State of California
AIR RESOURCES BOARD

Resolution 82-50

September 23, 1982

Agenda Item No.: 82-18-6

WHEREAS, the Air Resources Board (the "Board") and the federal Environmental Protection Agency have adopted ambient air quality standards for ozone (oxidant), and these standards are consistently exceeded in several of the state's air basins;

WHEREAS, Health and Safety Code Sections 39003, 39500, 39602, and 41500 authorize the Board to coordinate, encourage, and review efforts to attain and maintain state and national ambient air quality standards;

WHEREAS, Health and Safety Code Sections 39600 and 39605 authorize the Board to act as may be necessary to execute the powers and duties granted to and imposed upon the Board and to assist local air pollution control districts;

WHEREAS, the California Environmental Quality Act and Board regulations require that an activity not be adopted as proposed if mitigation measures or alternatives exist which would substantially reduce any significant adverse environmental effects of the proposed activity, and further require the Board to respond in writing to significant environmental issues raised;

WHEREAS, on September 23, 1982, the Board held a duly noticed public meeting to hear and consider the views and comments presented by the staff, affected industries, and other interested persons and agencies regarding the proposed control of organic compound emissions associated with waste disposal;

WHEREAS, the Board finds that:

Emissions of organic compounds associated with volatile organic waste disposal contribute significantly to the formation of ozone;

Methods for reducing organic compound emissions associated with volatile organic waste disposal are technologically feasible and cost effective in many cases. These methods are capable of reducing emissions from land disposal by approximately 90 percent and are expected to be available in California in the near future; and

The staff report and the information presented at the September 23, 1982 public meeting adequately address the environmental issues associated with this Suggested Control Measure, and the Board concurs in the staff's finding that no significant adverse environmental effects are likely to result from the endorsement of the Suggested Control Measure and its subsequent adoption and implementation by the districts.

NOW, THEREFORE, BE IT RESOLVED that the Board endorses the Suggested Control Measure for the Control of Organic Compound Emissions Associated with Volatile Organic Waste Disposal, as set forth in Attachment A to this resolution, and directs the Executive Officer to forward this resolution to the Technical Review Group for further refinement of the Suggested Control Measure.

BE IT FURTHER RESOLVED that authority is delegated to the Executive Officer to review the final form of the Suggested Control Measure as approved by the Technical Review Group, and he is directed to forward the Suggested Control Measure to air pollution control and air quality management districts with the recommendation that they consider adoption of the measure or a similar measure to the extent that such districts need to further reduce organic compound emissions in order to attain or maintain ambient air quality standards.

BE IT FURTHER RESOLVED that the Executive Officer is directed to work with the Bay Area Air Quality Management District to adopt and implement the measure in accordance with its nonattainment plan. During this process, the questions of the test method, emission estimates, and other technical issues will be further addressed and resolved. During this period, the Board staff will continue to coordinate with the State Interagency Task Force and the districts to assure maximum compatibility between the Governor's Landfill ban and the provisions of this Suggested Control Measure.

BE IT FURTHER RESOLVED that the Executive Officer is directed to provide assistance to any district requesting assistance in adopting, interpreting or implementing the Suggested Control Measure, including:

a. Improvement of estimates of the emissions and cost-effectiveness of emission reductions;

b. Finalization of the test procedure referenced in the Suggested Control Measure or suitable alternative test methods; and

c. Coordination with other state and federal agencies dealing with waste disposal regulations.

I certify that this is a
true and correct copy of
Resolution 82-50, as adopted
by the Air Resources Board.

Harold Holmes, Board Secretary

Attachment A

Regulation _____: Volatile Organic Waste

Rule _____ Generation, Storage, Transfer, Treatment, Recovery and Disposal of Volatile Organic Waste

Section A: Rule Description

This rule establishes standards to reduce organic compound emissions associated with volatile organic waste disposal.

Section B: Applicability

This rule applies to any person who generates, stores, transfers, treats, recovers, or disposes of volatile organic wastes.

Section C: Exemptions

1. Resource Recovery Operations for Landfill Methane- Existing moisture which is extracted with recovered methane from landfills and separated for disposal shall be allowed to be placed back into the landfill from which it was derived.
2. Dry Cleaning - Still residues from dry cleaning operations shall be exempt from complying with Section E. 3 of this rule until July 1, 1987. This exemption does not constitute waiver from any other District rules or regulations affecting such still residues.
3. Household Wastes - Wastes generated by household users shall be exempt from the requirements of this rule.

