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DATE: JULY 25, 1990

FROM: JIM WYCHE

RE: ENVIRONMENTAL PROCEDURE II-11
COMPLIANCE WITH VINYL CHLORIDE
REGULATIONS

Attached is your copy of an expanded procedure covering VC regulatory compliance which replaces existing procedures II-10, II-11, and II-12. Please see that those needing this information in your organization have access to this document.

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cc: Ron Kaspar (p. 40 only)

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ment pg 15/44 ; pg 19, 24, 26, 28

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ENVIRONMENTAL PROCEDURE II-11

TITLE: Compliance
with
Vinyl Chloride Regulations

REGULATORY
REFERENCE: Louisiana Emissions Standards for
Hazardous Air Pollutants, LAC 33,
Part III, Chapter 25

OBJECTIVE: To assure compliance with LDEQ
hazardous air pollutant standards
(LESHAP) for vinyl chloride and
OHC-EDC plants.

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ENVIRONMENTAL PROCEDURE II-11

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A GUIDE TO COMPLIANCE WITH
VINYL CHLORIDE REGULATIONS
FOR THE OPERATOR OF VC AND OHC-EDC PLANTS

INTRODUCTION

This guide to LDEQ vinyl chloride regulations promulgated under the Hazardous Air Pollutants requirements of the Federal Clean Air Act is intended for use by operational supervision and management who are ultimately responsible for 100% compliance with these regulations. Although other groups such as Instrument Maintenance, Shipping, Environmental, and Records, as indicated herein, are responsible for various elements, the overall responsibility for seeing that all things necessary for compliance with these regulations are done resides with Operations, primarily with the Area Supervisors of the VC-II and TE-II production units and WTU. Operations should make such checks as needed to assure that not only those items directly in their control are being done, but also that those to be done by other groups are, in fact, being done in a timely and appropriate fashion.

In order to make this document as simple and clear as possible, some interpretation and abbreviation of the regulations has been necessary. For example, rules pertaining to PVC manufacturers have been omitted since PPG does not produce PVC. Questions which may arise, or the need

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for further explanation, should be directed to Environmental for resolution.

I. WHAT IS COVERED (Applicability)

- 1) VC-II including OHC-EDC and LP EDC, the latter because OHC-EDC material is processed in the LP EDC portion of VC-II
- 2) The VC portion of TE-II, but not the DCE or MC sections
- 3) OHC-II
- 4) All VC product storage and loading facilities including the VC tank car loading rack

The boundaries of the affected facilities are indicated in Figures 1, 2, and 3. Note that the HCl by-product from VC production is not covered; neither are any other units not listed or described in the Figures. Some of the standards apply only to elements (i.e., pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, flanges and other connectors, and control devices or systems required by these regulations) "in VC service" (contains 10% or more VC).

For an element to be considered not "in VC service", it must be determined (by testing or by engineering judgement) that the VC content can be reasonably expected never to exceed 10% by weight. These standards are identified herein as applying to equipment "in VC service".

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Responsibilities:

- * For advising Environmental of any process changes which may affect Figures 1, 2, and 3 and/or applicability of these regulations - Area Supervisors VC-II, TE-II, WTU, and Shipping
- * For identifying equipment and elements "in VC service" - Area Supervisors VC-II, TE-II, and Shipping
- * For advising Operations and Shipping of regulatory changes and their impact and for interpreting the regulations - Environmental
- * For revising applicability Figures 1, 2, and 3 as necessary - Environmental

II. FOUR THINGS YOU CANNOT DO (Prohibited Activities and Circumvention)

- (1) Construct a new or modify an existing VC or OHC facility without first obtaining a permit from DEQ. Modification is any physical change in, or change in the method of operation of, a source that would increase the amount of VC emitted, but does not include routine maintenance, repair, replacement, or increase in production rate if such increase does not exceed the design capacity.
- (2) Operate in violation of these regulations except in very limited circumstances which could not have been avoided such as an act of God, of war, or of sabotage.
- (3) Fail to submit the reports and test results required by these regulations.

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- (4) Make any effort to conceal an emission which would otherwise constitute a violation, or to avoid coverage intended by these regulations.

Responsibilities:

- * For permitting - see Section III
- * For maintaining operations in compliance - Area Supervisors VC-II, TE-II, WTU, and Shipping
- * For reports - see Section VII.
- * For not circumventing the regulations - Area Supervisors VC-II, TE-II, WTU, and Shipping

III. SIX STEPS REQUIRED TO CONSTRUCT A NEW VC OR OHC PLANT OR MODIFY AN EXISTING PLANT (Permitting)

- 1) Obtain a pre-construction permit from DEQ before commencing construction of a new source, or modification of an existing source. Modification is any physical change in, or change in the method of operation of, a source that would increase the amount of VC emitted but does not include routine maintenance, repair, replacement or increase in production rate if such increase does not exceed the design capacity. See the regulations (Par. 2513 and 2551.B.8) for a description of the required contents of a permit application.
- 2) Notify DEQ of the anticipated date of initial start up <60 >30 days ahead of time.
- 3) Notify DEQ of the actual start-up date within 10 working days.

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- 4) Submit to DEQ an initial report within 90 days of initial start up. See the regulations (Par. 2559.C) for a listing of report contents.
- 5) Conduct an initial performance test when specified by the DEQ to demonstrate compliance with the 2% allowable leaking valve standard.
- 6) Conduct an emission test within 90 days of initial start up, providing the DEQ at least 30 days advance notice.

Responsibilities:

- * For seeking (through Environmental) a determination of permitting requirements before commencing construction - Derivatives Operations
 - * For providing to Environmental timely, sufficient, and complete information for permit applications, start up notifications, initial report, and initial emission and leaking valve test results reports - Derivatives Operations
 - * For preparing and submitting the permit application, start up notifications, initial report and emission and leaking valve test results - Environmental.
 - * For explaining & interpreting the term, conditions, and requirements of permits - Environmental.
- For the emission and leaking valve tests - see Section

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IV. OPERATING STANDARDS FOR VC AND OHC-EDC PLANTS

The VC regulations prescribe three types of standards: emission limits, equipment standards, and procedural requirements.

