.494	1450	—	—	—	90	99	7
7	10:21	83.52	0.08	1.2275	1400	—	—	—	91	100	6
8	10:24	85.30	0.09	1.4036	1370	—	—	—	92	100	6
9	10:27	87.39	0.09	1.4762	1280	—	—	—	92	101	7
2-10	10:30	89.55	0.070	1.5486	1330	1350 —	—	—	94	102	7
FINAL		91.785		.66830	310.9				89.825		

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-8-92

SITE Key West Incin #2 RUN # 3 PAGE 4 OF 4

M-5

SANDERS ENGINEERING & ANALYTICAL SERVICES, Inc.
1568 Leroy Stevens Rd.
Mobile, AL 36695
Office: (205) 633-4120
FAX#: (205) 633-2285

FIELD DATA SHEET

COMPANY USDA Animal Import Center DATE 4-7-92 METER BOX C-33

PLANT/(UNIT) Incinerator # 2 OPERATOR JCS ΔHa _____ cu. ft. /min.

LOCATION Key West, Fla. METHOD C1 PROBE _____ liner/length

RUN 1

NOZZLE CALIBRATION

PRE	POST
AVERAGE	AVERAGE

NOMOGRAPH

Kn	Tm
Noz	Ts
	ΔpH

FILTER

METER READING

496.539 FINAL	FINAL
492.435 INITIAL	INITIAL
4.104 NET	NET

LEAK CHECK

SYSTEM Pre	SYSTEM Post	PITOT Pre	PITOT Post
in. Hg	10 in. Hg	impact	impact
cm	02 cm	static	static

VOLUME OF LIQUID WATER COLLECTED

	IMP. 1	IMP. 2	IMP. 3	IMP. 4
FINAL				
INITIAL				
NET				

TOTAL _____

GAS ANALYSIS

O_2 10.0
CO_2 8.0
CO _____

STATIC -.15 in. H_2O

BAROMETRIC 30.02 in. Hg

RUN 2

NOZZLE CALIBRATION

PRE	POST
AVERAGE	AVERAGE

FILTER

METER READING

500.685 FINAL	FINAL
496.583 INITIAL	INITIAL
4.102 NET	NET

LEAK CHECK

SYSTEM Pre	SYSTEM Post	PITOT Pre	PITOT Post
in. Hg	10 in. Hg	impact	impact
cm	02 cm	static	static

VOLUME OF LIQUID WATER COLLECTED

	IMP. 1	IMP. 2	IMP. 3	IMP. 4
FINAL				
INITIAL				
NET				

TOTAL _____

GAS ANALYSIS

O_2 _____
CO_2 2.0
CO _____

STATIC -.15 in. H_2O

BAROMETRIC 30.02 in. Hg

RUN 3 on 4-8-92

NOZZLE CALIBRATION

PRE	POST
AVERAGE	AVERAGE

FILTER

METER READING

504.941 FINAL	FINAL
500.738 INITIAL	INITIAL
4.103 NET	NET

LEAK CHECK

SYSTEM Pre	SYSTEM Post	PITOT Pre	PITOT Post
in. Hg	10 in. Hg	impact	impact
cm	02 cm	static	static

VOLUME OF LIQUID WATER COLLECTED

	IMP. 1	IMP. 2	IMP. 3	IMP. 4
FINAL				
INITIAL				
NET				

TOTAL _____

GAS ANALYSIS

O_2 _____
CO_2 _____
CO _____

STATIC -.15 in. H_2O

BAROMETRIC 29.98 in. Hg

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD Δi in$_{O_2}H_2O$	TEMPERATURE °F STACK T_1	PROBE T_2	HOT BOX T_3	IMP. T_4	GAS METER IN	GAS METER OUT	VAC. in. H_g
1-1	3:35	492.435	2.0	9.3	132	129	113	119	88	89	0
1-1	3:40	442.9	2.0	15.6	141	136	120	125	89	89	0
1-1	4:05	497.1	2.0	8.0	145	140	127	131	87	87	0
-1	4:10	493.4	2.0	7.9	150	144	129	135	87	87	0
-1	4:15	493.8	2.0	9.8	151	147	134	139	87	87	0
-1	4:20	494.1	2.0	11.9	157	155	143	147	87	87	0
2-1	4:25	494.5	2.0	9.9	156	157	143	149	85	85	0
-1	4:33	494.9	2.0	11.0	158	157	143	149	83	83	0
-1	4:38	495.1	2.0	7.2	156	150	164	164	83	83	0
-1	4:43	495.4	2.0	13.7	171	166	150	157	83	83	0
-1	4:48	495.8	2.0	12.7	155	150	163	163	82	82	0
-1	4:53	496.2	2.0	11.0	164	161	172	170	82	82	0
BB	4:58	496.539									
				10.667	153.0	149.33	141.75	145.58		85.167	

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE _____

SITE Inc #2 Key West RUN # 1 PAGE ____ OF ____

C1

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O Ro=2	ORIFICE HEAD ΔH in.H_2O O=2	TEMPERATURE °F STACK T_1	PROBE T_2	HOT BOX T_3	IMP. T_4	GAS METER IN	GAS METER OUT	VAC. in. H_g
2-1	5:40	496.583	2.0	11.9	147	151	137	147	80	80	0
-1	5:45	476.9	2.0	14.1	171	175	161	170	80	80	0
-1	5:50	497.3	2.0	15.0	181	188	171	181	80	80	0
-1	5:55	497.6	2.0	14.4	184	190	175	185	80	80	0
-1	6:00	495.0	2.0	13.4	208	216	200	210	80	80	0
-1	6:05	498.3	2.0	14.5	189	197	180	190	80	80	0
1-1	6:15	498.7	2.0	11.6	189	191	180	192	80	80	0
-1	6:20	499.0	2.0	14.7	199	202	188	198	79	79	0
-1	6:25	499.3	2.0	12.4	189	195	186	200	79	79	0
-1	6:30	499.6	2.0	13.1	188	191	175	186	79	79	1
-1	6:35	499.9	2.0	11.2	191	193	179	190	79	79	1
-1	6:40	500.3	2.0	12.2	188	192	177	188	79	79	1
		500.685									
				13.208	185.33	190.08	175.75	186.416		79.583	

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA DATE 4-7-92

SITE Arc #2 Key West RUN # 2 PAGE 3 OF ____

C1

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F STACK T_1	PROBE T_2	HOT BOX T_3	IMP. T_4	GAS METER IN	GAS METER OUT	VAC. in. H_g
1-1	9:30	500.731	2.0	11.7	114	116	111	120	89	89	0
-2	9:35	501.0	2.0	11.7	130	132	127	135	88	88	0
-1	9:40	501.4	2.0	12.6	133	137	133	143	88	88	1
-1	9:45	501.7	2.0	12.9	134	137	133	140	88	88	1
-1	9:50	502.0	2.0	12.5	135	140	136	145	88	88	1
-1	9:55	502.3[illegible]	2.0	13.5	139	143	139	148	88	88	1
2-1	10:03	502.8	2.0	10.3	135	139	136	143	90	89	1
-2	10:08	503.1	2.0	13.4	131	135	131	140	91	90	1
-1	10:13	503.5	2.0	12.6	141	143	139	146	91	91	1
-1	10:18	503.9	2.0	10.0	131	135	132	140	90	90	1
-1	10:23	504.2	2.0	13.1	138	138	134	142	90	90	1
-1	10:28	504.6	2.0	13.6	139	143	140	149	90	90	1
000	10:33	504.941	2.0	1							
				12.3093	133.333	136.417	132.583	140.917		89.167	

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY _____ DATE 4-8-92

SITE Inc #12 Key West RUN # 3 PAGE ____ OF ____

C1

SANDERS ENGINEERING & ANALYTICAL SERVICES, Inc.
1568 Leroy Stevens Rd.
Mobile, AL 36695
Office: (205) 633-4120
FAX#: (205) 633-2285

FIELD DATA SHEET

COMPANY USDA Animal Import Center DATE 4-7-92 DGM# C-175
PLANT Key West OPERATOR KWIC ΔHa 0.7250
UNIT Incin #3 METHOD 5 PROBE SS (liner) 5 ft (length) cu. ft. /min.

	RUN 1	RUN 2	RUN 3
NOZZLE CALIBRATION PRE	0.420 / 0.420 / 0.420 / 0.420 AVERAGE	0.500 / 0.500 / 0.499 / 0.500 AVERAGE	0.500 / 0.500 / 0.~~499~~ / 0.500 AVERAGE
NOZZLE CALIBRATION POST	0.420 / 0.420 / 0.420 / 0.420 AVERAGE	0.500 / 0.500 / 0.500 / 0.500 AVERAGE	0.500 / 0.500 / 0.500 / 0.500 AVERAGE
FILTER NUMBER	97	59	101
METER READING FINAL	869.573	~~870.300~~ 910.584	951.723
METER READING INITIAL	840.245	870.300	910.900
METER READING NET	29.328	40.284	40.823
LEAK CHECK SYSTEM Pre	19 in. Hg	16 in. Hg	17 in. Hg
LEAK CHECK SYSTEM Post	19 in. Hg	18 in. Hg	18 in. Hg
LEAK CHECK PITOT Pre	~~impact~~ / ~~static~~	~~impact~~ / ~~static~~	impact / ~~static~~
LEAK CHECK PITOT Post	~~impact~~ / ~~static~~	~~impact~~ / ~~static~~	~~impact~~ / ~~static~~
LEAK CHECK SYSTEM Pre	0.005 cfm	0.000 cfm	0.001 cfm
LEAK CHECK SYSTEM Post	0.05 cfm	0.001 cfm	0.006 cfm
LEAK CHECK PITOT Pre	~~static~~	~~static~~	static
LEAK CHECK PITOT Post	~~static~~	~~static~~	~~static~~
VOLUME OF LIQUID WATER COLLECTED IMP. 1	106 FINAL / 100 INITIAL / 6 NET	184 FINAL / 100 INITIAL / 84 NET	194 FINAL / 100 INITIAL / 84 NET
VOLUME OF LIQUID WATER COLLECTED IMP. 2	154 FINAL / 100 INITIAL / 54 NET	108 FINAL / 100 INITIAL / 8 NET	114 FINAL / 100 INITIAL / 14 NET
VOLUME OF LIQUID WATER COLLECTED IMP. 3	0 FINAL / 0 INITIAL / 0 NET	2 FINAL / 0 INITIAL / 2 NET	0 FINAL / 0 INITIAL / 0 NET
VOLUME OF LIQUID WATER COLLECTED IMP. 4	1439.7 FINAL / 1433.7 INITIAL / 6.0 NET	1578.3 FINAL / 1571.5 INITIAL / 6.8 NET	1446.8 FINAL / ~~1439.7~~ 1439.7 INITIAL / 7.1 NET
TOTAL	66.0	100.80	105.1
GAS ANALYSIS O_2	~~13.0~~ 10.5%	14.5%	11.5%
GAS ANALYSIS CO_2	~~10.5~~ 5.5%	8%	6%
GAS ANALYSIS CO			
STATIC	-0.15 in. H_2O	-0.15 in. H_2O	-0.15 in. H_2O
BAROMETRIC	30.02 in. Hg	30.02 in. Hg	30.02 in. Hg

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F						VAC. in. H_g
					STACK	PROBE	HOT BOX	IMP.	GAS METER IN	GAS METER OUT	
1 - 1	9:45	840.245	0.1	0.7714	1525	—	244	67	75	80	2
2	9:48	841.84	0.09	0.7252	1565	—	-	—	75	81	2
3	9:51	843.35	0.10	0.7805	1573	—	—	—	76	82	2
4	9:54	844.63	0.08	0.6198	1588	—	—	—	77	85	2
5	9:57	845.94	0.10	0.7571	1636	—	—	—	79	88	2
6	10:00	847.34	0.12	0.9285	1636	—	—	—	80	89	2
7	10:03	848.59	0.11	0.8364	1627	—	—	—	82	90	3
8	10:06	850.45	0.10	0.7658	1612	—	—	—	84	92	3
9	10:09	852.15	0.10	0.7279	1720	—	—	—	85	93	3
1 - 10	10:12	853.58	0.08	0.6284	1560	—	—	—	87	95	3
2 - 1	10:19	854.815	0.09	0.6923	1603	—	—	—	89	93	2
2	10:22	856.16	0.10	0.7553	1641	—	—	—	90	97	3
3	10:25	857.57	0.10	0.8276	1649	—	—	—	91	99	4
4	10:28	859.07	0.11	0.8292	1645	—	—	—	92	100	4
5	10:31	860.59	0.10	0.7545	1643	—	—	—	93	101	5
6	10:34	862.15	0.12	0.9865	1688	—	—	—	95	103	5
7	10:37	864.40	0.11	0.8088	1698	—	—	—	96	103	5
8	10:40	865.33	0.10	0.7474	1668	—	—	—	96	104	5
9	10:43	866.74	0.09	0.6813	1627	—	—	—	98	105	5
2 - 10	10:46	868.40	0.08	0.6832	1398	—	—	—	98	106	4
FINAL		869.573	0.08	0.7164	1212				99	106	4
				.7578	1620.66				91.19		

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-7

SITE Key West Incin #3 RUN # 1 PAGE 2 OF 4

M-5

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in.H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F						VAC. in. Hg
					STACK	PROBE	HOT BOX	IMP.	GAS METER IN	GAS METER OUT	
1-1	11:25	870.30	0.12	1.7511	1571	—	230	70	96	99	7
2	11:28	872.50	0.11	1.5 279	1678	—	247	67	97	103	6
3	11:31	874.22	0.11	1.5058	1705	—	—	—	97	103	7
4	11:34	876.26	0.11	1.5249	1678	—	—	—	97	105	7
5	11:37	878.44	0.11	1.5466	1648	—	—	—	98	106	8
6	11:40	880.61	0.10	1.3817	1648	—	—	—	98	108	8
7	11:43	882.41	0.10	1.3850	1638	—	—	—	99	107	7
8	11:46	884.72	0.11	1.4662	1720	—	—	—	100	108	7
9	11:49	887.00	0.11	1.4929	1681	—	—	—	100	108	7
1-10	11:52	888.88	0.08	1.1682	1530	—	—	—	100	108	8
2-1	11:55	890.527	0.10	1.397	1630	—	—	—	101	108	8
2	11:58	892.59	0.09	1.2389	1651	—	—	—	101	109	7
3	12:01	894.82	0.10	1.3844	1639	—	—	—	102	110	7
4	12:04	896.46	0.09	1.2119	1698	—	—	—	103	110	8
5	12:07	898.64	0.11	1.5077	1660	—	—	—	104	111	9
6	12:10	900.45	0.12	1.6017	1717	—	—	—	103	110	9
7	12:13	902.43	0.11	1.4856	1736	—	—	—	104	111	11
8	12:16	904.97	0.10	1.3244	1734	—	—	—	104	111	11
9	12:19	906.52	0.10	1.3403	1708	—	—	—	105	111	11
2-10	12:22	908.69	0.09	1.2192	1685	—	—	—	105	111	11
FINAL		910.584	0.06	0.7806	1318	—	260	68	105	111	10
				1.4004	1689					104.5	

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY US DA Animal Import Center DATE 4-7-92

SITE Key West Incin # 3 RUN # 2 PAGE 3 OF 4

M)-5

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in. H_2O	ORIFICE HEAD ΔH in. H_2O	TEMPERATURE °F						VAC. in. H_g
					STACK	PROBE	HOT BOX	IMP.	GAS METER IN	GAS METER OUT	
1 - 1	13:05	910.700	0.11	1.5284	~~1660~~	—	240	57	100	100	2
2	13:08	912.13	0.10	1.3895	1650	—	—	—	100	105	4
3	13:11	914.95	0.10	1.3706	1679	—	—	—	100	108	4
4	13:14	916.85	0.10	1.3777	1668	—	—	—	101	108	4
5	13:17	918.11	0.10	1.3681	1683	—	—	—	101	109	5
6	13:20	921.35	0.12	1.6573	1625	—	—	—	101	109	5
7	13:23	923.75	0.10	1.3504	1711	—	—	—	102	110	5
8	13:26	926.20	0.10	1.3498	1712	—	—	—	102	110	6
9	13:29	927.75	0.11	1.4665	1739	—	—	—	102	110	6
1 - 10	13:32	929.59	0.08	1.1048	1663	—	—	—	103	113	6
2 - 1	13:37	931.34	0.11	1.5212	1660	—	—	—	102	108	7
2	13:40	933.43	0.10	1.3153	1769	—	—	—	103	110	7
3	13:43	935.29	0.11	1.4410	1778	—	—	—	103	111	7
4	13:46	937.45	0.11	1.4346	1788	—	—	—	104	112	8
5	13:49	939.87	0.12	1.5230	1850	—	—	—	105	112	8
6	13:52	941.66	0.11	1.4346	1788	—	—	—	105	113	10
7	13:55	944.50	0.10	1.3236	1758	—	—	—	105	113	9
8	13:58	946.15	0.10	1.3535	1706	—	—	—	106	113	9
9	14:01	947.94	0.09	1.192	1755	—	—	—	106	114	8
2 - 10	14:04	949.80	0.08	1.132	1600	—	—	—	106	114	8
FINAL	14:07	951.723	0.04	0.8005	1005	—	—	—	106	114	8
				1.3554	1679					116.67	

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-7-92

SITE Key West Incin #3 RUN # 3 PAGE 4 OF 4

M-5

SANDERS ENGINEERING & ANALYTICAL SERVICES, Inc.
1568 Leroy Stevens Rd.
Mobile, AL 36695
Office: (205) 633-4120
FAX#: (205) 633-2285

FIELD DATA SHEET

COMPANY USDA Animal Import Ctr DATE 4-7-92 DGM# C-133

PLANT Key West OPERATOR JCS ΔHa _____ cu. ft. /min.