4. Exempt Waste - a volatile organic waste whose organic content consists exclusively of the following compounds or various combinations of the following compounds shall be exempt from the requirements of this rule: Fluorochlorocarbons (Freon 11,12,23,113, 114,115); Methylene chloride; and 1,1,1-Trichloroethane.

Section D: Definitions

1. Dispose - To abandon, deposit, or otherwise discard any volatile organic waste contained or non-contained into or on any land or water so that such waste or any constituent of it may be emitted to the atmosphere.
2. Generator - Any person whose act or process produces volatile organic waste.
3. Incompatible Volatile Organic Wastes - Volatile organic wastes which are unsuitable for mixing under controlled conditions because the mixing could render some or all of the volatile organic wastes unsuitable for recycling or application of other resource recovery processes
4. Organic Compound - Any compound of carbon except:
   a. carbonates
   b. metallic carbides
   c. carbon monoxide
   d. carbon dioxide

e. carbonic acid

f. methane

5. Resource Recovery Processes - Any method, technique, or process which transforms a volatile organic waste into a usable material (such as a fuel supplement or recyclable solvent).

6. Storage - The containment of volatile organic waste prior to treatment, recovery, transfer, or disposal.

7. Treatment - Any method, technique, or process designed to change the properties of any volatile organic waste so as to reduce the organic compound content to one percent by weight or less.

8. Volatile Organic Waste - Any waste which is determined to contain organic compounds in excess of one percent by weight.*

9. Volatile Organic Waste Management Plan - A plan which sets forth a facility's procedure for the systematic control of emissions of organic compounds associated with the collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of volatile organic wastes.

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*The determination called for by Section D.8 shall be made by the Gravimetric Purge and Trap method described in Attachment B. when such method is approved by the Air Resources Board.

Section E: Standards

1. Storage

   a. A person subject to the requirement of Section F shall not store incompatible volatile organic wastes within the same container.

   b. Unless subject to storage requirements of another District rule or regulation, volatile organic wastes shall be stored in covered containers so as to reduce the evaporation of the wastes.

2. Transfer

   Persons transferring liquid volatile organic wastes into any container larger than 500 gallons' capacity shall utilize submerge filling, bottom loading, or vacuum trucks, or an equivalent method approved by the air pollution control officer.

3. Disposal

   A person shall not dispose of any volatile organic waste as defined in Section D. 8.

4. Treatment Prior to Disposal

   Any person operating a facility for the treatment of any volatile organic waste shall eliminate as a part of the treatment process, at least 95 percent of all organic compounds volatilized in connection with such treatment.

The air pollution control officer shall establish more stringent requirements, if necessary, to ensure that emissions in such quantities as to endanger public health do not result from any incineration or other treatment process.

5. Resource Recovery

Any person operating a process for the recovery of resources from any volatile organic waste shall recover or eliminate within the process at least 95 percent of all organic compounds volatilized during such resource recovery process.

The air pollution control officer shall establish more stringent requirements, if necessary, to ensure that emissions in such quantities as to endanger public health do not result from any incineration or other treatment process.

Section F: Volatile Organic Waste Management Plan

Persons generating, storing, treating, recovering or disposing of more than 1000 kilograms/month (1.1 tons/month) of volatile organic wastes shall submit annually to the air pollution control officer for approval, a Volatile Organic Waste Management Plan. The plan shall include but not be limited to the following:

1. a complete description of each process that generates volatile organic wastes;

2. a complete list showing name, quantities, sources and concentrations of all volatile organic wastes generated, stored, treated, recovered or disposed;

3. Descriptions of methods of handling, storage, treatment, recovery, transportation, and disposal of all volatile organic wastes and residues; and

4. Explanations of methods and procedures used to identify, characterize and evaluate the volatility and compatibility of volatile organic waste.

Section G: Increments of Progress

The following are the implementation dates for the requirements of this rule:

1. Nine months following adoption of rule: File Volatile Organic Waste Management Plan. Comply with Sections E.1. and E.2.