A. Emission Limits

- 1) The concentration of VC in exhaust gases (may be liquid or gas) discharged directly or ultimately to the atmosphere from any equipment used in VC formation and/or purification and in OHC-EDC purification (see Figures 1, 2, and 3 for applicability) shall not exceed 10 ppm. This does not apply to equipment that has been opened in accordance with the vessel opening requirements of these regulations. (See Section C below.) Note that leaks and relief valve discharges (SRVs, PCVs, etc.) are not considered exhaust gases and hence are not subject to the 10 ppm standard. [Vent headers in each area collect regulated exhaust gases for incineration. Extensive systems and procedures are employed to insure all VC vents are incinerated 100% of the time. If the stack monitors indicate the VC concentration in the exit gas is greater than 10 ppm, the operational parameters of the incinerator are checked immediately and, if a reason can be found, corrective action is immediately taken to reduce the VC concentration to less than 10 ppm.

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- 2) Emissions of VC from each OHC-EDC reactor are not to exceed 0.2g/kg of the 100% EDC so produced.
[Because Lake Charles has elected to incinerate this source along with all the other VC regulated vents, this standard does not affect our operations except that venting of OHC reactor emissions to the scrubber must be considered a by-pass of incineration for reporting purposes.]
- 3) There is to be no non-leak discharge from any relief valve on any equipment "in VC service" (contains 10% or more VC) except for "non preventable" discharges. "Non-preventable" is interpreted by the DEQ to be very restrictive (act of God, war, sabotage, etc). [Extensive design precautions and inspection/testing procedures are used to minimize the potential for SRV releases. See Environmental Procedure II-13.]
- 4) Each in-process wastewater stream must be reduced to 10 ppm VC or less before being mixed with any other in-process wastewater containing <10 ppm and before being exposed to the atmosphere. [This rule does not preclude mixing with other non-vinyl process water as long as the mixture is ducted to a common control device before being exposed to the atmosphere.] This does not apply to water used to wash out equipment after the equipment has already been opened in accordance with the vessel opening

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requirements of these regulations (see Section C below). This exception also covers purging wastewater from equipment, sight glasses, etc. for maintenance purposes. Sampling is also exempted since the wastewater contains less than 10% VC. However, any removal of material for processing such as organic phase or sludge from the CSS feed tanks must be done without exposing the material to the atmosphere. [If, because of equipment problems or process upsets, any in-process wastewater cannot be steam stripped, the VCM Emission Control SOP located in each control room is followed.]

- 5) Any control device employed to meet the requirements of these regulations must also meet the 10 ppm VC in exhaust gas standard. [The in-process wastewater strippers are vented to the incinerators.]
- ✓ 6) The percentage of leaking valves "in VC service" (containing 10% or more VC) must be $\leq 2\%$ in each process unit, or else more elaborate fugitive control standards apply).

Responsibilities:

- * For keeping all VC exhaust gases in the incinerator header, routed to incineration, and for avoiding non-incineration events - Area Supervisors VC-II, TE-II, WTU, and Shipping
- * For avoiding SRV releases - Area Supervisors VC-II,

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TE-II, and Shipping

- * For keeping all in-process wastewater contained and routed to the Central Steam Stripper or TE-II steam stripper and for avoiding dilution of in-process wastewater before stripping - Area Supervisors VC-II , TE-II, and WTU
- * For operating the incinerators , Central Steam Stripper and TE-II steam stripper in such a manner to achieve the 10 ppm standard - Area Supervisors VC-II, TE-II, and WTU
- * For maintaining an up-to-date listing of all equipment and SRVs "in VC service" - Area Supervisors VC-II, TE-II, and Shipping

B. Equipment Standards

- 1) Pumps, compressors, and agitators "in VC service" (contains 10% or more VC) must be sealless or employ double mechanical seals. For double mechanical seals, the pressure between the two seals must be such that any leak is into the pump [or, in Lake Charles case, into the vent header] and any VC between the two seals must be ducted to a control device achieving the 10 ppm exhaust gas limitation.
- 2) A rupture disk must be installed between the equipment and relief valves installed on equipment "in VC service" (contains 10% or more VC) unless

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the discharge is routed back into the process.

- 3) A reliable and accurate fixed point area monitoring system to detect major leaks and identify the general area of the plant where the leak is located must be installed to minimize leaks from equipment containing 10% or more VC. The monitor must obtain air samples on a continuous sequential basis and analyze the samples by gas chromatography. The location and number of sample points must be consistent with the number of pieces of equipment containing 10% or more VC and the size and physical layout of the plant.
- 4) A reliable and accurate portable HC detector must be available and used to find small leaks (see section C5 below).
- 5) Open-ended valves or lines (containing 10% or more VC) must be equipped with a cap, blind flange, plug or second valve which must seal the opening at all times except during operations requiring flow through the open-ended valve or line. For two valve arrangements, the valve on the process fluid end must be closed before the second valve is closed. For double block and bleed systems, the bleed valve or line may remain open during operations requiring venting the line between the two valves but must be capped, plugged, etc. at all other times.

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R sponsibilities:

- * For making sure all pumps comply with the double seal requirements - Area Supervisors VC-II, TE-II, and Shipping
For making sure applicable SRVs are protected with rupture disks and monitoring the disks to promptly detect and replace disk failures - Area Supervisors VC-II, TE-II, and Shipping
For making sure the fixed point monitoring system coverage is appropriate, that the system is operational, and that portable leak detectors are available in each area - Area Supervisors VC-II, TE-II, and Shipping
- * For seeing that the open-ended valve/line requirements are met - Area Supervisors VC-II, TE-II, and Shipping

C. Procedural Requirements

- 1) Opening of equipment/loading lines. The quantity of VC in any (not limited to 10% VC) VC or OHC equipment must be reduced to 2.0% by volume or 25 gallons, whichever is larger before opening the equipment to the atmosphere. This would apply also to purging of liquid from headers and/or knock out pots. The VC removed in making this reduction must be ducted to a control device meeting the 10 ppm standard. This reduction standard also applies to loading and unloading lines which are not opened after each operation. For those lines which are opened after each operation, the standard is no

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more than 0.13 cubic foot (one gallon) at STP. A written procedure for determining the amount of VC in equipment prior to opening is to be included in the standard operating procedure for the plant. [See Par. 2551.C in the regulations for details. Also see B)6 above for procedures regarding operation of double block and bleed arrangements on open-ended lines.]