UNIT 3 METHOD C1 PROBE _____ liner _____ length

	RUN 1	RUN 2	RUN 3
NOZZLE CALIBRATION PRE			
NOZZLE CALIBRATION POST			
AVERAGE			
FILTER NUMBER			
METER READING FINAL	483.903	488.072	492.350
METER READING INITIAL	479.725	483.941	488.168
METER READING NET	4.178	4.131	4.182
LEAK CHECK SYSTEM Pre	.10 in. Hg	10 in. Hg	10 in. Hg
LEAK CHECK SYSTEM Post	10 in. Hg	10 in. Hg	10 in. Hg
LEAK CHECK SYSTEM cfm	OK / OK	OK / OK	OK / OK
LEAK CHECK PITOT Pre	impact / static	impact / static	impact / static
LEAK CHECK PITOT Post	impact / static	impact / static	impact / static
VOLUME OF LIQUID WATER COLLECTED IMP. 1 FINAL			
VOLUME OF LIQUID WATER COLLECTED IMP. 2 FINAL			
VOLUME OF LIQUID WATER COLLECTED IMP. 3 FINAL			
VOLUME OF LIQUID WATER COLLECTED IMP. 4 FINAL			
VOLUME OF LIQUID WATER COLLECTED IMP. 1 INITIAL			
VOLUME OF LIQUID WATER COLLECTED IMP. 2 INITIAL			
VOLUME OF LIQUID WATER COLLECTED IMP. 3 INITIAL			
VOLUME OF LIQUID WATER COLLECTED IMP. 4 INITIAL			
VOLUME OF LIQUID WATER COLLECTED IMP. 1 NET			
VOLUME OF LIQUID WATER COLLECTED IMP. 2 NET			
VOLUME OF LIQUID WATER COLLECTED IMP. 3 NET			
VOLUME OF LIQUID WATER COLLECTED IMP. 4 NET			
VOLUME OF LIQUID WATER COLLECTED TOTAL			
GAS ANALYSIS O_2	10.5	11.5	11.5
GAS ANALYSIS CO_2	5.5	8	6.0
GAS ANALYSIS CO			
STATIC in. H_2O	-.15	-.25	-.15
BAROMETRIC in. Hg	30.02	30.02	30.02

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ~~ΔP~~ in. H_2O Rota2	ORIFICE HEAD ΔH O2 ~~in. H_2O~~	TEMPERATURE °F STACK T1	PROBE T2	HOT ~~BOX~~ T3	~~IMP.~~ T4	GAS METER IN	GAS METER OUT	VAC. in. H_g
1-1	9:45	479.725	2.0	10.0	92	96	96	98	78	77	1
-2	9:50	480.0	2	8.7	97	99	99	99	79	77	1
-3	9:55	480.3	2.0	8.8	101	105	103	105	79	77	1
-4	10:00	480.7	2.0	8.7	105	108	108	109	80	78	1
-5	10:05	481.0	2.0	10.0	109	113	111	110	80	78	1
-1	10:10	481.4	2.0	7.8	118	122	118	120	82	80	1
2-1	10:18	481.7	2.0	9.6	117	122	118	119	84	81	1
-2	10:24	482.1	2.0	~~8~~9.2	120	125	120	121	87	83	1
-1	10:29	482.5	2.0	10.0	121	127	121	124	90	86	1
-1	10:34	482.9	2.0	6.5	125	131	124	128	92	88	1
-1	10:39	483.2	2.0	9.5	127	133	128	129	93	89	1
-1	10:44	483.5	2.0	11.0	131	138	131	135	94	91	1
~~Stop~~	10:49	483.903									
	60min Run										
				9.15	113.58	118.25	114.75	116.42		85.46	

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-7-92

SITE Inc #3 Key West RUN # 1 PAGE 2 OF 4

C1

PORT # / POINT #	TIME	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP in. H_2O Roto	ORIFICE HEAD ΔH in. O_2 H_2O	TEMPERATURE °F STACK T_1	PROBE T_2	~~HOT BOX~~ T_3	~~IMP.~~ T_4	GAS METER IN	GAS METER OUT	VAC. in. H_g
2-1	11:25	483.941	2.0	9.6	145	152	146	152	85	84	0
-1	11:30	484.2	2.0	8.3	155	163	159	163	85	84	0
-1	11:35	484.6	2.0	10.9	171	167	170	162	85	85	0
-1	11:40	484.9	2.0	11.4	168	178	174	179	85	85	0
-1	11:45	485.3	2.0	11.5	173	181	178	184	85	85	0
-1	11:50	485.6	2.0	10.6	171	180	177	184	85	85	0
1-1	11:57	485.9	2.0	11.6	167	176	175	183	85	85	0
-1	12.02	486.3	2.0	11.6	176	186	184	194	85	85	0
-1	1207	486.7	2.0	9.5	177	186	185	196	85	85	0
-1	1212	487.0	2.0	9.2	176	188	186	199	85	85	0
-1	1217	487.3	2.0	9.9	177	188	187	198	85	85	0
-1	1223	487.7	2.0	10.5	180	189	190	203	85	85	0
off	1228	488.072									
				10.52	169.83	177.73	175.92	183.08		84.92	

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Ctr. DATE 4-7-92

SITE Inc #3 Key West RUN # 2 PAGE 3 OF 4

C1 119

PORT # / POINT #	TIME 1:05	GAS METER VOL. (cu.ft.)	VEL. HEAD ΔP ~~in. H$_2$O~~ K$_p$T$_s$	ORIFICE HEAD ΔH ~~in H$_2$O~~ $\Delta H_{@}$	TEMPERATURE °F: STACK T_1	PROBE T_2	HOT BOX	~~IMP.~~ T_M	GAS METER IN	GAS METER OUT	VAC. in. H$_g$
1-1	1:05	488.166	2.0	9.9	191	196	191	207	85	85	0
1	1:10	488.5	2.0	11.3	187	193	197	241	85	85	0
1	1:15	488.9	2.0	10.8	193	194	203	218	85	85	0
1	1:20	489.2	2.0	11.5	194	197	205	219	85	85	0
1	1:25	489.5	2.0	11.4	195	200	206	220	85	85	0
1	1:30	489.9	2.0	9.4	195	202	208	221	85	85	0
2-1	1:37	490.2	2.0	9.2	187	189	199	214	85	85	0
1	1:44	490.5	2.0	8.9	193	195	206	217	85	85	0
1	1:49	490.9	2.0	10.0	192	198	205	219	86	85	0
1	1:54	491.3	2.0	9.0	192	195	203	216	86	85	0
1	1:59	491.6	2.0	10.6	187	192	201	213	86	86	0
1	2:04	492.0	2.0	10.1	187	191	199	211	86	86	
Off	2:09	492.350									
Test time	1:05 - 2:09										
				10.175	190.25	194.69	201.58	215.50		85.25	

CHECK INDICATES TEMPERATURES MEET REQUIRED LIMITS.

COMPANY USDA Animal Import Center DATE 4-7-92

SITE Inc #3 Key West RUN # 3 PAGE 4 OF 4

Changed Dog

1 ☐ 4 - Test

2 3

SANDERS ENGINEERING & ANALYTICAL SERVICES, Inc.

1568 Leroy Stevens Rd.
Mobile, AL 36695

Office: (205) 633-4120
FAX#: (205) 633-2285

CHAIN of CUSTODY & LABORATORY ANALYSIS

COMPANY USDI Onsind Import Cents
PLANT Key West Fl.
UNIT 3

DATE of TEST 4-7,8,9-92

TEST: [X] M-5 [ ] M-17

[ ] OTHER _____

SAMPLE NO.	WASH	RETURNED BY	RECEIVED BY	TIME	DATE	REASON FOR CHANGE
97	97-W					
59	59-W			1:45pm	4-10-92	analysis
101	101-W					

UNIT: 3

RUN #	FILTER # 97	BEAKER. # 19
1	F 767.0	F 67703.5
	I 577.6	I 67136.0
	D 189.4	D 567.5
	TOTAL	756.9

RUN #	FILTER # 59	BEAKER. # 27
2	F 951.1	F 76903.6
	I 574.7	I 70464.5
	D 376.4	D 339.1
	TOTAL	715.5

RUN #	FILTER # 101	BEAKER. # 39
3	F 890.9	F 65707.0
	I 575.0	I 65329.9
	D 315.9	D 377.1
	TOTAL	693.0

RUN #	FILTER #	BEAKER. #
	F	F
	I	I
	D	D
	TOTAL	

UNIT: _____

RUN #	FILTER #	BEAKER. #
	F	F
	I	I
	D	D
	TOTAL	

RUN #	FILTER #	BEAKER. #
	F	F
	I	I
	D	D
	TOTAL	

RUN #	FILTER #	BEAKER. #
	F	F
	I	I
	D	D
	TOTAL	

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CHAIN of CUSTODY & LABORATORY ANALYSIS

COMPANY USDA Animal Import Center
PLANT Key West Fla.
UNIT 1 & 2

DATE of TEST 4-7,8,9-92

TEST: [X] M-5 [ ] M-17
[ ] OTHER

SAMPLE NO.	WASH	RETURNED BY	RECEIVED BY	TIME	DATE	REASON FOR CHANGE
98	98-W					
63	63-W					
64	64-W					
62	62-W					
60	60-W					
61	61-W					

UNIT: 1

RUN #	FILTER # 98	BEAKER. # 36
1	F 1108.8	F 69770.9
	I 575.5	I 69686.2
	D 633.3	D 84.7
	TOTAL	719.0

RUN #	FILTER # 63	BEAKER. # 42
3	F 919.1	F 70143.3
	I 576.4	I 70062.0
	D 342.7	D 81.3
	TOTAL	424.0

RUN #	FILTER # 64	BEAKER. # 35
4	F 1143	F 72009.0
	I 578.4	I 71949.9
	D 195.9	D 59.1
	TOTAL	255.0

RUN #	FILTER #	BEAKER. #
	F	F
	I	I
	D	D
	TOTAL	

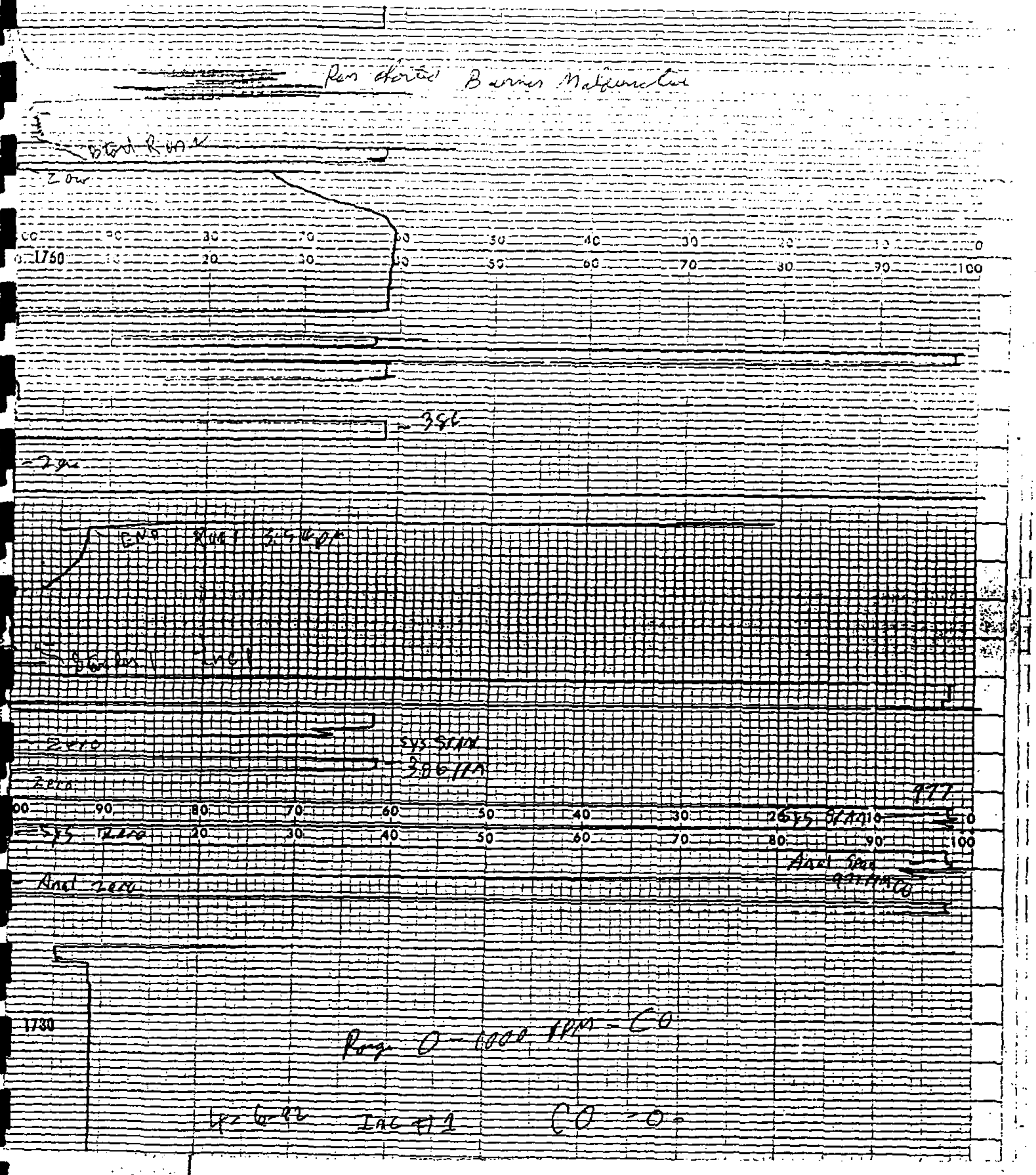
UNIT: 2

RUN #	FILTER # 62	BEAKER. # 29
1	F 1368.5	F 65116.4
	I 575.2	I 64526.6
	D 793.3	D 589.9
	TOTAL	1383.1

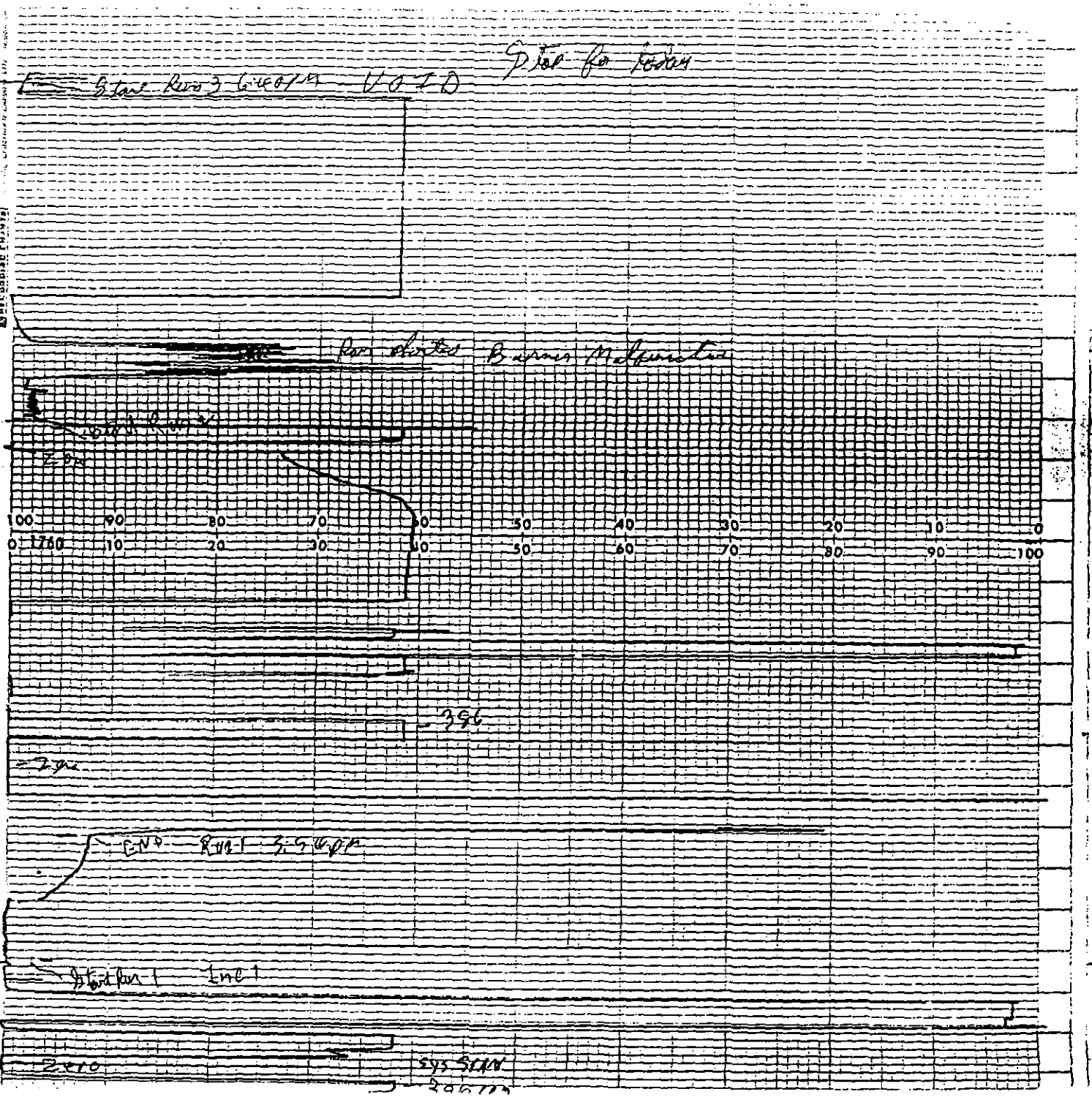
RUN #	FILTER # 60	BEAKER. # 37
2	F 900.1	F 68395.7
	I 577.9	I 67789.4
	D 322.2	D 606.3
	TOTAL	928.5