2. January 1, 1985: Comply with Sections E.3., E.4., and E.5.

3. After July 1, 1984, the air pollution control officer shall on his or her own motion or within 60 days after receipt of a petition, conduct a public hearing to determine whether it is feasible for the petitioner or others similarly situated to comply with the disposal, treatment, and/or resource recovery standards by January 1, 1985. The determination shall be based on the availability and cost-effectiveness

of the technology required. If the air pollution control officer finds that compliance with these standards by the petitioner or others similarly situated is not feasible by January 1, 1985, he or she shall either postpone the compliance date or modify the standards to the extent supported by the evidence. Upon request by the air pollution control office or District Board of Directors, the State Air Resources Board may conduct the public hearing and recommend that the air pollution control officer make the amendments set forth above.

Section H: Manual of Procedures

See Attachment B.

ATTACHMENT B

GRAVIMETRIC PURGE AND TRAP METHOD TO DETERMINE VOLATILE ORGANIC CONTENT OF WASTE PRODUCTS

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1. SCOPE

This procedure uses a purge and trap method to determine the weight percent of volatile organic compounds in organic products.

The purge method is designed to strip soluble and/or insoluble volatile organics from solid or liquid samples into an inert gas stream. The trap method collects and concentrates organic compounds while separating water.

These methods may not be applicable to some wastes or for some waste disposal procedures and other methods may be substituted with mutual agreement of the control authority and the producer.

2. APPLICABLE DOCUMENTS

2.1 ASTM Standards: Part 23

D 270 Sampling Petroleum and Petroleum Products

D 4057 Manual Sampling of Petroleum/Petroleum Products

2.2 Method 624, Purgeables, Pg. 69532, FR Volume 44, No. 233, Dec. 3, 1979

Method 602, Purgeable Aromatics, Pg. 69474; ibid.

2.3 EPA Reports

EPA-600/2-80-018: "Samples and Sampling Procedures for Hazardous Waste Streams."

3. PROCEDURE

3.1 Sampling

Using the appropriate sampling method referenced in Section 2, a representative one liter sample of waste is collected and transfered to a glass container with a foil-lined screw cap.

3.2 Liquid Sample Analysis

If the waste sample is a liquid (low viscosity) homogenize the sample with an ultrasonic homogenizer. An emulsification agent can be added if it can be shown not to cause interferences.

If the organic fraction is expected to contain less than ten percent soluble volatile organic species the procedure for insoluble organics is to be used. If the sample is expected to exceed 10% soluble volatile organics the procedures given for both soluble and insoluble organics are to be used.

3.2.1 Insoluble Organics

To purge the insoluble organics heat the purging chamber to 40^{o}C and purge with N_2 through a frit or needle into the sample at a rate of 100 ml/min. for 30 minutes.

3.2.2 Insoluble and Soluble Organics

To purge all organics heat the purging chambeer to 40^{o}C and purge with N_2 into the sample until all the liquid has vaporized or a constant liquid level is reached.

3.3 Solid or Sludge Sample Analysis

If the sample is a solid or very viscous liquid then an appropriate solvent of known amount is to be added. Water or N,N-Dimethylformamide may be useful for this purpose.The sample is to be uniformly dispersed, dissolved or

emulsified. An emulsification agent may be added if necessary, and if it can be shown not to cause interferences. The method will then follow steps 3.2.1 - 3.2.2 outlined for liquid samples.

3.4 Traps

The first adsorbent trap contains No. 3A molecular sieves for adsorption of water with minimal adsorption of organic species. The trap is designed for 90% water retention based on a 99% water sample.

The VOC is trapped on a tared adsorbent (Tenax GC or activated carbon). The adsorbent is weighed when the test is completed.

3.5 VOC Calculations

The percent of VOC in the waste sample is determined from the weight gain of the organic adsorption trap.

$$\text{Percent VOC} = \frac{\text{Trap Weight Gain}}{\text{Initial Sample Weight}} \times 100$$

4. Interferences

4.1 Interferences from Analytical System

Interferences coextracted from the samples will vary considerable from source to source. Impurities in the purge gas and organic compounds out-gassing from the plumbing ahead of the trap account of the majority of contamination problems. The analytical system must be demonstrated to be free from interferences under the conditions of the analysis by running method blanks. Method blanks are run by charging the purging device with organic-free water and analyzing it in a normal manner. The use of non-TFE plastic tubing, non-TFE thread sealants, or flow controllers with rubber components in the purging device should be avoided.