- 2) Manual Venting. Manual venting of gases from equipment "in VC service" (contains 10% or more VC) must be ducted to a control device meeting the 10 ppm exhaust gas standard.
- 3) Leakage from SRVs. After each pressure release (those containing 10% or more VC), the relief devices must be restored to a condition of no detectable emissions by replacing the rupture disk as soon as practicable, but no later than 5 calendar days after such release unless repair is technically infeasible without a process unit shutdown. In such case repair must occur before the end of the next unit shutdown.
- 4) Samples - Unused portions of samples containing 10% or more by weight VC must be returned to the process and sampling collection systems must be closed loop with zero VC emissions to the atmosphere. This does not apply to non-extractive samplers or in-line samples (or to in-process

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wastewater since it does not contain 10% or more VC).

- 5) All procedural requirements described above must be incorporated into a standard operating procedure document available for inspection. This procedure must include provisions for measuring the VC content of equipment 1,250 gallons or larger before opening to the atmosphere.
- 6) Leak Detection and Elimination - A formal leak detection and elimination program must be written and implemented to minimize leaks from equipment containing 10% or more VC. Two systems are required, a reliable and accurate fixed point area monitoring system and a reliable and accurate portable HC detector. The former is to detect major leaks and identify the general area of the plant where the leak is located. The monitor must obtain air samples on a continuous sequential basis and analyze the samples by gas chromatography. The latter is to be used routinely to find small leaks and to pinpoint major leaks indicated by the fixed point system. In both cases the location and number of sample points and frequency of monitoring must be consistent with the number of pieces of equipment containing 10% or more VC and the size and physical layout of the plant. (Incinerator vent headers are to be included in the monitoring.) 7

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Areas which do not have equipment containing 10% or more VC (i.e., CSS area) are not required to be monitored. The program must contain two further elements. What constitutes a leak must be defined taking into account background concentration of VC in the area being monitored. The definition need not be the same for all areas of the plant and may be changed over time as background concentrations are reduced. A plan of action to be taken when a leak is detected must be in place. [See the three Lake Charles plans -VC-II, TE-II, and Shipping - for details.] The promulgation in 1984 of new fugitive monitoring regulations for volatile hazardous air pollutants required that existing leak detection and elimination plans be demonstrated to be adequate or else be replaced with a program defined in the new regulations. The new regulations also defined acceptable leak repair time. (See 7 below.) Demonstration that an existing plan is adequate is done by means of an annual performance test of 90% of all valves, or 200, whichever is smaller, containing 10% or more VC (except those designated as unsafe to monitor) in each unit (TE-II and VC-II).

- 7) Leak repair. When a leak is detected, a plan of action must be implemented. Unless repair of a leak is technically infeasible without a process

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unit shutdown, in which case the repair must occur before the end of the next process unit shutdown, a leak must be repaired as soon as practical, but not later than 15 calendar days after it is detected. A first attempt at repair must be made no later than five calendar days after each leak is detected. In the case of valves and flanges, the first attempt should include, but not necessarily be limited to, tightening of bonnet bolts; replacement of bonnet bolts; tightening of packing gland nut; and injection of lubricant into a lubricated packing. Delay of repair for valves is also allowed if it can be shown that emissions of purged material resulting from immediate repair are greater than the fugitive emissions likely to result from delay of repair, and when repair is effected, the purged material is collected and destroyed or recovered.

- 8) A formal leak detection and elimination program incorporating the above must be written and available for inspection.

Responsibilities:

- * For maintaining a written procedure for all procedural requirements in Section C in the standard operating procedure for the unit - Area Supervisors VC-II, TE-II, and Shipping
- * For seeing that the equipment/loading line opening

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procedures are followed - Area Supervisors VC-II, TE-II, WTU, and Shipping

- * For abiding by the manual venting rule and for conducting all VC sampling in closed loop samplers, and returning unused samples to the process -Area Supervisors VC-II, TE-II, and Shipping, and Lab
- * For monitoring pressures and promptly replacing rupture disks under SRVs - Area Supervisors VC-II, TE-II, and Shipping
- * For abiding by the written leak detection and elimination plan (see plans for details but primarily performing leak patrols, checking fixed point monitoring system reports, and responding to alarms/leaks documenting the response) and for advising Environmental of any revisions/updates required (including revision to definition of a leak) - Area Supervisors VC-II, TE-II, and Shipping
- * For preparing the written leak detection and elimination plan and for submitting to DEQ leak detection plan revisions -Environmental

V. HOW COMPLIANCE IS MEASURED (Emission Tests, Emission Monitoring) Continuous monitoring of emissions is required, along with an annual compliance test, to demonstrate compliance with the 10 ppm standard for emissions and wastewater. In addition, an annual performance test must be

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performed to demonstrate compliance with the allowable percentage of leaking valves.

A. Continuous system for incinerator stacks. The monitoring system must obtain air samples on a continuous sequential basis from all emission points for which a standard applies [these have been determined to be the three incinerator stacks (all four incinerators)] and analyze the samples by gas chromatography and record the results. A system to automatically calculate and record emission concentration averaged over each one hour period is necessary to comply with the Quarterly Report requirements. Emergency emission points such as relief valves and scrubber vents (i.e., discharges from OHC Rxs) are exempted from such monitoring. Operation without the monitoring system in service (except for momentary outages for calibration, etc.) would be considered a violation of these regulations.

[The three incinerator stacks are sampled at approximately five minute intervals and analyzed by GC with flame ion detection. Results are printed out in the control rooms and alarms sounded whenever the analysis exceeds 10 ppm VC. These monitoring systems receive emergency maintenance service 24 hours per day as needed. Incinerator operators monitor the hourly average values printed out by the systems and "call out" analyzer maintenance personnel whenever the analyzer obviously malfunctions, or whenever readings in excess of

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10 ppm VC are recorded for two consecutive hours and all efforts to correct the problem have been exhausted. and in the case of >10ppm hourly averages, to Environmental to prepare the quarterly report.]