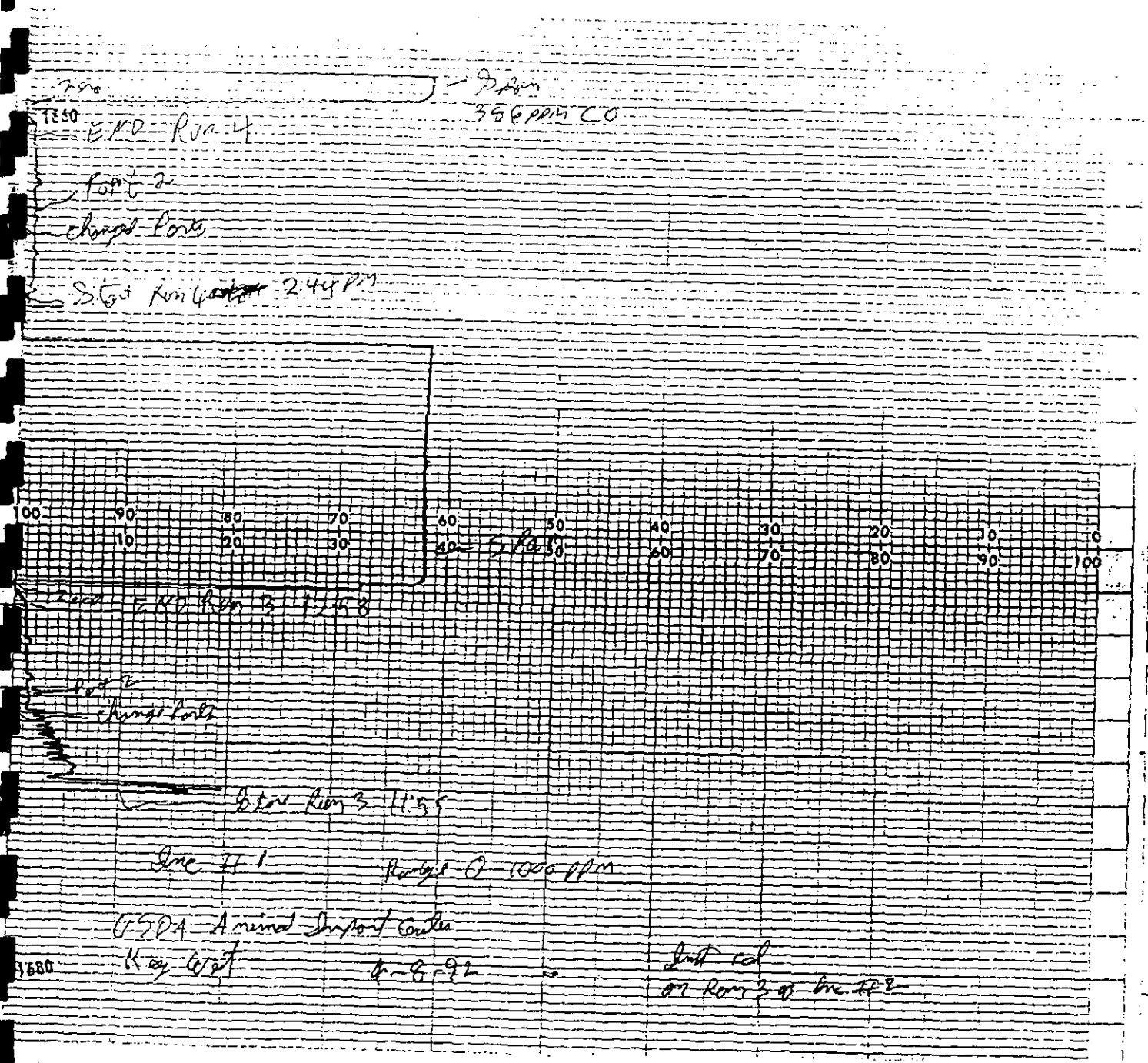
RUN #	FILTER # 61	BEAKER. # 46
3	F 722.8	F 65127.0
	I 579.0	I 64147.0
	D 143.8	D 980.0
	TOTAL	1123.0

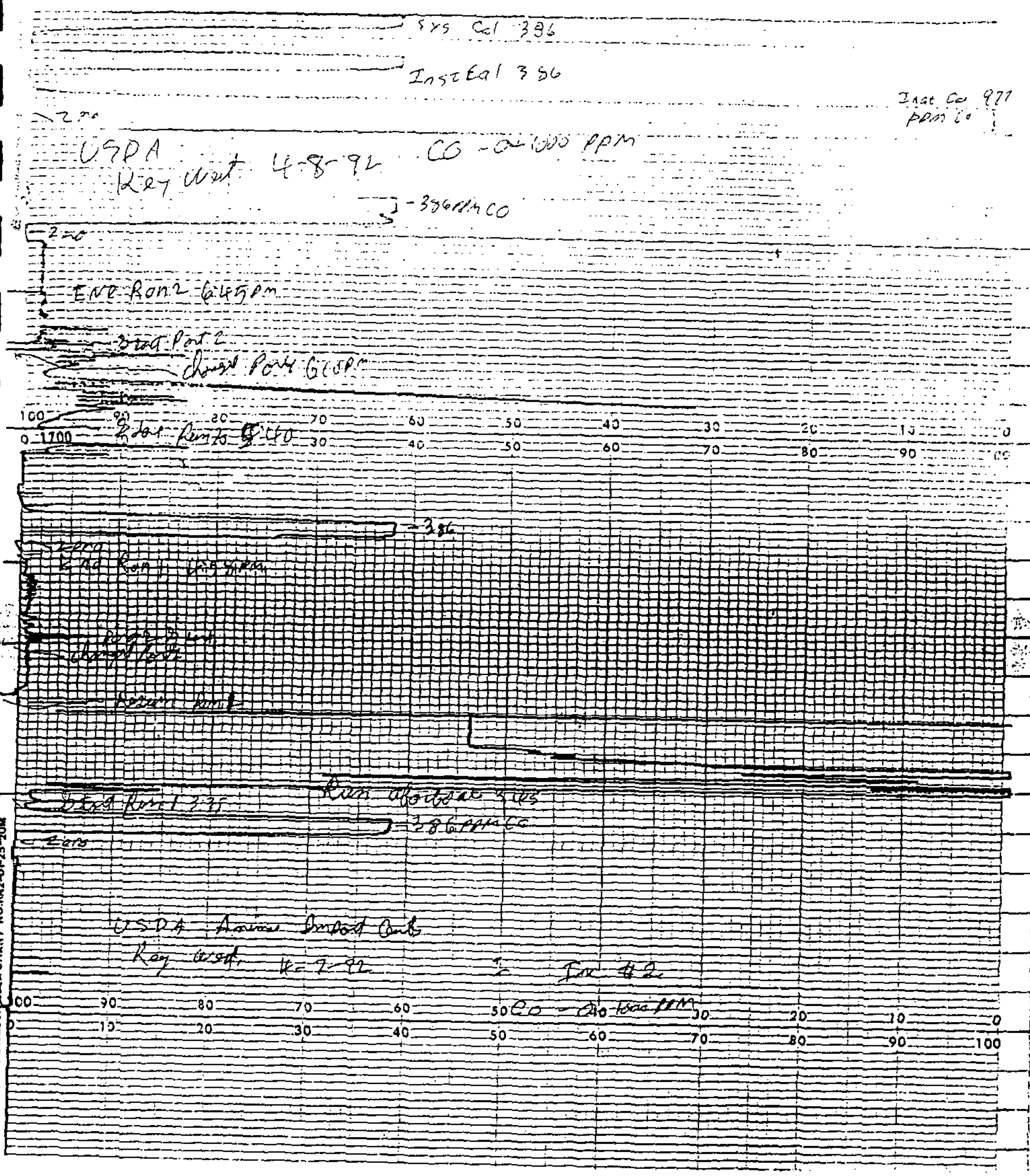
RUN #	FILTER #	BEAKER. #
	F	F
	I	I
	D	D
	TOTAL	

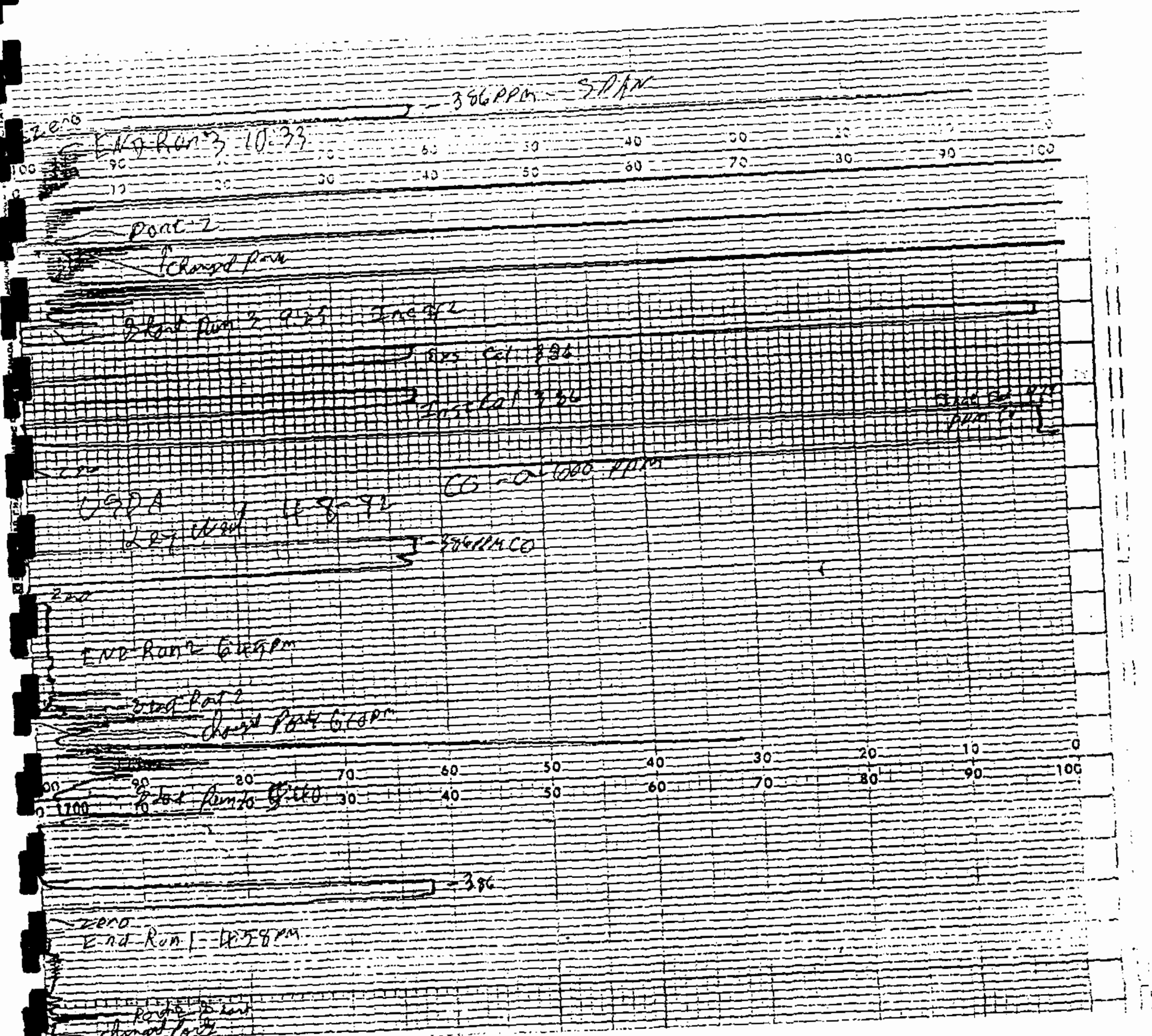


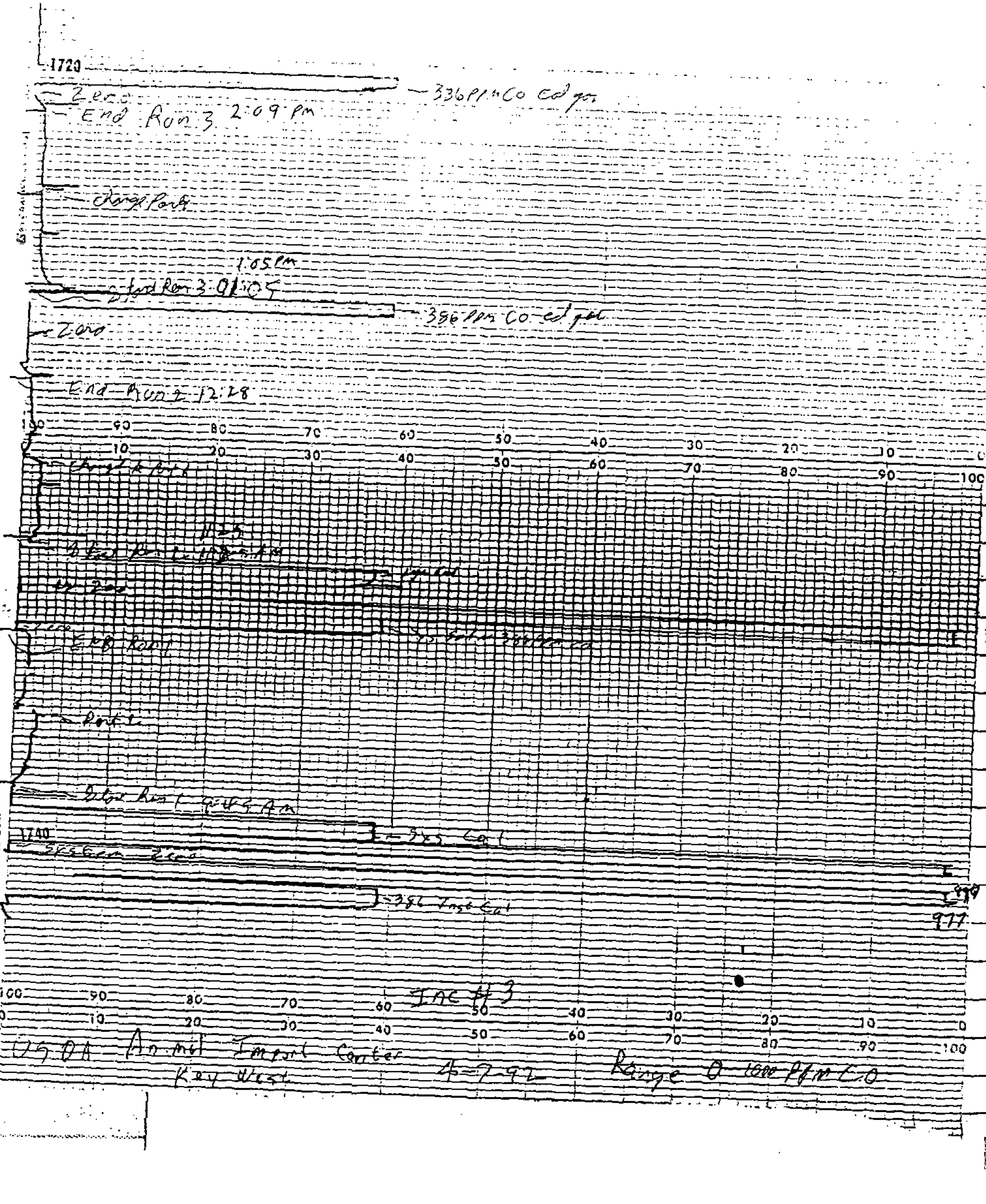
Res started Burner Malfunction
Zero
1750
386
Zero
END RUN 1 3:54 PM
Zero
SYS SPAN 386 PPM
Zero
977
SYS Zero
SYS SPAN
Anal Span 951 PPM CO
Anal zero
1730
Range 0 – 1000 PPM – CO
4-6-82 IAC #1 CO -0-