4.2 Sample Contamination

Samples can be contaminated by diffusion of volatile organics (particularly methylene chloride) into the sample during sampling, shipment and storage. A field blank prepared from organic-free water and carried through the sampling and handling protocol can serve as a check on such contamination.

4.3 Cross Contamination

Cross contamination can occur whenever high level and low level samples are sequentially analyzed. To reduce cross contamination, it is recommended that the purging device and sample syringe be scrubbed with an appropriate solvent and a bottle brush and rinsed out twice, between samples, with organic-free water. Whenever an unusually concentrated sample is encountered, it should be followed by an analysis of organic-free water to check for cross-contamination. For samples containing large amounts of water soluble materials, suspended solids, high boiling compounds, or high organohalide levels, it may be necessary to wash out the purging device with a soap solution, rinse with distilled water, and then dry in a 105^{o}C oven between analyses.

A different cleaning procedure can be used if an organic-free water sample is run to check for cross-contamination.

5. Apparatus:

5.1 Hardware

Purging system

frit or needle disperser

Stirrer

Connecting Tubing

Nitrogen

Constant Temperature Bath

Trap System

Coalescing Filter

3A Molecular Sieve

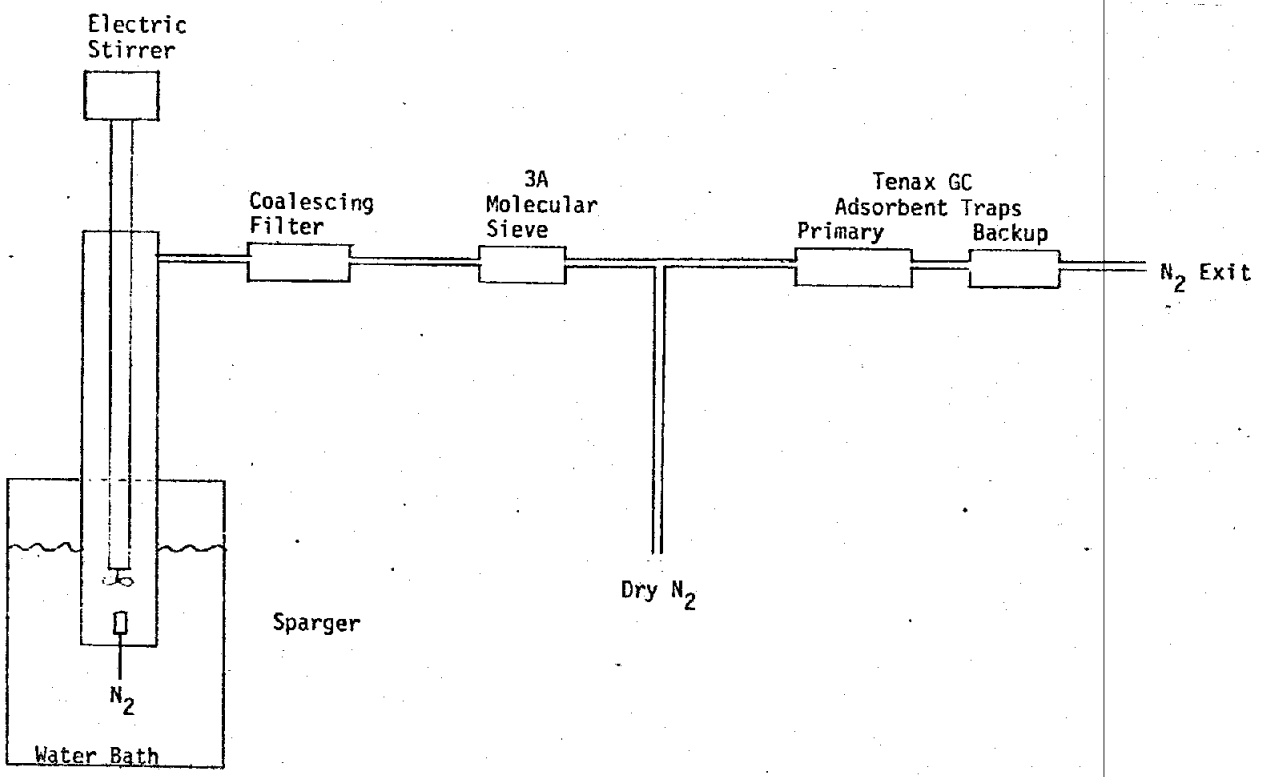
Rotameters

Tenax Tube

Activated Charcoal Tube

Analytical Balance

5.2 Schematic:



Schematic of Gravimetric Purge and Trap Method

5.3 Apparatus Description

The purging chamber discussed here is made of Teflon. Teflon is inert in contact with wastes and will deform instead of shatter should a waste explode on heating. The design of the purging chamber should permit a stirrer to be attached. Also an opening must be available to allow a sparger to be placed within the chamber. The sample of waste is stirred while a sparger distributes N_2 into the sample. The purging chamber is placed in a constant temperature bath.

A coalescing filter is used to remove water droplets or foam formed by the purging process. To remove water vapor from the gas stream a 3A molecular sieve is used.

The organic sorbent trap consists of tubing packed with Tenax - GC (60-80 mesh) and a backup tube of Tenax - GC (60-80 mesh) for breakthrough detection. Activated carbon may be used as the adsorbent if water does not interfere.

6. Reagents

6.1 Sodium thiosulfate--(ACS) Granular.

6.2 Trap Materials

6.2.1 Porous polymer packing 60/80 mesh chromatographic grade Tenax GC (2, 6-diphenylene oxide).

6.3 Organic-free water

6.3.1 Organic-free water is defined as water free of interference when employed in the purge and trap procedure described herein. It is generated by passing tap water or well water through a carbon filter bed containing about 1 lb. of activated carbon.