- B. Annual Compliance Test for CSS and TE-II steam stripper. An annual test for compliance with emission⁷ and wastewater standards must be conducted. [The testing requirement applies to the incinerator stacks and the discharge of the Central Steam Stripper (CSS) and TE-II steam stripper but does not apply to uncontrolled emergency discharge lines, such as scrubber stacks, that vent through relief valves. Because the continuous analyzers on the incinerator stacks have been certified through testing as equivalent to the annual compliance test, only the steam strippers have to be tested each year.] The DEQ must be given at least 30 days notice of the testing.

Testing requirements are as follows:

- 1) Adequate sample ports, safe sampling platforms, safe access to platforms, and adequate utilities must be provided.
- 2) The testing must be conducted at the maximum production rate at which the equipment will be operated and under other conditions representative of its operation.
- 3) Each sample must be analyzed within 72 hours of collection and emissions determined within 30 days.

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- 4) Approved test methods must be used. [See Par. 2555.G of the regulations for details.]

C. Valve leaks. Each year, at least 90%, or 200, whichever is smaller, of the valves in each process unit (VC-II and TE-II) containing 10% or more VC must be monitored for leakage with the portable HC detector. The test must be made by traversing the instrument probe around the potential leak interfaces as close to the interface as possible. A reading of >1,500 ppm indicates a leak. (the regulation specifies 10,000 ppm but PPG has chosen to use a more stringent standard). Acceptable performance is 2% or less leakers. These valves are to be monitored within a one week time frame and the HC detector must be calibrated on the same day that the monitoring is performed. (See Section V.) The percentage leakers must be calculated.

Responsibilities:

- * For keeping the continuous incinerator stack monitoring systems in operation - Area Supervisors VC-II and WTU, and Instrument Maintenance
- * For scheduling and conducting the annual compliance test on the steam stripper effluents and for notifying DEQ in advance of the test - Environmental
- * For providing appropriate compliance test conditions and relevant operational data for the test - Area Supervisors WTU and TE-II

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- * For conducting the annual valve leak performance test - Area Supervisors VC-II and TE-II

VI. CALIBRATION AND MAINTENANCE REQUIREMENTS An acceptable calibration and maintenance schedule is required for the continuous emission monitors, the fixed point monitoring system and the portable HC detector. The schedules must include for the former two, a daily (defined in the Leak Detection Program as 5 days/wk) span check using a concentration of VC equal to that defined as a leak (currently 5 ppm) for the fixed point system and 10 ppm in the case of the emission monitors. Each portable HC detector must be calibrated weekly and, in the case of the annual performance test for leaking valves, be calibrated each day of the test. The HC detector is to be calibrated using a concentration of VC equal to that defined as a leak (currently 10 ppm) for routine testing and using a concentration of 1,500 ppm methane or n-hexane for the annual performance test. The calibration gas cylinder (See par. 2551 and 2643 of the regulations for details on the gas mixtures required.) used for these checks must have affixed (by the supplier) a tag giving the date of preparation, the recommended shelf life, and a certification of the VC (or HC) concentration. The DEQ has indicated that an acceptable plan will also include an annual check of the integrity of the fixed point monitoring system sampling lines by introducing a known concentration of VC into each sample point. All

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calibration activities should be documented thoroughly.

Responsibilities:

- * For calibrating each portable HC detector weekly (daily during the annual valve leak performance test) and documenting the results - Instrument Maintenance
 - * For performing the daily span checks on the incinerator stack monitors and the fixed point monitoring systems - Instrument Maintenance
 - * For performing the annual integrity test on the fixed point systems sample lines - Instrument Maintenance
 - * For assuring that the calibration gas used is appropriate and that the cylinders are correctly labeled throughout the period of use - Instrument Maintenance
- For keeping the monitoring systems on line and documenting any down time - Instrument Maintenance

VII. WHAT RECORDS MUST BE CREATED AND MAINTAINED

(Recordkeeping)

- A. The following must be created and maintained for a minimum of 5 years (PPG policy):
- 1) A record of fixed point monitoring results showing the concentration of VC, location of each measurement, and the date and approximate time of each measurement. Those analyses indicating a leak must be identified and a brief description of the cause and corrective action noted on the record.

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- 2) A record of leak patrols conducted with the portable HC detector, including the identification of the detector used; the location, date and time of leaks found; the cause of each leak; action taken to repair the leak; and any action taken to prevent a recurrence of that leak.
- 3) A record of continuous emissions monitoring data generated by the incinerator stack monitor. This record should identify each one-hour period (interpreted to mean each hour beginning on the hour) for which the VC concentration averages in excess of 10 ppm and the reason for such emission. All three hour averages which include an hour in excess of 10 ppm should be calculated and made part of the record.
- 4) A record of calculated VC emissions to the atmosphere from venting of OHC reactor emissions to the vent scrubber (including reactor start-ups). This record should identify date, time, duration, total quantity of VC emitted, and whether or not the 0.2 g/Kg standard was exceeded.
- 5) A written report of each SRV release, or other sudden release of VC (regardless of the amount), containing the information specified in the VC SRV Release Report (for SRVs) and the Complex Environmental Incident Report (for all other releases).

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- 6) A record of calibration and maintenance work done on the portable HC detector, the fixed point monitoring system, and the incinerator stack monitors including dates, nature of work, and downtime.
- B. The following must be created and maintained for a minimum of 10 years (PPG policy):
- 1) A record of annual emission test results (CSS and TE-II steam stripper effluent) including process data needed to define operating conditions at the steam strippers during the sampling.
 - 2) A record of the annual leaking valve performance tests including identification of the valves tested, persons performing the test, and the HC detectors used.
- C. The following must be maintained for a minimum of 10 years (PPG policy) after expiration:
- 1) Permit applications, permits, leak detection plans.

Responsibilities:

- For verifying that the fixed point and incinerator stack monitoring system results reports are printing correctly and advising Instrument Maintenance of any problems -- Area Supervisors VC-II, TE-II, WTU, and Shipping
- * For documenting leaks, causes, corrective action, etc. on the monitoring records from the fixed point systems, the portable HC detector patrols, and the incinerator

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stack monitors, for calculating three hour averages of incineration stack excursions, and for calculating VC emissions from venting of OHC reactor emissions to the vent scrubber - Area Supervisors VC-II, TE-II, WTU, and Shipping.