Start Run 2 6:40 PM VOID
Run aborted Burner Malfunction
Void Run 2
End
100 90 80 70 60 50 40 30 20 10 0
0 10 20 30 40 50 60 70 80 90 100
396
End Run 1 3:50 PM
Start Run 1 Line 1
Zero
Sys Start


Room
356 ppm CO
END Run 4
Port 2
change Ports
Start Run 4 2:44 PM
100
90
10
80
20
70
30
60
40
50
50
40
60
30
70
20
80
0
90
0
100
Start END Run 3 1:25
Port 2
change Ports
Start Room 3 11:55
Once If I
Range 0-1000 ppm
USDA Animal Import Center
Key West
4-6-92
Start cal
on Room 3 of Once If I

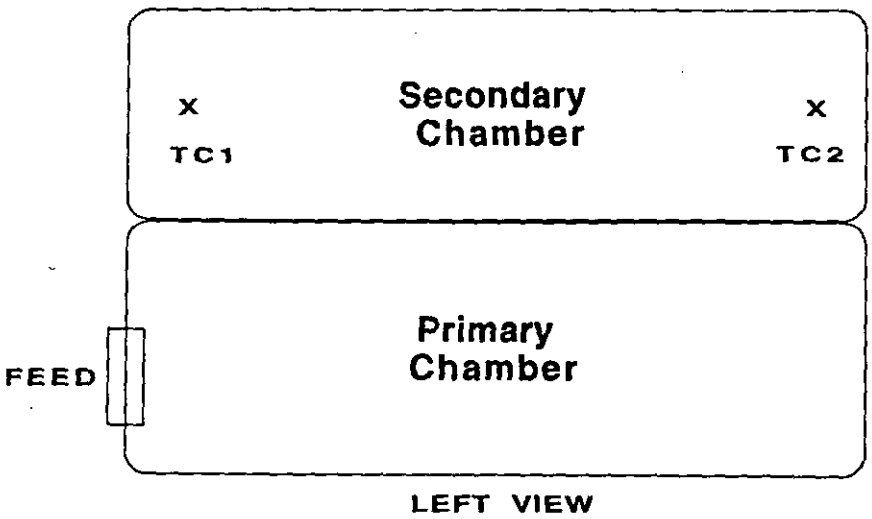

Inst Cal 386
USDA
Key West 4-8-92 CO - 0-1000 PPM
-386 ppm CO
100 90 80 70 60 50 40 30 20 10 0
0 10 20 30 40 50 60 70 80 90 100
-386
Zero
386 ppm CO
USDA Animal Import Unit
Key West 4-7-92
CO - 0-1000 PPM
CHART NO. RN2-01425-20M


386 PPM - SPAN
zero
END Run 3 10:33
Port 2
Changed Port
Sys Cal 386
Inst Cal 386
CO ~ 600 PPM
USDA
4-8-92
386 PPM CO
END Run 2
-386
zero
End Run 1

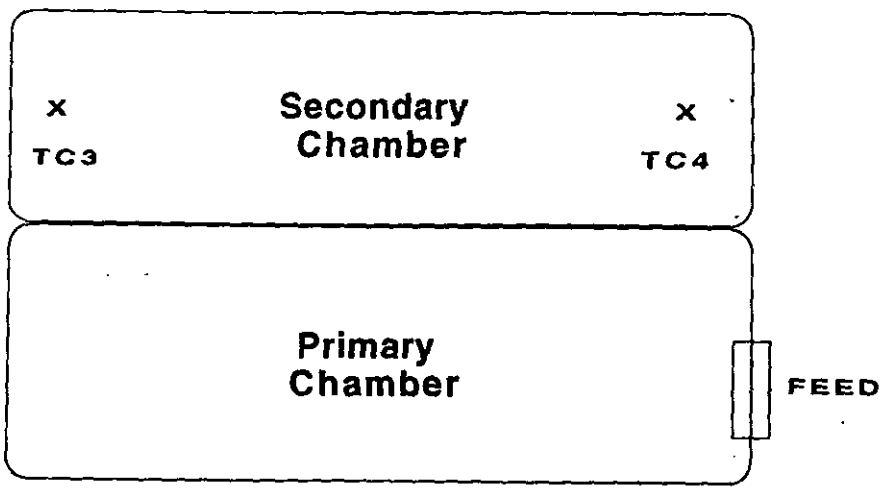

1720
336 PPM CO Cal gas
Zero
End Run 3 2:09 PM
1:05 PM
386 PPM CO cal gas
Zero
End Run 2 12:28
11:25
1740
IAC #3
USDA Animal Import Center
Key West
4-7-92
Range 0-1000 PPM CO

APPENDIX B SKIN TEMPERATURE RESULTS

USDA Animal Import Center
Key West Florida
Thermocouple Locations



LEFT VIEW



RIGHT VIEW

USDA Animal Import Center
Key West, FL

Skin Temperature Measurements

Incinerator 1

Run 1
Temperature (F°)

TIME	T1	T2	T3	T4
02:50	88	89	89	89
02:55				
03:00	97	95	96	98
03:05	95	93	96	98
03:10	95	94	100	96
03:15	97	103	103	100
03:24	103	100	109	106
03:29	102	106	99	104
03:34	107	101	113	110
03:39	104	98	111	105
03:44	112	104	133	116
03:49	116	107	138	112
Average	101.45	99.09	107.91	103.09

Total Average	102.89
Maximum Value	138

Run 2
Temperature (F°)

TIME	T1	T2	T3	T4
11:55	117	108	103	107
12:00	127	120	116	122
12:05	149	140	137	144
12:10	150	142	137	143
12:15	159	149	147	153
12:20	155	144	139	145
12:28	149	141	136	144
12:33	152	143	135	142
12:38	153	144	139	147
12:43	156	146	141	149
12:48	159	151	144	152
12:53	159	151	143	151
Average	148.75	138.92	134.75	141.58

Total Average	141.25
Maximum Value	159

Run 3
Temperature (F°)

TIME	T1	T2	T3	T4
02:44	193	183	169	179
02:49	181	171	164	176
02:54	181	173	169	180
02:59	180	168	170	182
03:04	178	165	172	183
03:09	181	172	166	176
03:20	180	170	168	182
03:25	188	174	173	185
03:30	187	177	174	185
03:35	183	172	169	180
03:40	186	172	173	185
03:45	191	179	177	187
Average	184.08	173.00	170.33	181.67

Total Average	177.27
Maximum Value	193

USDA Animal Import Center
Key West, FL

Skin Temperature Measurements

Incinerator 2

Run 1
Temperature (F°)

TIME	T1	T2	T3	T4
03:35	132	129	113	119
03:40	141	136	120	125
04:05	145	140	127	131
04:10	150	144	129	135
04:15	151	147	134	138
04:20	157	155	143	147
04:28	156	157	143	149
04:33	158	157	143	149
04:38	156	150	164	164
04:43	171	166	150	157
04:48	155	150	163	163
04:53	164	161	172	170
Average	153.00	149.33	141.75	145.58

Total Average	147.42
Maximum Value	172

Run 2
Temperature (F°)

TIME	T1	T2	T3	T4
05:40	147	151	137	147
05:45	171	175	161	170
05:50	181	188	171	181
05:55	184	190	175	185
06:00	208	216	200	210
06:05	189	197	180	190
06:15	189	191	180	192
06:20	199	202	188	198
06:25	189	195	166	200
06:30	188	191	175	186
06:35	191	193	179	190
06:40	188	192	177	188
Average	185.33	190.08	175.75	186.42

Total Average	184.40
Maximum Value	216

Run 3
Temperature (F°)

TIME	T1	T2	T3	T4
09:30	114	116	111	120
09:35	130	132	127	135
09:40	133	137	133	143
09:45	134	137	133	140
09:50	135	140	136	145
09:55	139	143	139	148
10:03	135	138	136	143
10:08	131	135	131	140
10:13	141	143	139	146
10:18	131	135	132	140
10:23	138	138	134	142
10:28	139	143	140	149
Average	133.33	136.42	132.58	140.92

Total Average	135.81
Maximum Value	149

USDA Animal Import Center
Key West, FL

Skin Temperature Measurements

Incinerator 3

Run 1
Temperature (F°)

TIME	T1	T2	T3	T4
09:45	92	96	96	98
09:50	97	99	99	99
09:55	101	105	103	105
10:00	105	108	108	109
10:05	109	113	111	110
10:10	118	122	118	120
10:15	117	122	118	119
10:24	120	125	120	121
10:29	121	127	121	124
10:34	125	131	124	128
10:39	127	133	128	129
10:44	131	138	131	135
Average	113.58	118.25	114.75	116.42

Total Average	115.75
Maximum Value	138

Run 2
Temperature (F°)

TIME	T1	T2	T3	T4
11:25	145	152	146	152
11:30	155	163	159	163
11:35	171	167	170	162
11:40	168	178	174	179
11:45	173	181	178	184
11:50	171	180	177	184
11:57	167	176	175	183
12:02	176	186	184	194
12:07	177	186	185	196
12:12	178	188	188	199
12:17	177	188	187	198
12:23	180	189	190	203
Average	169.83	177.83	175.92	183.08

Total Average	176.67
Maximum Value	203

Run 3
Temperature (F°)

TIME	T1	T2	T3	T4
01:05	181	186	191	207
01:10	187	193	197	211
01:15	193	198	203	218
01:20	194	197	205	219
01:25	195	200	206	220
01:30	195	202	208	221
01:39	187	189	199	214
01:44	193	195	206	217
01:49	192	198	205	219
01:54	192	195	203	216
01:59	187	192	201	213
02:04	187	191	199	211
Average	190.25	194.67	201.92	215.50

Total Average	200.58
Maximum Value	221

A P P E N D I X C CALIBRATIONS AND QUALITY CONTROL DATA

ANALYZER CALIBRATION DATA
for
CARBON MONOXIDE

USDA ANIMAL IMPORT CENTER
INCINERATOR #1
KEY WEST, FLORIDA

4-6&9-92

Source Identification: INC #1

Span (PPM) 1000

	Cylinder Value (PPM)	Analyzer Response (PPM)	Absolute Difference (PPM)	Difference (% of Span)	Allowable Difference (% of Span)
Zero Gas	0	0	0	0.0	+-2
Mid Range	386	386	4	0.4	+-2
High Range	977	973	0	0.0	+-2

USDA ANIMAL IMPORT CENTER
INCINERATOR #1
CARBON MONOXIDE TESTING
CALIBRATION BIAS & DRIFT DATA
04-6&9-92

		RUN 1		RUN 2		RUN 3	
		Zero Gas	Upscale	Zero Gas	Upscale	Zero Gas	Upscale
Analyzer Cal. Response	PPM	0.00	383.00	0.00	383.00	0.00	382.00
Initial							
System Cal. Response	PPM	0.00	383.00	0.00	383.00	0.00	382.00
System Cal. Bias	%Span	0.00	0.00	0.00	0.00	0.00	0.00
System Allowable Bias	%	5.0	5.0	5.0	5.0	5.0	5.0
Final							
System Cal. Response	PPM	0.00	386.00	0.00	386.00	0.00	375.00
System Cal. Bias	%Span	0.00	0.30	0.00	0.30	0.00	-0.70
System Allowable Bias	%	5.0	5.0	5.0	5.0	5.0	5.0
Drift	%Span	0.00	0.30	0.00	0.30	0.00	-0.70
Instrument Span	PPM	1000.00					

$$\text{System Calibration Bias} = \frac{\text{System Cal. Responce - Analyzer Cal. Responce}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Responce - Initial System Cal. Responce}}{\text{Span}} \times 100$$

ANALYZER CALIBRATION DATA
for
CARBON MONOXIDE

USDA ANIMAL IMPORT CENTER
INCINERATOR #2
KEY WEST, FLORIDA

4-7-92

Source Identification: INC #2

Span (PPM) 1000

	Cylinder Value (PPM)	Analyzer Response (PPM)	Absolute Difference (PPM)	Difference (% of Span)	Allowable Difference (% of Span)
Zero Gas	0	0	0	0.0	+-2
Mid Range	386	385	0	0.0	+-2
High Range	977	977	0	0.0	+-2

USDA ANIMAL IMPORT CENTER
INCINERATOR #2
CARBON MONOXIDE TESTING
CALIBRATION BIAS & DRIFT DATA
04-07-92

		RUN 1		RUN 2		RUN 3	
		Zero Gas	Upscale	Zero Gas	Upscale	Zero Gas	Upscale
Analyzer Cal. Response	PPM	0.00	385.00	0.00	380.00	0.00	378.00
Initial							
System Cal. Response	PPM	0.00	385.00	0.00	380.00	0.00	378.00
System Cal. Bias	%Span	0.00	0.00	0.00	0.00	0.00	0.00
System Allowable Bias	%	5.0	5.0	5.0	5.0	5.0	5.0
Final							
System Cal. Response	PPM	0.00	380.00	0.00	373.00	0.00	382.00
System Cal. Bias	%Span	0.00	-0.50	0.00	-0.70	0.00	0.40
System Allowable Bias	%	5.0	5.0	5.0	5.0	5.0	5.0
Drift	%Span	0.00	-0.50	0.00	-0.70	0.00	0.40
Instrument Span	PPM	1000.00					

$$\text{System Calibration Bias} = \frac{\text{System Cal. Responce - Analyzer Cal. Responce}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Responce - Initial System Cal. Responce}}{\text{Span}} \times 100$$

ANALYZER CALIBRATION DATA
for
CARBON MONOXIDE

USDA ANIMAL IMPORT CENTER
KEY WEST, FLA.

4-7-92

Source Identification: INC #3

Span (PPM) 1000

	Cylinder Value (PPM)	Analyzer Response (PPM)	Absolute Difference (PPM)	Difference (% of Span)	Allowable Difference (% of Span)
Zero Gas	0	0	0	0.0	+-2
Mid Range	386	387	0	0.0	+-2
High Range	977	977	0	0.0	+-2

USDA ANIMAL IMPORT CENTER
INCINERATOR #3
CARBON MONOXIDE TESTING
CALIBRATION BIAS & DRIFT DATA
04-07-92

		RUN 1		RUN 2		RUN 3	
		Zero Gas	Upscale	Zero Gas	Upscale	Zero Gas	Upscale
Analyzer Cal. Response	PPM	0.00	386.00	0.00	386.00	0.00	386.00
Initial							
System Cal. Response	PPM	0.00	380.00	0.00	372.00	0.00	380.00
System Cal. Bias	%Span	0.00	-0.60	0.00	-1.40	0.00	-0.60
System Allowable Bias	%	5.0	5.0	5.0	5.0	5.0	5.0
Final							
System Cal. Response	PPM	0.00	380.00	0.00	380.00	-4.00	373.00
System Cal. Bias	%Span	0.00	-0.60	0.00	-0.60	-0.40	-1.30
System Allowable Bias	%	5.0	5.0	5.0	5.0	5.0	5.0
Drift	%Span	0.00	0.00	0.00	0.80	-0.40	-0.70
Instrument Span	PPM	1000.00					

$$\text{System Calibration Bias} = \frac{\text{System Cal. Responce - Analyzer Cal. Responce}}{\text{Span}} \times 100$$

$$\text{Drift} = \frac{\text{Final System Cal. Responce - Initial System Cal. Responce}}{\text{Span}} \times 100$$

INITIAL
METER CALIBRATION FORM - DGM

DATE: 01-15-92 Box No. C-133

Ref. DGM Ser. # 1044453 Calibrated By Chris Leitsch

RUN #	1	2	3	4	5
DELTA H (DGM)	0.5	1.0	2.0	3.0	4.0
Y (Ref. DGM)	1.000	1.000	1.000	1.000	1.000
Reference DGM					
Gas Vol. Initial	910.795	916.173	922.063	927.918	934.488
Gas Vol. Final	916.033	921.785	927.549	933.651	939.954
Meter Box DGM					
Gas Vol. Initial	385.500	391.000	397.100	403.100	409.800
Gas Vol. Final	390.853	396.711	402.720	408.935	415.339
Reference DGM Temp.	Avg.	Avg.	Avg.	Avg.	Avg.
Deg F Initial	66	67	69	70	71
Deg F Final	67	69	70	71	72
Meter Box DGM					
Temp. Initial In	74	82	87	90	91
Temp. Initial Out	69	73	77	79	80
Temp. Final In	83	87	90	90	95
Temp. Final Out	73	76	78	81	81
P Bar IN. Hg	30.24	30.24	30.24	30.24	30.24
Time (sec.)	780	600	420	360	300
Meter Calibration Factor (Y)	0.993	1.002	0.996	1.002	1.005
Qm (C.F.M.)	0.408	0.567	0.790	0.961	1.098
Km (Std Pressure)	0.740	0.724	0.712	0.707	0.699
DELTA Ha	1.69	1.74	1.78	1.80	1.83