6.3.2 A water system (Millipore Super-Q or equivalent) may be used to generate organic-free deionized water.

6.3.3 Organic-free water may also be prepared by boiling water for 15 minutes. Subsequently, while maintaining the temperature at 90°C, bubble a contaminant-free inert gas through the water for one hour. While still hot, transfer the water to a narrow mouth screw cap bottle equipped with a Teflon seal.

7. Quality Control

7.1 Before processing any samples, the analyst should daily demonstrate, through the analysis of an organic-free water method blank, that the entire analytical system is interference-free.

7.2 Standard quality assurance practices should be used with this method. Field replicates should be collected to validate the precision of the sampling technique. Laboratory replicates should be analyzed to validate the precision of the analysis at concentrations near the standard. Fortified samples should be analyzed to validate the accuracy of the analysis. The analytical precision should be established by round-robin prior to application of the standard. Periodic interlaboratory comparisons may be required.

7.3 The analyst should maintain constant surveillance of both the performance of the analytical system and the effectiveness of the method in dealing with each sample matrix by determining the precision of the method in blank water and spiking each 5-ml sample, standard, and blank with surrogate halocarbons.

7.3.1 Determine the precision of the method by dosing blank water with the compounds selected as surrogate standards--bromochloromethane,

2-bromo-1-chloropropane, and 1.4-dichlorobutane--and running replicate analyses. Calculate the recovery and its standard deviation. These compounds represent early, middle, and late eluters over the range of the pollutant compounds.

7.3.2 The sample matrix can affect the purging efficiencies of individual componds; therefore, each sample must be dosed with the surrogate standards and analyzed in a manner identical to the internal standards in blank water. If the recovery of the surrogate standard shows a deviation greater than two standard deviations (7.3.1), repeat the dosed sample analyses. If the deviation is again greater than two standard deviations, dose another aliquot of the same sample with the compounds of interest at approximately two times the measured values and analyze. Calculate the recovery for the individual compounds using these data.

8. Sample Collection, Preservation and Handling

8.1 Grab samples must be collected in glass containers having a total volume greater than 1000 ml. Fill the sample bottles in such a manner that no air bubbles pass through the sample as the bottle is being filled. Seal the bottles so that no air bubbles are entrapped in it. Maintain the hermetic seal on the sample bottle until time of analysis.