- * For keeping records from the fixed point systems, the portable HC detector patrols, and the incinerator stack monitors for the specified time - Records
- * For keeping records of SRV releases, other sudden releases, annual emission test results, leaking valve performance tests, permit applications, permits, and leak detection plans for the specified time - Environmental
- * For creating and keeping calibration and maintenance records on the fixed point monitoring systems, the portable HC detectors, and the incinerator stack monitors - Instrument Maintenance

VIII. WHAT MUST BE REPORTED TO DEQ (Reporting Requirements)

A. Telephone. The DEQ must be notified immediately but not later than 3 hours after learning of VC discharges from:

- 1) SRV releases
- 2) line or vessel ruptures
- 3) equipment failures
- 4) any other sudden release (i.e., CSS system rupture disk releases)
- 5) by-pass of VC vents (including OHC reactor vents)

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from incineration or of wastewater from either steam stripper for more than 60 minutes (in these cases notification must be within 3 hours from beginning of the discharge)

[Blown rupture disks on VC vent header systems are considered to be sudden releases rather than incinerator bypasses. VC leaks detected by the fixed point monitoring system or portable HC detector are to be recorded as specified in the leak detection and elimination plan and are exempt from these reporting requirements. The distinction between a leak qualifying for this exemption and a sudden release which must be reported is a gray area. Generally leaks are regarded as slow and non-sudden. A drip or trickle from a corrosion point, bad gasket, valve stem, etc., is considered a leak. A spray which suddenly develops is probably a sudden release. To qualify for the exemption, the incident must be regarded as a leak and be within the area covered by the leak detection and elimination plans.]

- B. Incident Reports. A written report on each incident listed above must be submitted to DEQ within seven working days after learning of the discharge. The required information is listed in the Lake Charles Complex Environmental Incident Report, and, in the case of SRV releases, in the VC SRV Release Report. In the case of OHC reactor vent bypasses, if the calculations

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indicate the resultant emissions are within regulatory limits, the report should so indicate.

C. Quarterly Report. A written discharge report must be submitted to DEQ by March 15, June 15, September 15, and December 15 of each year. The report must include the identity of the source, date and time of the discharge, and the approximate quantity of VC discharged from any:

- 1) SRV release,
- 2) line or vessel rupture,
- 3) equipment failure,
- 4) any other sudden release,
- 5) by-pass of VC vents (excluding OHC reactor emissions) from incineration or of wastewater from the CSS or TE-II steam stripper (for any period of time).
- 6) by-pass of OHC reactor emissions from incineration if the 0.2 g/KG standard is exceeded.

In addition the report must include a tabulation of date, time, and reason for any incinerator stack emission which averaged over any one hour period (interpreted to mean any hour period beginning on the hour) exceeds 10 ppm VC. The highest three consecutive hour average including each one hour excursion is also reported. Lake Charles policy permits repetitive incinerator bypass events separated by less than 15 minutes and stemming from the same cause to be reported as a single occurrence. The results of the annual leaking valve performance tests must be included in the first quarterly

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report following each test.

Responsibilities:

- * for detecting and promptly notifying Environmental of incidents requiring telephone notification - Area Supervisors VC-II, TE-II, WTU, and Shipping for providing to Environmental prompt and complete written reports of these incidents - Area Supervisors VC-II, TE-II, WTU, and Shipping
- * for providing to Environmental on a timely basis the required information on incinerator stack emissions, incinerator bypasses, and steam stripper bypasses - Area Supervisors VC-II, TE-II, and WTU
- * For making telephone notifications and submitting all written reports to DEQ on a timely basis -Environmental

IX. TRAINING

A copy of this procedure is kept in the Control Rooms at VC-II, TE-II, Organics Shipping, and WTU. Area Supervisors are responsible for seeing that their personnel are familiar with applicable portions of this procedure through initial training sessions, on-the-job training, and annual training programs. Requirements of the VC regulations are also woven into the SOP manuals in each Control Room.

Responsibilities:

- * For training personnel on the regulations - Area Supervisors VC-II, TE-II, WTU, and Shipping.

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X. SUMMARY OF RESPONSIBILITIES

A. Area Supervisor VC-II

- 1) For advising Environmental of any process changes which may affect applicability of these regulations
- 2) For identifying and maintaining an up-to-date listing of all equipment and elements "in VC service" .
- 3) For maintaining operations in compliance
- 4) For not circumventing the regulations
- 5) For keeping all VC exhaust gases in the incinerator header and routed to incineration and for avoiding non-incineration events
- 6) For avoiding SRV releases
- 7) For keeping all in-process wastewater contained and routed to the CSS and for avoiding dilution before stripping
- 8) For operating the incinerator in such a manner to achieve the 10 ppm standard at all times
- 9) For making sure all pumps comply with the double seal requirements
- 10) For making sure applicable SRVs are protected with rupture disks and monitoring the disks to detect and replace disk failures
- 11) For making sure the fixed point monitoring system coverage is appropriate, that the system is operational, and that portable leak detectors are available
- 12) For seeing that the open-ended valve/line requirements are met
- 13) For maintaining a written procedure for all procedural requirements in the standard operating procedure for the unit
- 14) For seeing that equipment/loading line opening procedures are followed
- 15) For abiding by the manual venting rule and

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conducting all VC sampling in closed loop samplers and returning unused samples to the process.