Average Y (Meter Calibration Factor	1.000
Average Km (Standard Pressure)	0.716
Average DELTA Ha of Orifice	1.77

INITIAL
METER CALIBRATION FORM - DGM

DATE: 01-15-92 Box No. c-175

Ref. DGM Ser. # 1044453 Calibrated By Chris Leitsch

RUN #	1	2	3	4	5
DELTA H (DGM)	0.50	1.00	2.00	3.00	4.00
Y (Ref. DGM)	1.00	1.00	1.00	1.00	1.00
Reference DGM					
Gas Vol. Initial	977.470	953.044	959.151	965.264	971.562
Gas Vol. Final	982.538	958.705	964.876	971.211	977.296
Meter Box DGM					
Gas Vol. Initial	454.200	429.000	435.300	441.600	448.100
Gas Vol. Final	459.550	434.850	441.200	447.737	454.000
Reference DGM Temp.				Avg.	Avg.
Deg F Initial	71	69	69	70	69
Deg F Final	69	69	70	69	70
Meter Box DGM					
Temp. Initial In	91	83	90	96	98
Temp. Initial Out	89	77	81	85	88
Temp. Final In	95	90	96	101	105
Temp. Final Out	90	81	85	88	91
P Bar IN. Hg	30.24	30.24	30.24	30.24	30.24
Time (sec.)	780	600	420	360	300
Meter Calibration Factor (Y)	0.984	0.990	0.999	1.004	1.010
Qm (C.F.M.)	0.393	0.571	0.824	0.999	1.156
Km (Std Pressure)	0.701	0.727	0.739	0.729	0.730
DELTA Ha	1.76	1.70	1.62	1.64	1.63

Average Y (Meter Calibration Factor) 0.997
Average Km (Standard Pressure) 0.725
Average DELTA Ha of Orifice 1.670

FINAL
METER CALIBRATION FORM - DGM

DATE: 04-15-92 Box No. C-175

Ref. DGM Ser. # 10444453 Calibrated By Kevin

RUN #	1	2	3
DELTA H (DGM)	1.5	1.5	1.5
Y (Ref. DGM)	1.000	1.000	1.000
Reference DGM			
Gas Vol. Initial	530.440	535.940	541.015
Gas Vol. Final	535.940	541.015	546.527
Meter Box DGM			
Gas Vol. Initial	185.130	190.660	195.952
Gas Vol. Final	190.660	195.952	201.624
Reference DGM Temp.	Avg.	Avg.	Avg.
Deg F Initial	80	79	79
Deg F Final	79	79	79
Meter Box DGM			
Temp. Initial In	75	77	80
Temp. Initial Out	77	83	87
Temp. Final In	77	80	83
Temp. Final Out	83	87	93
P Bar IN. Hg	30.18	30.18	30.18
Time (sec.)	480	435	480
Meter Calibration Factor (Y)	0.988	0.960	0.980
Qm (C.F.M.)	0.679	0.692	0.681
Km (Std Pressure)	0.708	0.719	0.705
DELTA Ha	1.80	1.71	1.75

Average Y (Meter Calibration Factor)	0.976
Initial Y (Meter Calibration Factor)	0.997
Percent Error	2.11%
Average Km (Standard Pressure)	0.711
Average DELTA Ha of Orifice	1.76

FINAL
METER CALIBRATION FORM - DGM

DATE: 04-15-92 Box No. C-133

Ref. DGM Ser. # 1044453 Calibrated By Kevin

RUN #	1	2	3
DELTA H (DGM)	0.1	0.1	0.1
Y (Ref. DGM)	1.000	1.000	1.000
Reference DGM			
Gas Vol. Initial	553.995	559.275	564.545
Gas Vol. Final	559.275	564.545	569.882
Meter Box DGM			
Gas Vol. Initial	551.110	556.590	562.148
Gas Vol. Final	556.590	562.148	567.920
Reference DGM Temp.	Avg.	Avg.	Avg.
Deg F Initial	79	79	78
Deg F Final	79	77	77
Meter Box DGM			
Temp. Initial In	87	92	99
Temp. Initial Out	104	101	117
Temp. Final In	91	99	106
Temp. Final Out	107	115	120
P Bar IN. Hg	30.18	30.18	30.18
Meter Calibration Factor (Y)	0.996	0.990	0.981

Average Y (Meter Calibration Factor) 0.989

MAGEHELIC CALIBRATION

SER. NO.	10720-AB68	R1061-6AG48	R5031-SEB76	R1062-9JA82	R1051-3MR42	R1071-JA8	R1083-ICF 80
RANGE	0-.25	0-.50	0-2	0-5	0-10	0-25	0-.50
REFERENCE READING	BOX #1	FIELD DEVICE READING					
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.05						
0.10	0.10	0.11					
0.200	0.20	0.20					
0.400		0.39					
0.500			0.48				
1.000			0.98	1.00			
1.500			1.47				
2.000				2.00	1.95		
3.500				3.50			
5.000					4.90	5.00	
8.00					8.10		
10.00						10.00	
20.00						19.80	

DATE: 1-10-92 **SIGNATURE:** Robert T. Richman

MAGNEHELIC CALIBRATION

Ser. No.	10819-DR2	R1090-2AG18	R50315-EB93	R1062-9TA87	30830-AM79	R1072-2MC5	
Range	0-.25	0-.5	0-2	0-5	0-10	0-25	
Reference Reading	Box #2	Field Device Reading					
0.00	0.00	0.00	0.00	0.00	0.00	0.00	
0.05	0.04						
0.10	0.10	0.10					
0.20	0.19	0.19					
0.40		0.38					
0.50			0.50				
1.00			0.97	0.98			
1.50			1.42				
2.00				2.00	1.90		
3.50				3.45			
5.00					4.90	5.00	
8.00					7.80		
10.00						9.50	
20.00						19.20	

DATE 1-8-92 **Signature:** Robert Richman

MAGNEHELIC CALIBRATION
BOX #3

SERIAL NO.	R10831CF80	R01126TC2	R10608CF14
RANGE	0 - 0.5	0 - 2	0 - 10
* REFERENE READING TAKEN FROM OIL GAGE MANOMETER			

* REF.	ACTUAL	* REF.	ACTUAL	* REF.	ACTUAL
0.10	0.13	0.5	0.50	2.0	1.8
0.20	0.23	1.0	1.05	5.0	4.7
0.40	0.395	1.5	1.58	8.0	7.7
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00

DATE: 1-8-92 SIGNATURE: Robert Richman

MAGNEHELIC CALIBRATION
BOX #5

SERIAL NO.	R900723MRR1		R901003CD87		R901119RR106	
RANGE	0 - 0.5		0 - 5		0 - 25	
* REFERENE READING TAKEN FROM OIL GAGE MANOMETER						
	*REF.	ACTUAL	*REF.	ACTUAL	*REF.	ACTUAL
	0.40	0.39	4.00	4.05	20.0	19.6
	0.20	0.20	2.00	2.02	10.0	9.60
	0.10	0.095	1.00	1.00	5.00	4.80
	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00

DATE: 1-8-92 SIGNATURE: Robert Richmann

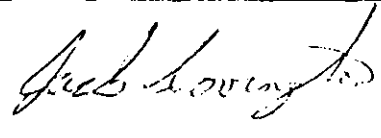
MAGNEHELIC CALIBRATION

BOX #	460	133	173	175
SER. NO.	91127WW137	91126AM91	R20208A617	R01126YC2
RANGE	0-2	0-2	0-2	0-2
REFERENCE READING	FIELD DEVICE READING			
0.50	0.50	0.47	0.49	0.48
1.00	1.00	0.96	0.98	0.98
1.50	1.55	1.45	1.50	1.45
1.75	0.00	0.00	0.00	0.00
3.50	0.00	0.00	0.00	0.00
4.75	0.00	0.00	0.00	0.00

SIGNATURE: Robert Richman DATE: 1-10-92

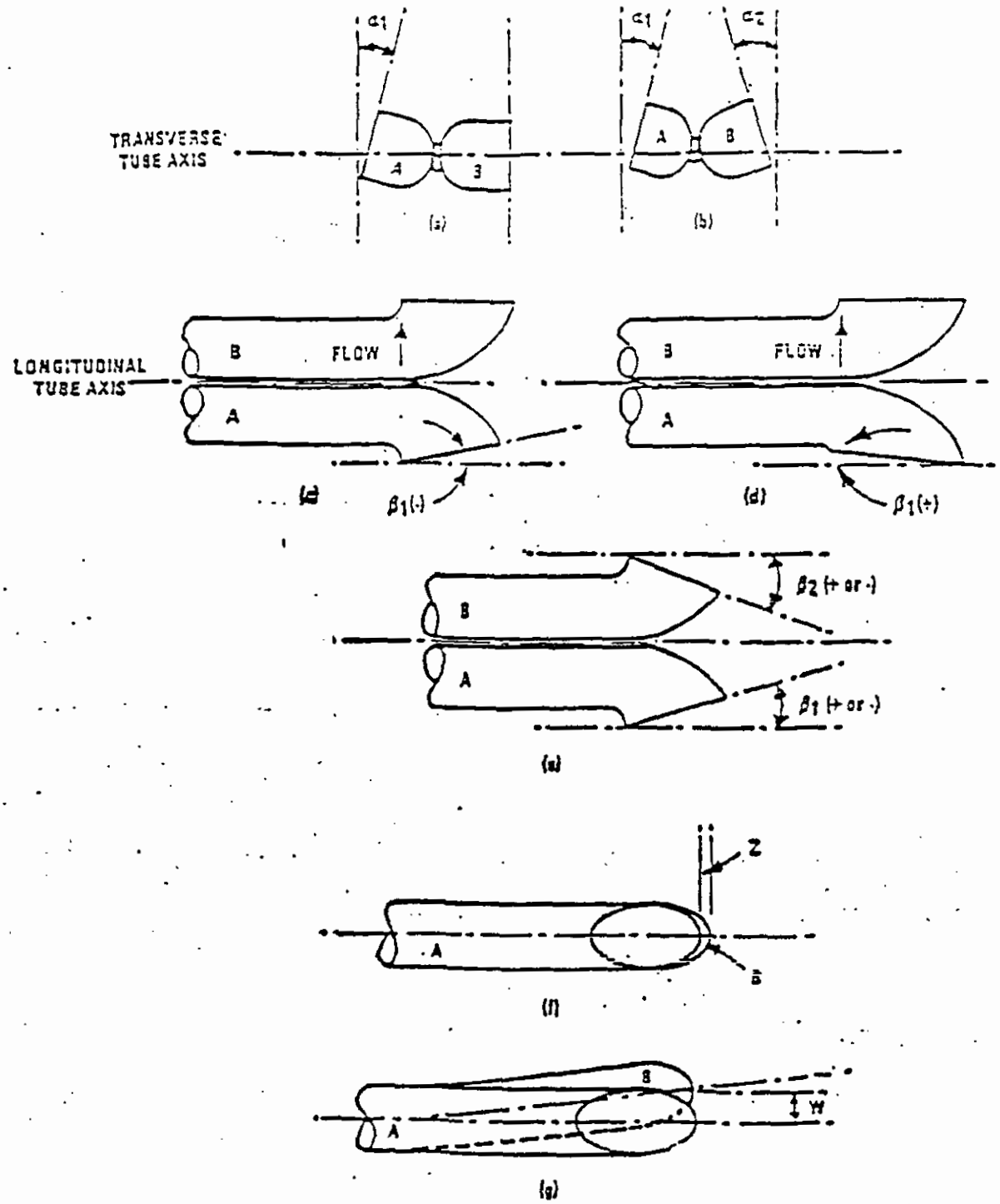
TEMPERATURE CALIBRATIONS - DEGREES FAHRENHEIT

REFERENCE DEVICE READING*	0 DEG. F	210 DEG.	420 DEG.	630 DEG.	840 DEG.	1050 DEG.	1260 DEG.	1470 DEG.	1680 DEG.	1900 DEG.
METER BOX #1 C-133 11580	0	210	416	625	834	1046	1256	1463	1673	1893
METER BOX #2 C-175 15962	2	212	421	631	833	1057	1269	1478	1688	1910
METER BOX #3 C-173 S11-24	1	210	418	626	836	1049	1262	1471	1680	1920
METER BOX #4 D-460 15751	1	209	417	626	835	1048	1258	1456	1678	1903
2879	0	211	421	631	839	1050	1259	1470	1680	1900
PORTABLE THERMOCOUPLE # 1 249662.00	0	210	420	631	839	1049	1258	1469	1678	1898
PORTABLE THERMOCOUPLE # 2 - T-05792	0	210	418	630	846	1065	1279	1493	1705	1914
PORTABLE THERMOCOUPLE # 3 - P-3	1	209	416	626	841	1058	1273	1484	1688	1894

DATE: 01-10-92 **SIGNATURE:** 

+

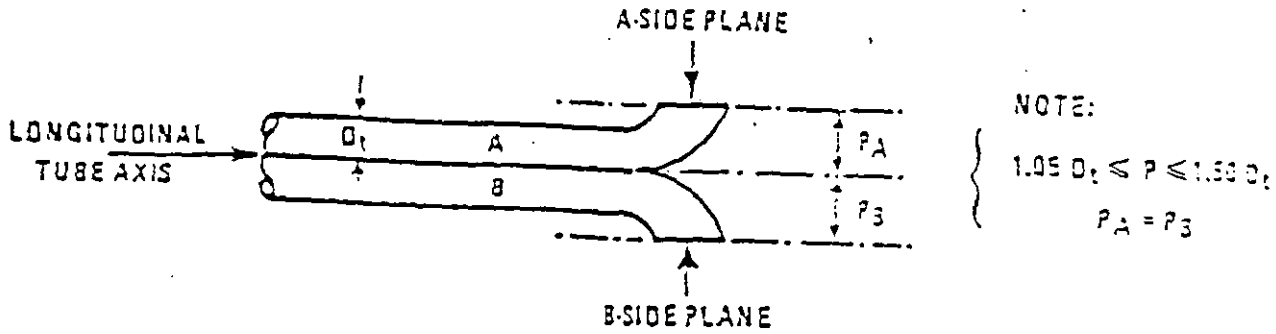
* Reference Device is an Omega Engineering CL505-A calibrated reference thermocouple-potentiometer system.



Types of face-opening misalignment that can result from field use or improper construction of Type S pitot tubes. These will not affect the baseline value of $\bar{C}p(s)$ so long as α_1 and $\alpha_2 < 10°$, β_1 and $\beta_2 < 5°$, $z < 0.32$ cm (1/8 in.) and $w < 0.08$ cm (1/32 in.) (citation 11 in Section 6).

The Pitot used was within the following geometric specifications:

$C_p = 0.84$



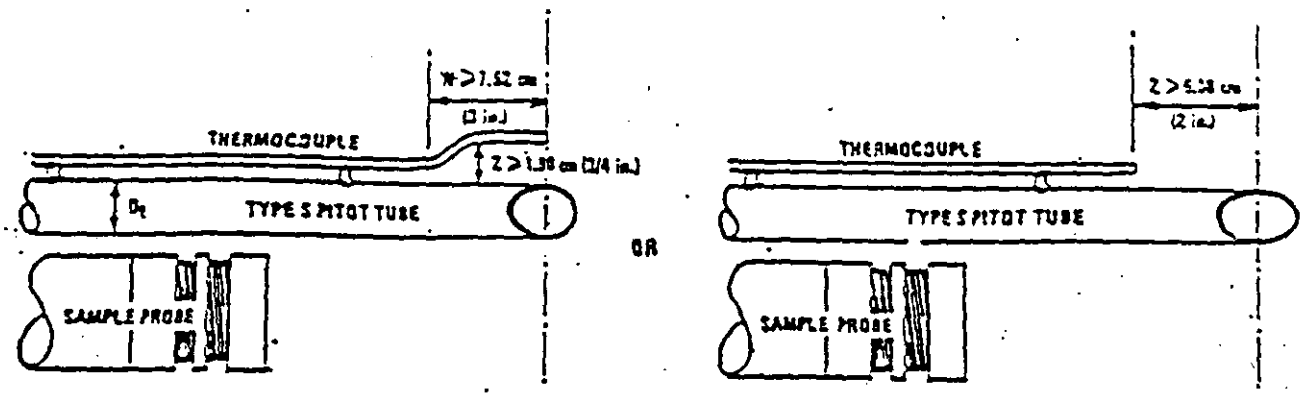


Figure 2-7. Proper thermocouple placement to prevent interference; D_t between 0.48 and 0.95 cm (3/16 and 3/8 in.).