8.2 The sample must be iced or refigerated from the time of collection until extraction. If the sample contains residual chlorine, add sodium thiosulfate preservative (10 ug/40 ml) to the empty sample bottles just prior to shipping to the sample site, fill with sample just to overflowing, seal the bottle, and shake vigorously for 1 minute.

8.3 All samples must be analyzed within 7 days of collection.

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item:	Public Meeting to Discuss a Suggested Control Measure to Reduce Organic Compound Emissions Associated with Volatile Organic Waste Disposal.
Agenda Item No.	82-18-6
Public Meeting Date:	September 23, 1982
Response Date:	September 23, 1982
Issuing Authority:	Air Resources Board
Comment:	Incineration of halogenated wastes may result in emissions of toxic by-products.

Response:

Toxic by-product formation and control are a function of incinerator and control system design. EPA has issued permits for incineration of PCB's, probably the most difficult chlorinated waste to destroy, in Deer Park, Texas and El Dorado, Arkansas. These permits and ARB policy regarding the incineration of PCB's are discussed in the ARB report, "An Air Resources Board Policy Regarding Incineration as an Acceptable Technology for PCB Disposal," December, 1981. Evaluations of specific incineration projects will need to be done on a case-by-case basis. The staff feels that toxic compound emissions from properly designed incineration systems will likely prove to be at acceptable levels for most waste types.

Referring to the December, 1981, report, the staff reached the conclusion, "A review of available data on PCB incineration toxic by-products (dioxins and furans) suggests that the emissions of these pollutants from cement kilns would be at acceptable levels." Since PCB's are extremely difficult to destroy, it is reasonable to assume that systems can be designed to minimize toxic by-product emissions from other waste incineration systems.

Comment: Incineration of wastes may result in residues which require land disposal or special treatment.

Response:

Negative environmental impacts of incineration residue wastes have been mitigated at facilities presently in operation. Residues of incineration are dependent on the waste stream. Heavy metals, scrubber wastes, and other undesirable residues might need to be further treated and stabilized prior to disposal. Facilities in other parts of the United States have been able to comply with all water and land quality requirements while disposing of such wastes.

Comment: Incineration results in emissions of NOx, SOx, particulate matter (PM), and hydrochloric acid (HCl) which may negatively offset the reduction of volatile organic compounds from the phase out of land disposal of volatile organic wastes.

Response:

Air pollution control systems are available for emissions of SOx, PM and HCl. Emissions of NOx are dependent on incinerator design and operation. New incinerator designs are likely to emit significantly lower levels of NOx than existing designs.

Furthermore, existing district rules and regulations will mitigate any emissions increases from siting a new hazardous waste incinerator in California. Many of the waste types subject to this measure can be incinerated in cement kilns, with no significant change in existing rates of emissions.

Comment: The Suggested Control Measure will allow an increase in disposal of VOC to landfills, landfarms, and surface impoundments at IT Corporation's Martinez and Benecia facilities because the Bay Area Air Quality Management District's (BAAQMD) existing Rule 2, Regulation 8 is more stringent. (IT Corporation)

Response:

The Suggested Control Measure when adopted by the BAAQMD, would not negate the applicability of Rule 2, Regulation 8 to the IT Corporation's two facilities, if Regulation 8 were found to be more stringent. However, it has not yet been substantiated that Regulation 8 would be more stringent than the SCM. Regulation 8 is intended to apply to air pollution sources with stacks that can be monitored for a comparison to Regulation 8's standards of 300 ppm or 15 pounds/hour. IT Corporation has stated that its facilities comply with these standards by measuring the headspace above a waste sample with a hydrocarbon analyzer to determine whether the waste should be directly ponded or treated before being ponded. However, a direct correlation between this test method presently used by IT Corporation, and the preliminary test method contained in the SCM has not been made. Until this is done, it is not possible to determine that Regulation 8 is more stringent than the SCM.

CERTIFIED: Board Secretary

Date: 10-21-82

State of California

Memorandum

To : Huey D. Johnson
Secretary
Resources Agency

Date : November 4, 1982

Subject: Filing of Notice of Decision of the Air Resources Board

From : Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decision and response to environmental comments raised during the comment period.

Harold Holmes
Board Secretary

attachments
Resolution 82-50
Resolution 82-55
S.E.I. for Diesels