- 16) For abiding by the written leak detection and elimination plan and for advising Environmental of any revisions/updates required.
- 17) For verifying that the fixed point and incinerator stack monitoring systems results reports are printing correctly and advising Instrument Maintenance of any problems.
- 18) For keeping the continuous incinerator stack monitoring system in operation
- 19) For conducting the annual valve leak performance test
- 20) For documenting leaks, causes, corrective actions, etc. on the monitoring records from the fixed point systems, the portable HC detector patrols, and the incinerator stack monitor.
- 21) For calculating and providing to Records the required information on VC emissions from venting of OHC reactors to the vent scrubber.
- 22) For detecting and promptly notifying Environmental of incidents requiring telephone notification of DEQ
- 23) For providing to Environmental prompt and complete written reports of these incidents
- 24) For providing to Environmental on a timely basis the required information on incinerator by-passes and incinerator stack emissions including three hour averages for each >10 ppm incinerator stack incident.
- 25) For training personnel on the regulations

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B. Area Supervisor TE-II

- 1) For advising Environmental of any process changes which may affect applicability of these regulations
- 2) For identifying and maintaining an up-to-date listing of all equipment and elements "in VC service"
- 3) For maintaining operations in compliance
- 4) For not circumventing the regulations
- 5) For keeping all VC exhaust gases in the incinerator header and routed to incineration and for avoiding non-incineration events
- 6) For avoiding SRV releases
- 7) For keeping all in-process wastewater contained and routed to the CSS or TE-II steam stripper and for avoiding dilution before stripping
- 8) For operating the TE-II steam stripper in such a manner to achieve the 10 ppm standard at all times
- 9) For making sure all pumps comply with the double seal requirements
- 10) For making sure applicable SRVs are protected with rupture disks and monitoring the disks to detect and replace disk failures
- 11) For making sure the fixed point monitoring system coverage is appropriate, that the system is operational, and that portable leak detectors are available
- 12) For seeing that the open-ended valve/line requirements are met
- 13) For maintaining a written procedure for all procedural requirements in the standard operating procedure for the unit
- 14) For seeing that equipment/loading line opening procedures are followed
- 15) For abiding by the manual venting rule and conducting all VC sampling in closed loop samplers and returning unused samples to the process.

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- 16) For abiding by the written leak detection and elimination plan and for advising Environmental of any revisions/updates required.
- 17) For verifying that the fixed point and incinerator stack monitoring systems results reports are printing correctly and advising Instrument Maintenance of any problems.
- 18) For providing appropriate compliance test (for steam stripper effluent) conditions and relevant operational data for the test
- 19) For conducting the annual valve leak performance test
- 20) For documenting leaks, causes, corrective actions, etc. on the monitoring records from the fixed point system, and the portable HC detector patrols
- 21) For calculating and providing to Records the required information on VC emissions from venting of OHC reactors to the vent scrubber.
- 22) For detecting and promptly notifying Environmental of incidents requiring telephone notification of DEQ
- 23) For providing to Environmental prompt and complete written reports of these incidents
- 24) For providing to Environmental on a timely basis the required information on incinerator by-passes
- 25) For training personnel on the regulations

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C. Area Supervisor Shipping

- 1) For advising Environmental of any process changes which may affect applicability of these regulations
- 2) For identifying and maintaining an up-to-date listing of all equipment and elements "in VC service"
- 3) For maintaining operations in compliance
- 4) For not circumventing the regulations
- 5) For keeping all VC exhaust gases in the incinerator header and routed to incineration and for avoiding non-incineration events
- 6) For avoiding SRV releases
- 7) For making sure all pumps comply with the double seal requirements
- 8) For making sure applicable SRVs are protected with rupture disks and monitoring the disks to detect and replace disk failures
- 9) For making sure the fixed point monitoring system coverage is appropriate, that the system is operational, and that portable leak detectors are available
- 10) For seeing that the open-ended valve/line requirements are met
- 11) For maintaining a written procedure for all procedural requirements in the standard operating procedure for the unit
- 12) For seeing that equipment/loading line opening procedures are followed
- 13) For abiding by the manual venting rule and conducting all VC sampling in closed loop samplers and returning unused samples to the process.
- 14) For abiding by the written leak detection and elimination plan and for advising Environmental of any revisions/updates required.
- 15) For verifying that the fixed point monitoring system results reports are printing correctly and advising Instrument Maintenance of any problems.

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- 16) For documenting leaks, causes, corrective actions, etc. on the monitoring records from the fixed point system, and the portable HC detector patrols
- 17) For detecting and promptly notifying Environmental of incidents requiring telephone notification of DEQ
- 18) For providing to Environmental prompt and complete written reports of these incidents
- 19) For training personnel on the regulations

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D. Area Supervisor WTU

- 1) For advising Environmental of any process changes which may affect applicability of these regulations
- 2) For maintaining operations in compliance
- 3) For not circumventing the regulations
- 4) For keeping all VC exhaust gases in the incinerator header and routed to incineration and for avoiding non-incineration events
- 5) For keeping all in-process wastewater contained and routed to the CSS and for avoiding dilution before stripping
- 6) For operating the incinerators and CSS in such a manner to achieve the ~~<10~~ ppm standard at all times (VCN)
- 7) For seeing that equipment/loading line opening procedures are followed
- 8) For verifying that the fixed point and incinerator stack monitoring systems results reports are printing correctly and advising Instrument Maintenance of any problems.
- 9) For keeping the continuous incinerator stack monitoring system in operation
- 10) For providing appropriate ^(ANNUAL) compliance test (for the CSS effluent) conditions and relevant operational data for the test
- 11) For documenting causes, corrective action, etc. on the monitoring records from the incinerator stack monitors
- 12) For detecting and promptly notifying Environmental of incidents requiring telephone notification of DEQ
- 13) For providing to Environmental prompt and complete written reports of these incidents
- 14) For providing to Environmental on a timely basis the required information on incinerator by-passes and incinerator stack emissions including three hour averages for each >10 ppm incinerator stack incident
- 15) For training personnel on the regulations

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E. Derivatives Operations

- 1) For seeking (through Environmental) a determination of permitting requirements before commencing construction
- 2) For providing to Environmental timely, sufficient, and complete information for permit applications, start-up notifications, initial report, and initial emission and leaking valve test results reports

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F. Instrument Maintenance

- 1) For keeping the fixed point and continuous monitoring systems on line and documenting any downtime .
- 2) For calibrating each portable HC detector weekly (daily during the annual valve leak performance test) and documenting the results
- 3) For performing the daily span checks on the continuous emission monitors and fixed point monitoring systems
- 4) For performing the annual integrity test on the sample lines for the fixed point systems
- 5) For assuring the calibration gas used is appropriate and that the cylinders are correctly labeled throughout the period of use.
- 6) For creating and keeping calibration and maintenance records on the fixed point monitoring systems, the portable HC detectors, and the incinerator stack monitors.