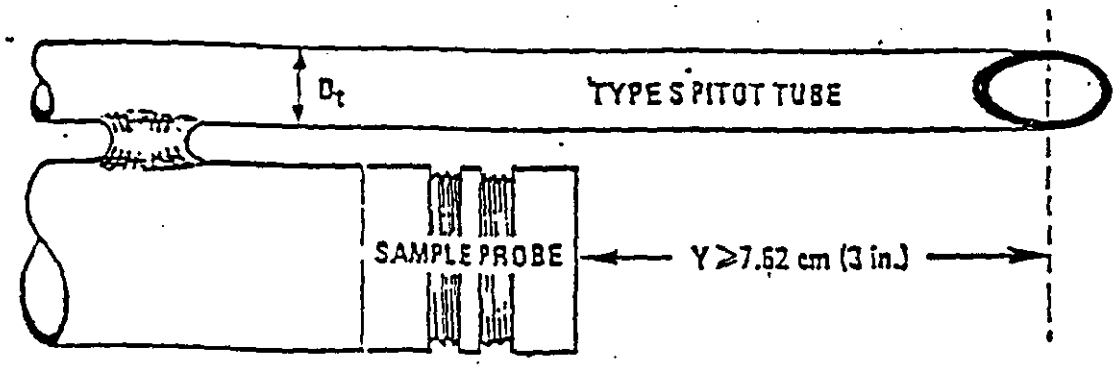
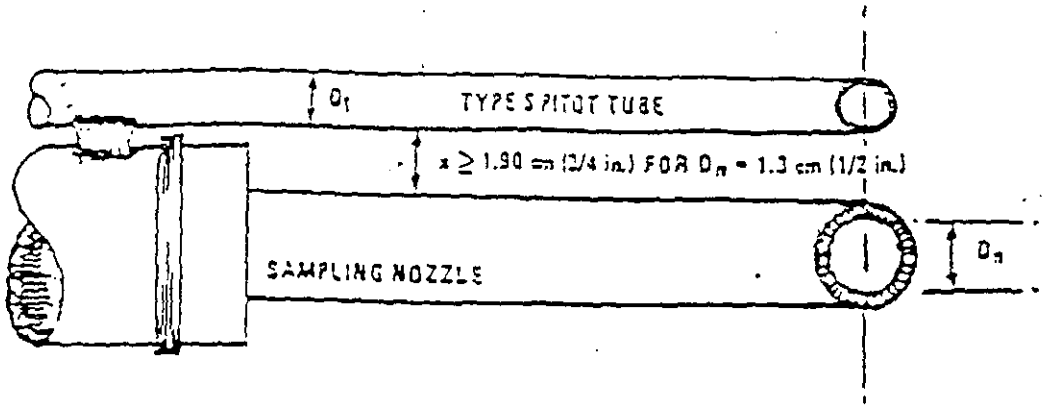
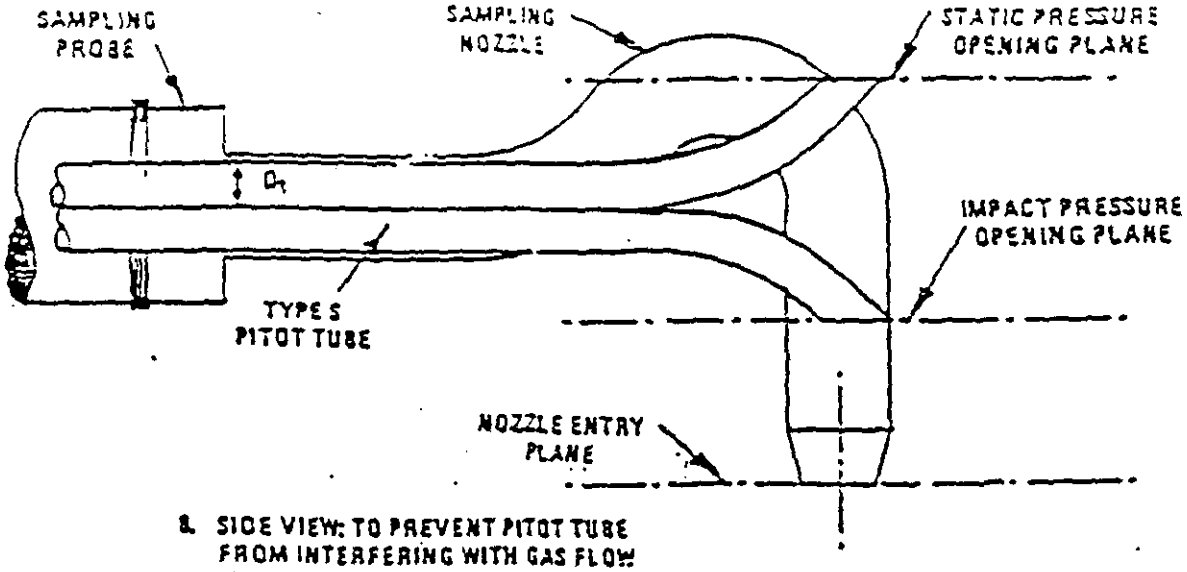


Figure 2-8. Minimum pitot-sample probe separation needed to prevent interference; D_t between 0.48 and 0.95 cm (3/16 and 3/8 in.).



A. BOTTOM VIEW: SHOWING MINIMUM PITOT-NOZZLE SEPARATION.



B. SIDE VIEW: TO PREVENT PITOT TUBE FROM INTERFERING WITH GAS FLOW STREAMLINES APPROACHING THE NOZZLE, THE IMPACT PRESSURE OPENING PLANE OF THE PITOT TUBE SHALL BE EVEN WITH OR ABOVE THE NOZZLE ENTRY PLANE.

Proper pitot tube - sampling nozzle configuration to prevent aerodynamic interference; buttonhook - type nozzle; centers of nozzle and pitot opening aligned; D_t between 0.48 and 0.95 cm (3/16 and 3/8 in.).

APPENDIX B

Codes

APPENDIX B - Codes

Attached documentation taken from the Florida State Department of Environmental Protection (FDEP) Emission Standards.

17-296.200 Definitions. The following words and phrases when used in this chapter shall, unless content clearly indicates otherwise, have the following meanings:

(1) "Acid Mist" - Liquid drops of any size of any acid including but not limited to sulfuric acid and sulfur trioxide, hydrochloric acid and nitric acid as measured by test methods approved by the Department.

(2) "Acrylonitrile" - An organic chemical, formula C_3H_3N, used in the production of various resins, polymers and acrylic fibers. Synonyms for acrylonitrile are: 2-propenitrile, acrylon, acrylonitrile monomer, cyanoethylene, AN, VCN, and vinyl cyanide. The Chemical Abstract Service registration number is 107-13-1.

(3) "Actual Emissions" - The actual rate of emission of a pollutant from a source as determined in accordance with the following provisions:

(a) In general, actual emissions as of a particular date shall equal the average rate, in tons per year, at which the source actually emitted the pollutant during a two year period which precedes the particular date and which is representative of the normal operation of the source.

The Department may allow the use of a different time period upon a determination that it is more representative of the normal operation of the source. Actual emissions shall be calculated using the source's actual operating hours, production rates and types of materials processed, stored, or combusted during the selected time period.

(b) The Department may presume that source specific allowable emissions for a source are equivalent to the actual emissions of the source provided that, for any air pollutant that is specifically regulated by the EPA under the Clean Air Act, such source specific allowable emissions limits are federally enforceable.

(c) For a source which has not completed start-up and testing on a particular date, actual emissions shall equal the potential emissions of the source on that date.

(4) "Administrator" - The Administrator of the United States Environmental Protection Agency or the Administrator's designee.

(5) "Affected Pollutant" - In a nonattainment area or area of influence the pollutant for which the area is designated nonattainment is the affected pollutant except in the case of ozone nonattainment areas where the affected pollutant is volatile organic compounds (VOC).

(6) "Air Curtain Incinerator" - A portable or stationary combustion device that directs a plane of high velocity forced draft air through a manifold head into a pit with vertical walls in such a manner as to maintain a curtain of air over the surface of the pit and a recirculating motion of air under the curtain.

(7) "Air Dried Coating" - Coatings which are dried by the use of air or forced warm air at temperatures up to 194 degrees Fahrenheit (90 degrees Celsius).

(8) "Air Pollutant" - Any substance (particulate, liquid, gaseous, organic or inorganic) which if released, allowed to escape, or emitted, whether intentionally or unintentionally, into the outdoor atmosphere may result in or contribute to air pollution.

(9) "Air Pollution" - The presence in the outdoor atmosphere of the state of any one or more substances or pollutants in quantities which are or may be harmful or injurious to human health or welfare, animal or plant life, or property, or unreasonably interfere with the enjoyment of life or property, including outdoor recreation.

(10) "Air Pollution Control Equipment" - Equipment, including that used to separate entrained particulate matter or organic vapors from gases, gas separation equipment, thermal oxidation equipment, and chemical reaction/conversion equipment, which is designed and used to reduce the discharge of a specific air pollutant to the atmosphere.

(a) "Destructive Control Device" - Any device intended and designed for the reduction of VOC pollutant emissions from a stationary air pollution source which alters the chemical composition of the pollutant flowing through the device.

(b) "Non-Destructive Control Device" - Any device intended and designed for the reduction of VOC pollutant emissions from a stationary air pollution source which does not alter the chemical composition of the pollutant flowing through the device.

(11) "Air Quality Control Region" - Any air quality control region designated pursuant to Section 107 of the Clean Air Act. The boundaries of the air quality control regions in Florida are set forth in 40 CFR Sections 81.49, 81.68, 81.91, 81.95, 81.96 and 81.97. A copy of the above referenced documents is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., and may be inspected at the Department's Tallahassee office.

(12) "Allowable Emissions" - The emission rate calculated using the maximum rated capacity of the source, as limited or modified by any state or federally enforceable restrictions on the operating rate or hours of operation, or both, and the most stringent state or federal emission limiting standard applicable to the source; or the maximum allowable emission rate specified by any state or federally enforceable permit conditions.

(13) "Alternative Control Techniques Document" or "ACT" - A guidance document issued by the U.S. Environmental Protection Agency under the Clean Air Act (42 U.S.C. s. 7511b) which identifies control alternatives for sources of volatile organic compounds (VOC) and nitrogen oxides (NOx) that emit more than 25 tons per year.

(14) "Ambient Air Quality Standard" or "Ambient Standard" - A restriction established to limit the quantity or concentration of an air pollutant that may be allowed to exist in the ambient air for any specific period of time.

(a) "National Ambient Air Quality Standard" means an ambient standard established by EPA as listed in 40 CFR 50.

(b) "Primary Standard" means an ambient standard established to protect public health.

(c) "Secondary Standard" means an ambient standard established to protect the public welfare including the protection of animal and plant life, property, visibility and atmospheric clarity, and the enjoyment of life and property.

(d) "State Ambient Air Quality Standard" means an ambient standard established or adopted by the Department.

(15) "Application Area" - The area where a coating is applied by spraying, dipping, or flowcoating techniques.

(16) "Area of Influence" - An area which is outside the boundary of a nonattainment or air quality maintenance area but within the locus of all points that are fifty kilometers outside of the boundary of the nonattainment or air quality maintenance area.

(17) "Asphalt" - A dark brown to black cementitious material (solid, semi-solid, or liquid in consistency) in which the predominating constituents are bitumens which occur in nature as such or which are obtained as a residue in refining petroleum.

(18) "Batch Process" - A process which takes in the basic raw materials at the beginning of a cycle and processes them in accordance with a predetermined scheme during which no more basic raw materials are added to the process. Two variations include:

(a) Processes where some of the reactants (materials) are added at the beginning with the remainder added as the reaction progresses.

(b) Processes where once the materials are added, one or more products are continuously removed as the reaction progresses.

Such processes include, but are not limited to, production of super phosphate, basic oxygen furnaces, and cement batch plants.

(19) "Biohazardous Waste" - Any solid waste or liquid waste which may present a threat of infection to humans. The term includes, but is not limited to, nonliquid human tissue and body parts; laboratory and veterinary waste which contain human-disease-causing agents; discarded sharps; human blood, human blood products and body fluids. The following are also included:

(a) Used absorbent materials such as bandages, gauzes, or sponges supersaturated, having the potential to drip or splash, with blood or body fluids from areas such as operating rooms, delivery rooms, trauma centers, emergency rooms, or autopsy rooms;

(b) Devices which retain visible blood adhering to inner surfaces after use and rinsing such as intravenous tubing, hemodialysis filters, and catheters. Medical devices used in the treatment of hepatitis B virus or human immunodeficiency virus suspected or positive patients shall be segregated as biohazardous waste; and

(c) Other contaminated solid waste materials which represent a significant risk of infection because they are generated in medical facilities which care for persons suffering from diseases requiring strict isolation criteria and listed by the United States Department of Health and Human Services, Centers for Disease Control, "CDC Guideline for Isolation Precautions in Hospitals," July/August 1983.

(20) "Biological Waste" - Solid waste that causes or has the capability of causing disease or infection and includes, but is not limited to, biohazardous waste, diseased or dead animals, and other wastes capable of transmitting pathogens to humans or animals.

(21) "Biological Waste Incineration Facility" - One or more incinerators located on one or more contiguous or adjacent properties which is/are operated or utilized for the disposal or treatment of biological waste and is/are owned or operated by the same person or by persons under common control.

→(86) "Human Crematory" means any combustion apparatus used solely for the cremation of dead human bodies with appropriate containers as described in Rule 17-296.401(5)(a), F.A.C.

17-296.401 Incinerators.

(1) Any incinerator with a charging rate of less than 50 tons per day.

(a) No visible emission (5 percent opacity) except that visible emissions not exceeding 20 percent opacity are allowed for up to three minutes in any one hour period.

(b) No objectionable odor allowed.

(2) Existing incinerators, other than those which are operated or utilized for the disposal or treatment of biological waste, with a charging rate equal to or greater than 50 tons per day.

(a) Particulate matter - 0.1 grains per standard cubic foot dry gas corrected to 50 percent excess air.

(b) No objectionable odor allowed.

(3) New incinerators, other than those which are operated or utilized for the disposal or treatment of biological waste, with a charging rate equal to or greater than 50 tons per day.

(a) Particulate matter - .08 grains per standard cubic foot dry gas corrected to 50 percent excess air.

(b) No objectionable odor allowed.

(4) Biological Waste Incineration Facilities.

The following requirements apply to all new, modified, and existing biological waste incineration facilities. Any facility with a capacity equal to or less than 500 pounds per hour used solely for the incineration of dead animals for which a complete application for a permit to construct is received by the Department on or after September 1, 1992, shall comply with these requirements before operation may commence. Any facility with a capacity equal to or less than 500 pounds per hour used solely for the incineration of dead animals for which a complete application for a permit to construct is received by the Department prior to September 1, 1992, shall comply with these requirements by April 1, 1994. Any new facility that is not used solely for the incineration of dead animals or any facility with a capacity greater than 500 pounds per hour for which a complete application for a permit to construct is received by the Department after August 30, 1989, shall comply with these requirements before operation may commence. All other facilities shall comply with these requirements by July 1, 1992. This rule does not apply to human remains for which a DHRS death certificate has been issued, that are disposed of by a person licensed under the provisions of Chapter 470, F.S.

(a) Facilities with a capacity equal to or less than 500 pounds per hour used solely for the incineration of dead animals.

1. Particulate matter emissions shall not exceed 0.080 grains per dry standard cubic foot of flue gas, corrected to 7% O_2.

2. Facilities subject to this rule shall incinerate only dead animals and if applicable, the bedding and the remains associated with the animals placed in leak proof containers. Containers may contain up to 0.5 percent by weight chlorinated plastics. Plastic bags used for the incineration of animals shall be nonchlorinated and no less than 3 mils thick. Facilities subject to this rule shall not incinerate dead animals which were used for biomedical or commercial experimentation. No other material, including biohazardous waste as defined in Rule 17-2.100, F.A.C., shall be incinerated.

(b) Facilities with a capacity equal to or less than 500 pounds per hour that are not used solely for the incineration of dead animals.

1. Particulate matter emissions shall not exceed 0.100 grains per dry standard cubic foot of flue gas, corrected to 7% O_2.

2. Hydrochloric Acid (HCl) emissions shall not exceed 4.0 pounds per hour.

(c) Facilities with a capacity greater than 500 pounds per hour, but less than or equal to 2,000 pounds per hour.

1. Particulate matter emissions shall not exceed 0.030 grains per dry standard cubic foot of flue gas, corrected to 7% O_2.

2. Hydrochloric acid (HCl) emissions shall not exceed 4.0 pounds per hour; or shall be reduced by 90% by weight on an hourly average basis.

(d) Facilities with a capacity greater than 2000 pounds per hour.

1. Particulate matter emissions shall not exceed 0.020 grains per dry standard cubic foot of flue gas, corrected to 7% O_2.

2. Hydrochloric acid (HCl) emissions shall not exceed 50 parts per million by volume, dry basis, corrected to 7% O_2 on a three hour average basis; or shall be reduced by 90% by weight on an hourly average basis.

(e) All facilities unless otherwise noted are subject to the following design, operating, monitoring and operator training requirements.

1. Any incinerator with a capacity equal to or less than 500 pounds per hour used solely for the incineration of dead animals for which a complete application for a permit to construct a new unit was received by the Department on or after August 30, 1989, shall provide design calculations to confirm a sufficient volume in the secondary (or last) chamber combustion zone to provide for at least a 1.0 second gas residence time at 1800 degrees Fahrenheit. The actual operating temperature of the secondary (or last) chamber combustion zone will be no less than 1600 degrees Fahrenheit throughout the combustion process in the primary chamber. Primary chamber and stack shall not be used in calculating this residence time. The primary chamber shall not be charged unless the secondary (or last) chamber combustion zone temperature is equal to or greater than 1600 degrees Fahrenheit.

2. Any incinerator with a capacity equal to or less than 500 pounds per hour used solely for the incineration of dead animals for which a complete application for a permit to construct a new unit was received by the Department prior to August 30, 1989, shall provide design calculations to confirm a sufficient volume in the secondary (or last) chamber combustion zone to provide for at least a 1.0 second gas residence time at 1600 degrees Fahrenheit. The actual operating temperature of the secondary (or last) chamber combustion zone will be no less than 1400 degrees Fahrenheit throughout the combustion process in the primary chamber. The primary chamber shall not be charged unless the secondary (or last) chamber combustion zone temperature is equal to or greater than 1400 degrees Fahrenheit.

3. Any incinerator that is not used solely for the incineration of dead animals or any incinerator with a capacity greater than 500 pounds per hour shall operate with a combustion zone design temperature of no less than 1800 degrees Fahrenheit for at least a 1.0 second gas residence time in the secondary (or last) combustion chamber. Primary chamber and stack shall not be utilized in calculating this residence time.

4. Mechanically fed facilities shall incorporate an air lock system to prevent opening the incinerator to the room environment. The volume of the loading system shall be designed to prevent overcharging thereby assuring complete combustion of the waste.

5. Carbon monoxide (CO) emissions shall not exceed 100 parts per million by volume, dry basis, corrected to 7% O_2 on an hourly average basis.

6. Incineration or ignition of waste shall not begin until the secondary (or last) combustion chamber temperature requirement is attained. All air pollution control and continuous emission monitoring equipment shall be operational and functioning properly prior to the incineration or ignition of waste and until all the wastes are incinerated. During shutdowns, the secondary (or last) combustion chamber temperature requirement shall be maintained using auxiliary burners until the wastes are completely combusted.

7. Radioactive waste may not be burned in an incinerator subject to this rule unless the incinerator has been issued a permit or the waste is of such quantity to be exempt in accordance with Department of Health and Rehabilitative Services (HRS) Rule 10D-91 or 10D-104.003, F.A.C.

8. Hazardous waste may not be burned in an incinerator subject to this rule unless the incinerator has been issued a permit or the waste is of such quantity to be exempt in accordance with Department Rule 17-30, F.A.C.

9. Any operators of incinerators with a capacity equal to or less than 500 pounds per hour used solely for the incineration of dead animals shall be trained by the equipment manufacturer's representatives or an equivalent state-approved organization. The training shall provide a

basic understanding of the principles of the combustion process, provide instruction on the operation and maintenance of the incinerator, and increase awareness of regulation requirements and safety concerns. Training programs shall be a minimum of 8 hours of instruction. Training programs shall at a minimum include hands-on experience involving start-up, operation of at least one incineration cycle, shut-down of equipment, and one full cycle of preventative maintenance actions. The content of the training program shall be submitted to the Department for approval. The Department shall approve training programs which meet, at a minimum, the criteria set forth in the EPA Hospital Incinerator Operator Training Program EPA-450/3-89-003, EPA-450/3-89-004, EPA-450/3-89-010. New construction applicants shall submit a training program, or reference a previously approved training program, with the construction application. Existing facilities shall submit a training program no later than October 1, 1991. The applicant shall submit a copy of a certificate for each operator having satisfactorily completed the Department-approved training program. New and modified sources shall submit copies of the operator training certificates within 15 days after completion of initial compliance test. Existing sources shall submit copies of the operator training certificates before stack testing or before April 1, 1994, whichever shall occur first. After April 1, 1994, all sources shall submit copies of the operator training certificates prior to renewal of operating permits. The owner shall not allow the incinerator to be operated unless it is operated by an operator who has satisfactorily completed the required training program.

10. Any operator of an incinerator that is not used solely for the incineration of dead animals or any operator of an incinerator with a capacity greater than 500 pounds per hour shall be trained by the equipment manufacturer's representative or an equivalent state-approved organization. The training shall provide a basic understanding of the principles of the combustion process, provide instruction on proper operating practices and procedures, and increase awareness of regulation requirements and safety concerns. Training programs shall be minimum of 16 hours of instruction. The content of the training program shall be submitted to the Department for approval. The Department shall approve training programs which meet, at a minimum, the criteria set forth in the EPA Hospital Incinerator Operator Training Program EPA-450/3-89-003, EPA-450/3-89-004, EPA-450/3-89-010. The applicant shall submit a copy of a certificate for each operator having satisfactorily completed a Department approved training program with the test notification and prior to issuance or renewal of the operating permit. The owner shall not allow

the incinerator to be operated unless it is operated by an operator who has satisfactorily completed the required training program.

→ (5) Human Crematories. The following requirements apply to all new, modified, and existing human crematory facilities. Any new human crematory for which a complete application for a permit to construct is received by the Department after the effective date of this rule shall comply with these requirements before operation may commence. All other facilities shall comply with these requirements by April 1, 1994.

(a) Particulate matter emissions shall not exceed 0.080 grains per dry standard cubic foot of flue gas, corrected to 7% O_2.

(b) Carbon monoxide (CO) emissions shall not exceed 100 parts per million by volume, dry basis, corrected to 7% O_2.

(c) Crematory units for which a complete application for a permit to construct a new unit was received by the Department on or after August 30, 1989, shall provide design calculations to confirm a sufficient volume in the secondary chamber combustion zone to provide for at least a 1.0 second gas residence time at 1800 degrees Fahrenheit. The actual operating temperature of the secondary chamber combustion zone will be no less than 1600 degrees Fahrenheit throughout the combustion process in the primary chamber. Primary chamber and stack shall not be used in calculating this residence time. The primary chamber shall not be charged unless the secondary chamber combustion zone temperature is equal to or greater than 1600 degrees Fahrenheit.

(d) Crematory units for which construction began or for which a complete application for a permit to construct a new unit was received by the Department prior to August 30, 1989, shall provide combustion calculations to confirm a sufficient volume in the secondary chamber combustion zone to provide for at least a 1.0 second gas residence time at 1600 degrees Fahrenheit. The actual operating temperature of the secondary chamber combustion zone will be no less than 1400 degrees Fahrenheit throughout the combustion process in the primary chamber. Primary chamber and stack shall not be used in calculating this residence time. The primary chamber shall not be charged unless the secondary chamber combustion zone temperature is equal to or greater than 1400 degrees Fahrenheit.

(e) Facilities subject to this rule shall cremate only dead human bodies with appropriate containers. The bodies may be clothed. The containers may contain up to 0.5 percent by weight chlorinated plastics as demonstrated by

manufacturer's data sheet. No other material, including biological waste as defined in Rule 17-296.200(19), F.A.C., shall be incinerated.

(f) All crematory operators shall be trained by the equipment manufacturer's representatives or another qualified organization. The training shall provide a basic understanding of the principles of the combustion process, provide instruction on the operation and maintenance of the crematory unit, and increase awareness of regulation requirements and safety concerns. Training programs shall be a minimum of 8 hours of instruction. Training programs shall at a minimum include hands-on experience involving start-up, operation of at least one cremation, shut-down of the equipment, and one full cycle of preventive maintenance actions. The content of the training program shall be submitted to the Department for approval. The Department shall approve training programs which meet, at a minimum, as is applicable to human cremation, the criteria set forth in the EPA Hospital Incinerator Operator Training Program, EPA-450/3-89-003, EPA-450/3-89-004, EPA-450/3-89-010. New construction applicants shall submit a training program or reference a previously approved training program with the construction application. Existing facilities shall submit a training program no later than October 1, 1993. The applicant shall submit a copy of a certificate for each operator having satisfactorily completed the Department-approved training program. New sources shall submit copies of the operator training certificates within 15 days after completion of initial compliance test. Existing sources shall submit copies of the operator training certificates before stack testing or before April 1, 1994, whichever shall occur first. After April 1, 1994, all sources shall submit copies of the operator training certificates prior to renewal of operating permits. The owner shall not allow the crematory to be operated unless it is operated by an operator who has satisfactorily completed the required training program.

(5) General Requirements -- Biological Waste Incineration Facilities.

Each owner or operator of a biological waste incineration facility shall install, operate, and maintain in accordance with the manufacturer's instructions continuous emission monitoring equipment.

(a) The monitors shall record the following operating parameters.

1. Secondary (or last) combustion chamber exit temperature.

2. Oxygen (for facilities with a capacity greater than 500 pounds per hour).

(b) Any owner or operator subject to the provisions of Rule 17-297.500(5), F.A.C., shall maintain a complete file of all measurements, including continuous emissions monitoring system, monitoring device, and performance testing measurements; all continuous emissions monitoring system performance evaluations; all continuous emissions monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required, recorded in a permanent legible form suitable for inspection. The file shall be retained for at least two years following the date of such measurements, maintenance, reports and records.

(6) General Requirements - Soil Thermal Treatment Facilities. If a facility is subject to Rule 17-296.415, F.A.C., it shall be equipped with instruments to continuously monitor and record the temperature and the carbon monoxide concentration of the flue gases leaving the high temperature zone, but before any dilution air is mixed with the flue gases. The temperature monitor shall be certified by the manufacturer to be accurate to within 1% of the temperature being measured. The temperature monitoring system shall be calibrated at least annually by the procedure recommended by the manufacturer. The calibration shall be at a minimum of three temperatures and over a range from 10% below to 10% above the designed flue gas hot zone temperature of the soil thermal treatment facility. Calibration records shall be kept for a minimum of three years. The carbon monoxide monitor shall be certified by the manufacturer to be accurate to within 10% of the carbon monoxide concentration by volume, mean value, or 5% of the applicable standard of 100 ppm, whichever is greater, as determined by an EPA Test Method 10. The carbon monoxide continuous emission monitoring device shall be certified, calibrated, and operated according to Performance Specification 4 of 40 CFR 60, Appendix B (July 1, 1991), excluding Section 5.3, Calibration Drift Test Period, of Performance Specification 2.

(7) General Requirements - Human Crematories. Each human crematory facility shall install, operate, and maintain continuous monitors to record temperature at the point where 1.0 second gas residence time is obtained in the secondary chamber combustion zone in accordance with the manufacturer's instructions. Any owner or operator subject to the provisions of Rule 17-297.500(6), F.A.C., shall maintain a complete file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; and adjustments, preventive maintenance, and corrective maintenance performed on these systems or devices, recorded in a permanent legible form suitable for inspection. Continuous temperature monitoring documentation shall include operator name, operator indication of when the primary chamber is charged, date, time, and temperature markings. The file shall be retained for at least two years following the recording of such measurements, maintenance, reports, and records.

Specific Authority: 403.061, F.S.

Law Implemented: 403.021, 403.031, 403.061, 403.087, 470.025, F.S.

History: Formerly 17-2.710, Amended 11-17-92, 12-02-92.

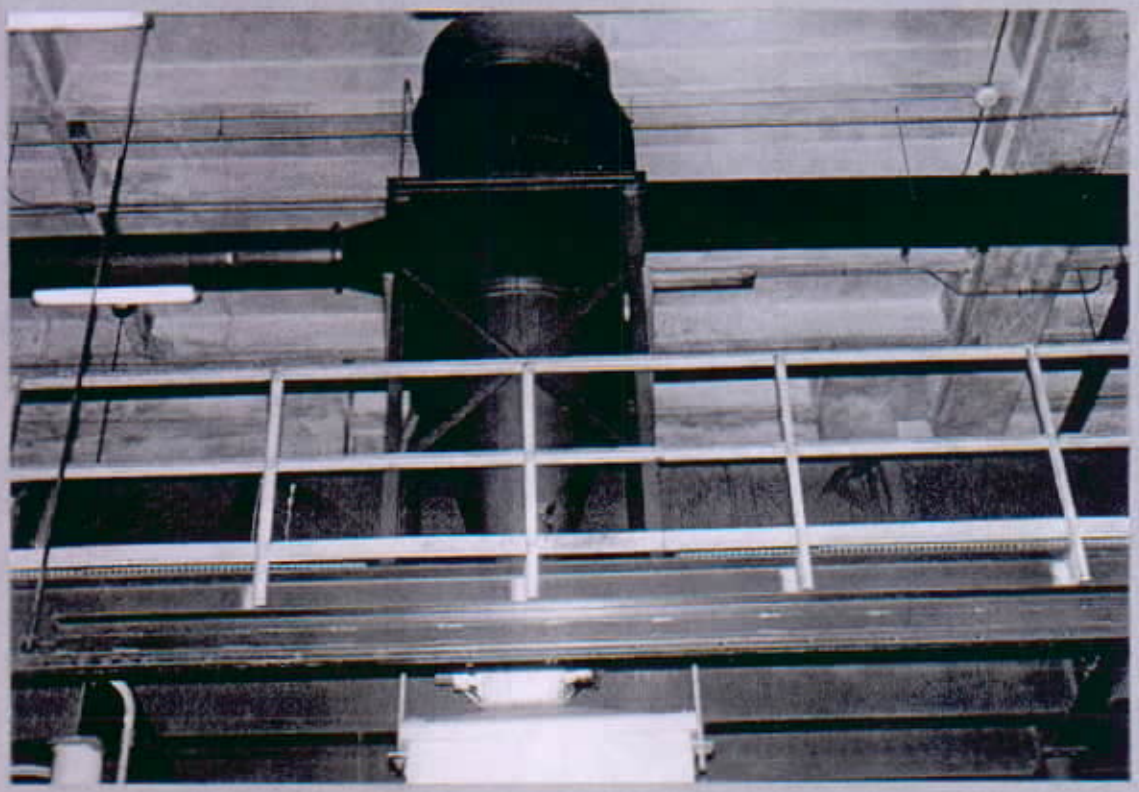
Emission Limiting Standard	Type Source	Pollutant	Test Methods	Min. Sampling volume	Special Conditions
17-296.310(1) (continued)	2. Dry Controls	Particulate	EPA Method 17		Acetone Wash, average stack temperature below 275 degrees F.
			EPA Method 5		Acetone Wash
	Phosphate Processing	Particulate	EPA Method 5 (Reserved)	30 dscf	
17-296.401(1)-(3)	Incinerators	Visible Emissions	DER Method 9		
		Odor	(Reserved)		
		Particulate	EPA Method 5	30 dscf	EPA Method 3 using Orsat analysis required for percent excess air correction.
17-296.401(4)	Biological Waste Incinerators	Visible Emissions	DER Method 9		
		Odor	(Reserved)		
		Carbon Monoxide	EPA Method 10		Frequency of testing established by size, type and status of facility as follows:
		Oxygen	EPA Method 3		
		Particulate	EPA Method 5	30 dscf	1. Facilities with a capacity equal to or less than 500 pounds per hour.
		Hydrochloric Acid	EPA Method 26	30 dscf	Existing -- Initial compliance and prior to renewing operating permit.
					New -- Prior to obtaining and renewing operating permit.

Emission Limiting Standard	Type Source	Pollutant	Test Methods	Min. Sampling volume	Special Conditions
17-296.401(4) (continued)					2. Facilities with a capacity greater than 500 pounds per hour. New and Existing -- Initial compliance and annually thereafter. 3. Facilities with a capacity equal to or less than 500 pounds per hour used solely for the incineration of dead animals may demonstrate compliance with the remaining carbon monoxide and particulate emission standards by submission of a test report for an identical (same make, model, and permitted capacity) incinerator tested in Florida and approved by the Department. The test data in the test report must be less than five years old and may or may not be obtained from the unit that is being permitted.