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G. Environmental

- 1) For revising applicability Figures 1, 2, and 3 as necessary
- 2) For advising Operations and Shipping of regulatory changes and their impact and for interpreting the regulations
- 3) For preparing and submitting permit applications, start-up notifications, initial reports, and emission and leaking valve test results
- 4) For explaining and interpreting the term, conditions, and requirements of permits
- 5) For preparing and submitting to DEQ leak detection plans and revisions
- 6) For scheduling and conducting the annual compliance test on the steam stripper effluents and for notifying DEQ in advance of the test
- 7) For keeping records of SRV releases, other sudden releases, annual emission test results, leaking valve performance tests, permit applications, permits, and leak detection plans for the specified time
- 8) For making all telephone notifications and submitting all written reports to DEQ on a timely basis

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H. Lab

- 1) For returning unused samples to VC-II

I. Records

- 1) For keeping records from the fixed point systems, the portable HC detector patrols, the incinerator stack monitors, and calculated OHC reactor emissions from scrubber venting for the specified time (5 years)

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X. APPROVALS:

Laura White 7/16/90
Manager, Derivatives

SG Jordan 7/17/90
Manager, Operations Services

JE Madams 7/19/90
Manager, Maintenance & Engineering

Whi J. Paul 7/19/90
Manager, Laboratory Services/
Environmental Control

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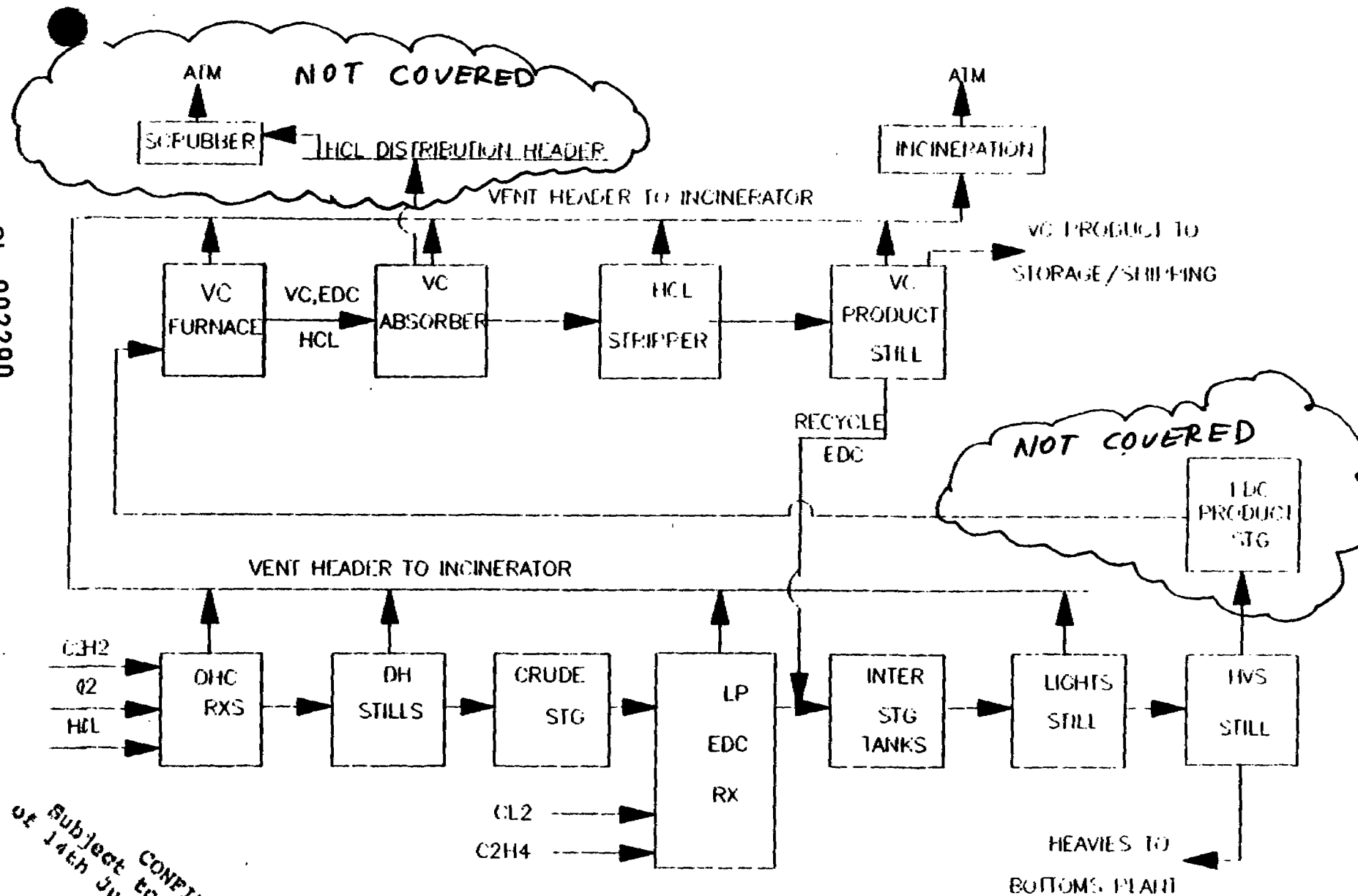