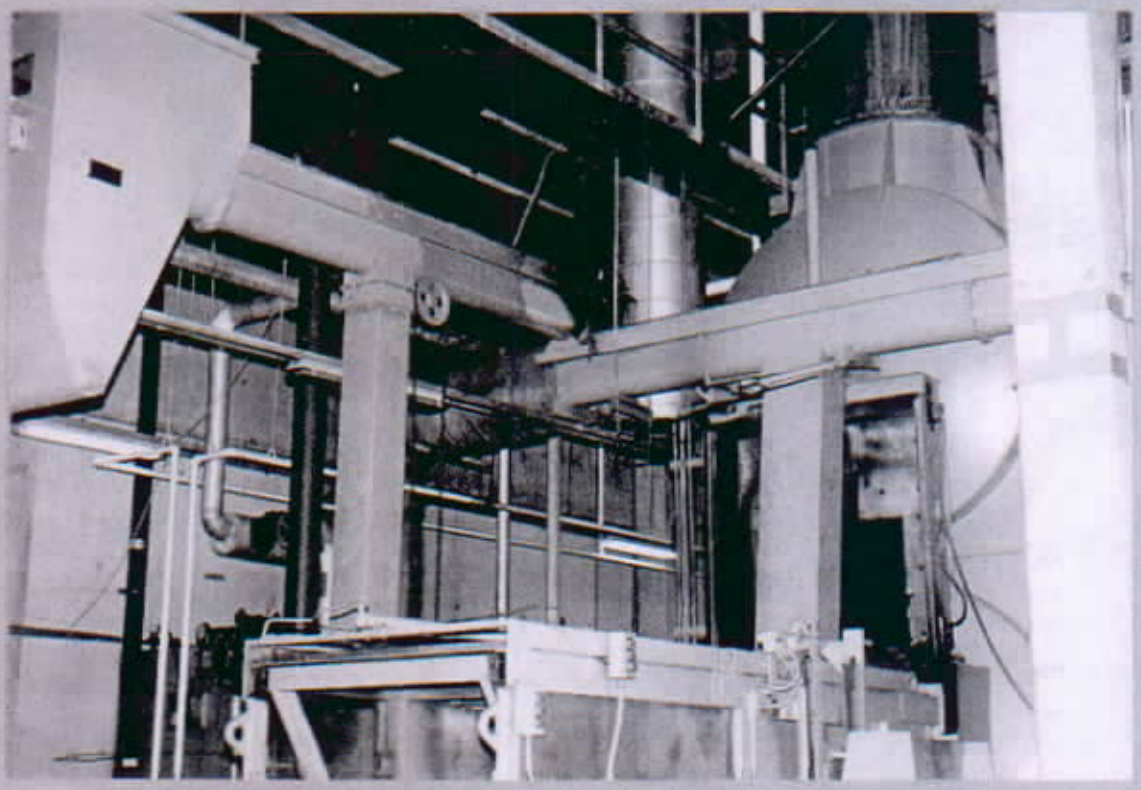
Emission Limiting Standard	Type Source	Pollutant	Test Methods	Min. Sampling Volume	Special Conditions
17-296.401(5)	Human Crematory	Visible Emissions	DER Method 9		
		Odor	[Reserved]		
		Carbon Monoxide	EPA Method 10		Frequency of testing: 1. Existing -- initial compliance and *prior to renewing operating permit.* 2. New -- prior to obtaining and renewing operating permit. 3. Facilities may demonstrate compliance with the carbon monoxide and particulate emission standards by submission of a test report for an identical (same make, model, and permitted capacity) crematory unit tested in Florida and approved by the Department. The test data in the test report must be less than five years old and may or may not be obtained from the unit that is being permitted.
		Oxygen	EPA Method 3		
		Particulate	EPA Method 5	30 dscf	
17-296.401(1)	Air Curtain Incinerators	Visible Emissions	DER Method 9		

APPENDIX C

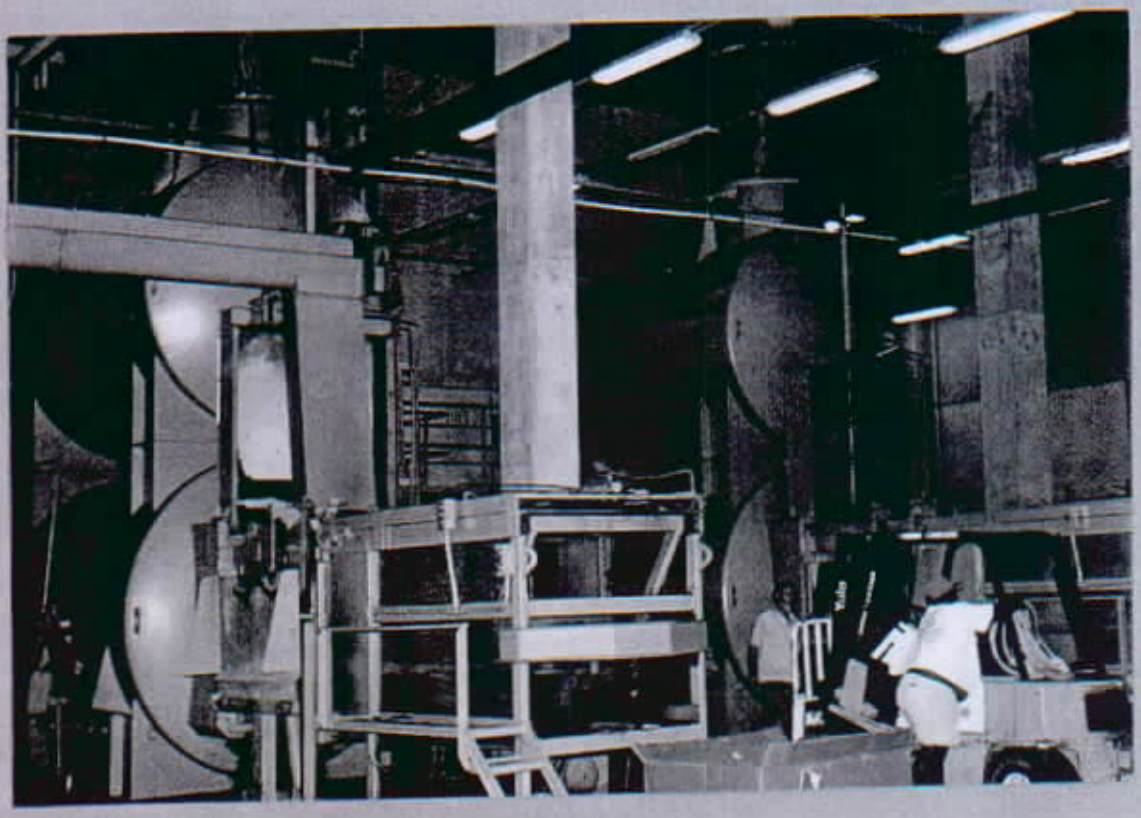
Photos

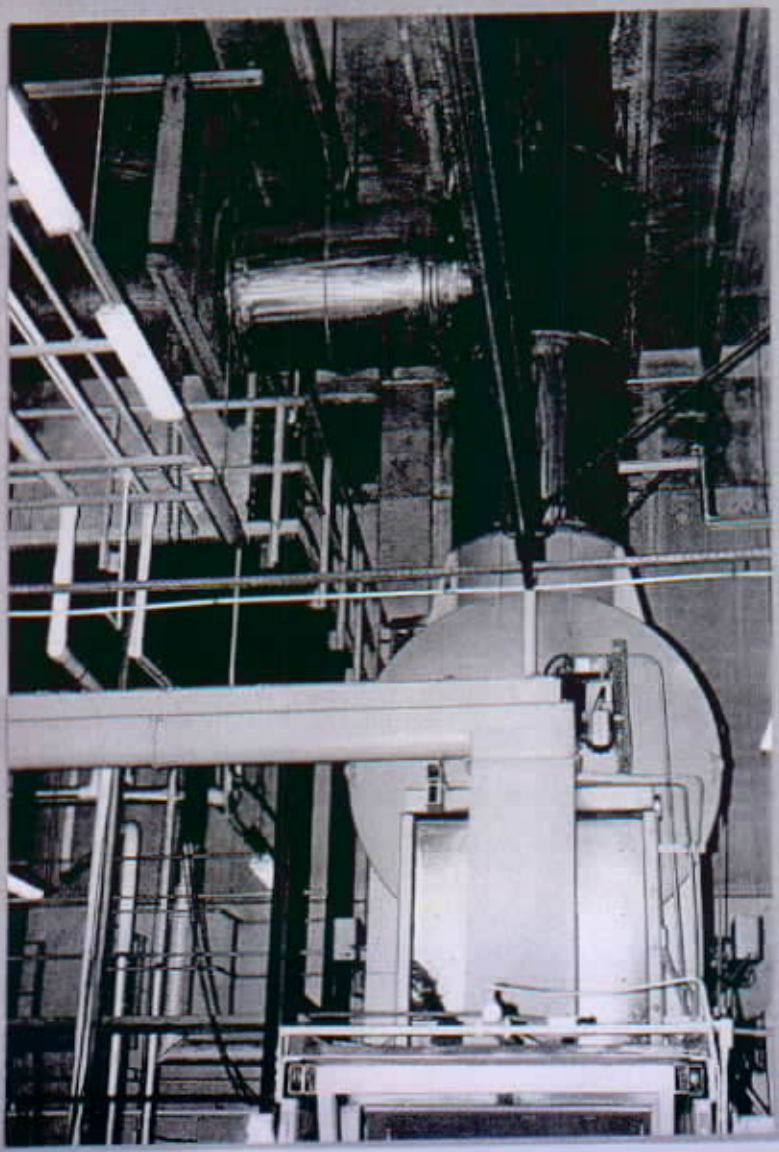


Waste Feed Hopper



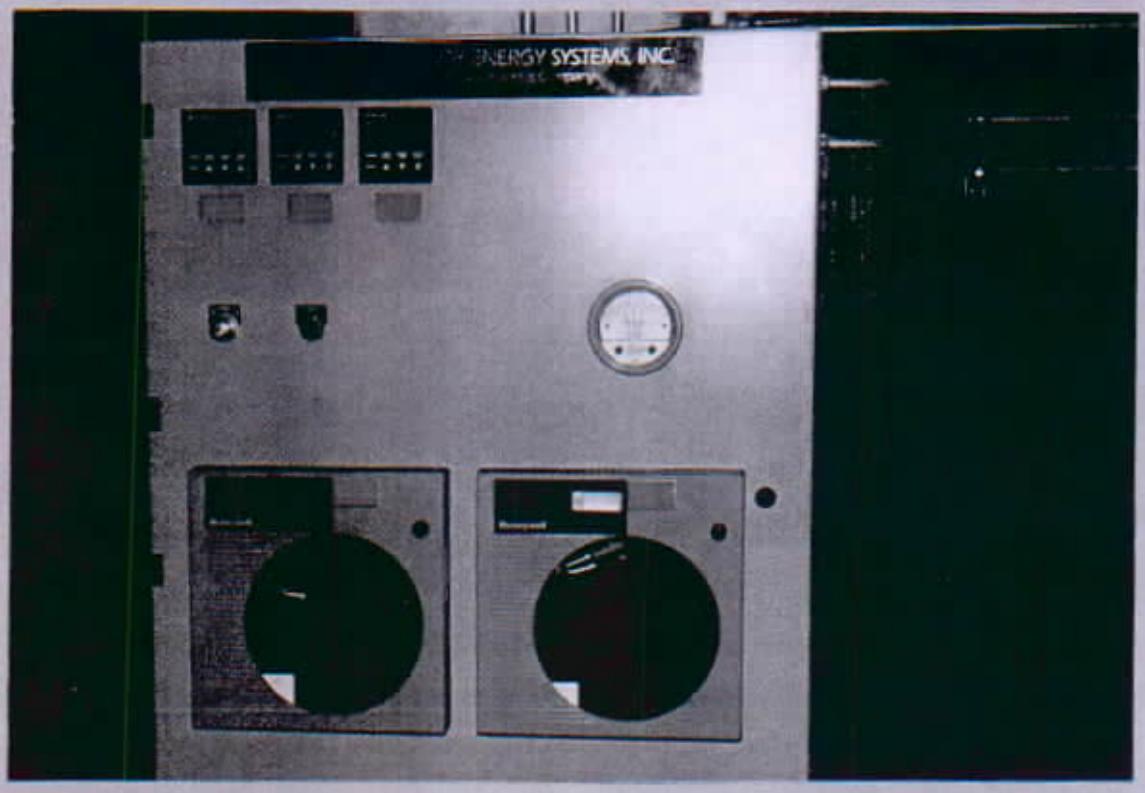
Waste Feed System and Incinerator 1



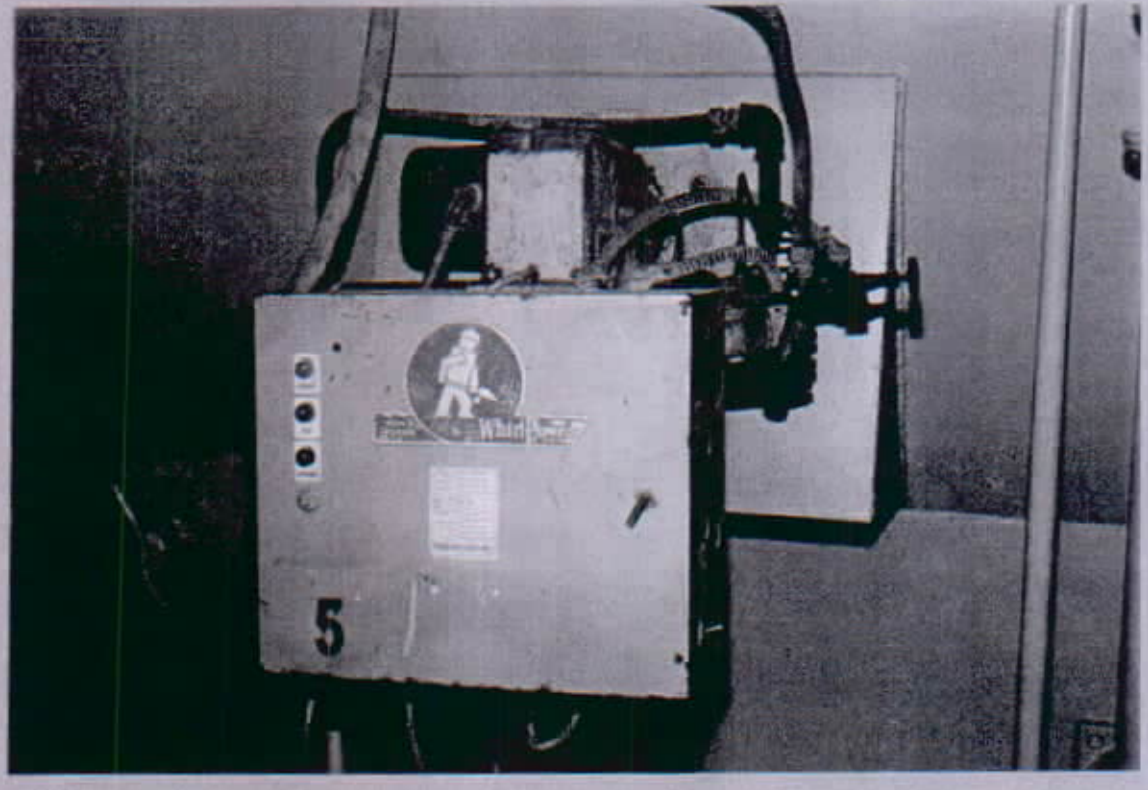


Incinerators 1 and 2
(Photo above)

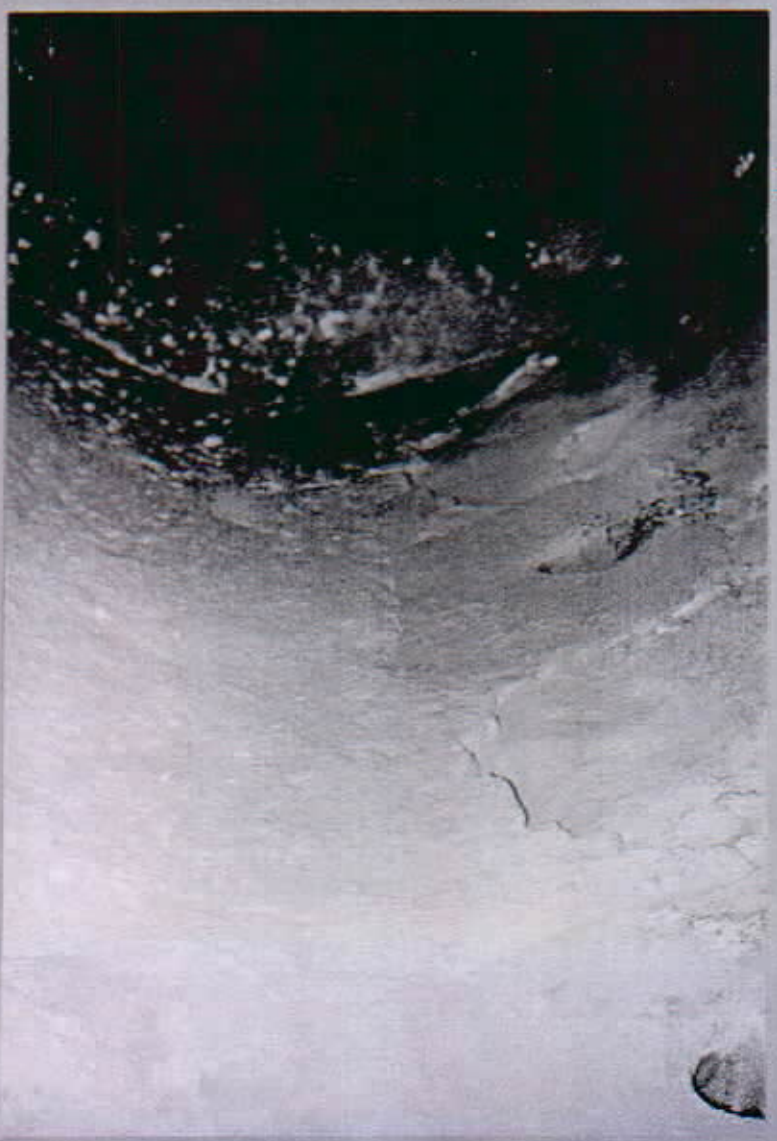
Incinerator 2
(Photo left)



Control Panel - Incinerator 2



Lower Chamber Burner - Incinerator 2



Interior of Lower Chamber -
Incinerator 2 (Both photos)