FIGURE 1. VC-II

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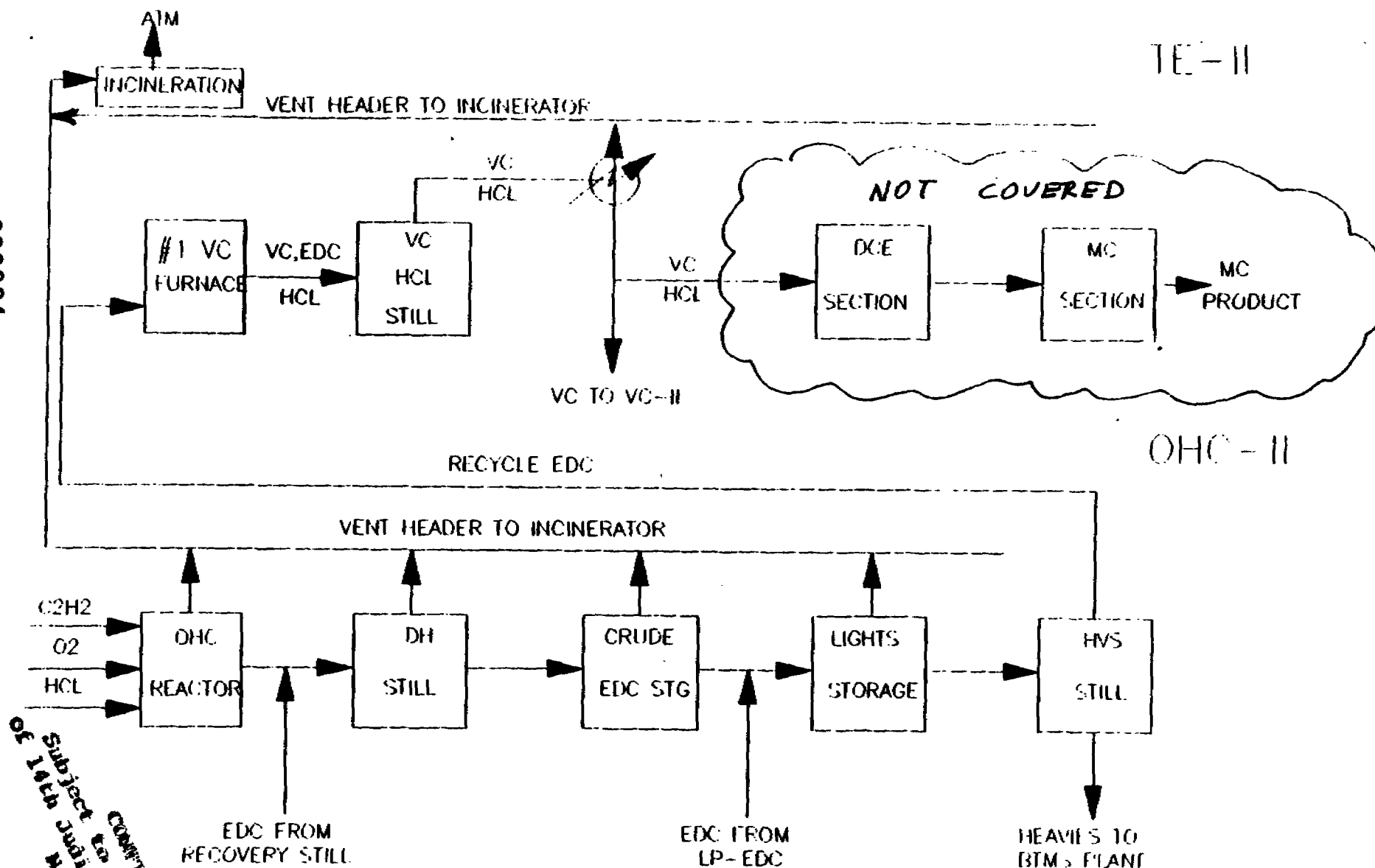
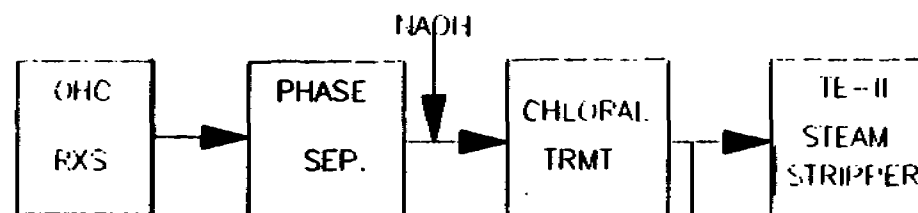


FIGURE 2. TE-II AND OHC-II

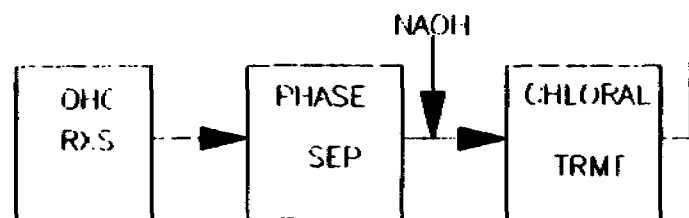
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TE-II



VC-II



CSS
FEED
TANKS

CSS

FORMAL
DESI

BLEACH
ACID

EFFLUENT TO
OUTFALL

NOT COVERED

WTU

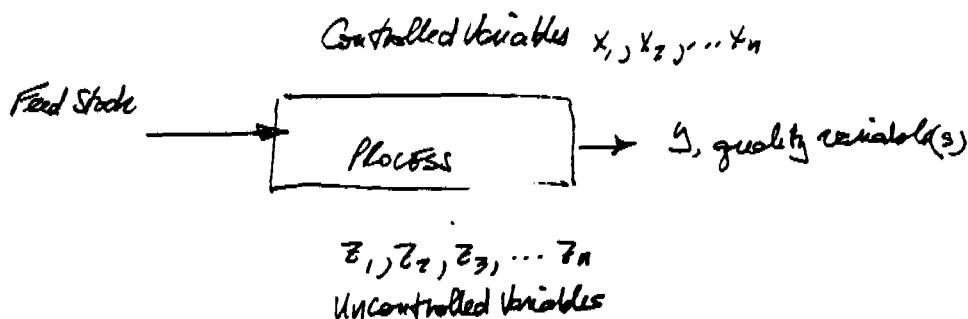
ORGANICS
RECYCLED
TO PROCESS

(ALL VENTS. COLLECTED FOR INCINERATION)

FIGURE 3. IN-PROCESS WASTEWATER SYSTEM

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Process Model



With strippers operate in real time, allowing little time to respond to changes in inputs

if two variables are truly independent of one another, then they would move freely within their bounds, governed only by their separate distributions. But if they are related to one another, this is not true.

Example - height and weight and shoe size for people

variables tied together do not move freely, but induce changes in one another as they change.

Example of 2 unrelated variables on scatter (x,y) diagram

Example of 2 related variables on scatter diagram (x,y plot) $R^2 = 0.5$

Example of 2 correlated variables with $R^2 = 0.9$

data points from 2 systems that are tied together → example 2 steam strippers on same steam header, tied into one vent system, etc.

selecting variable of interest

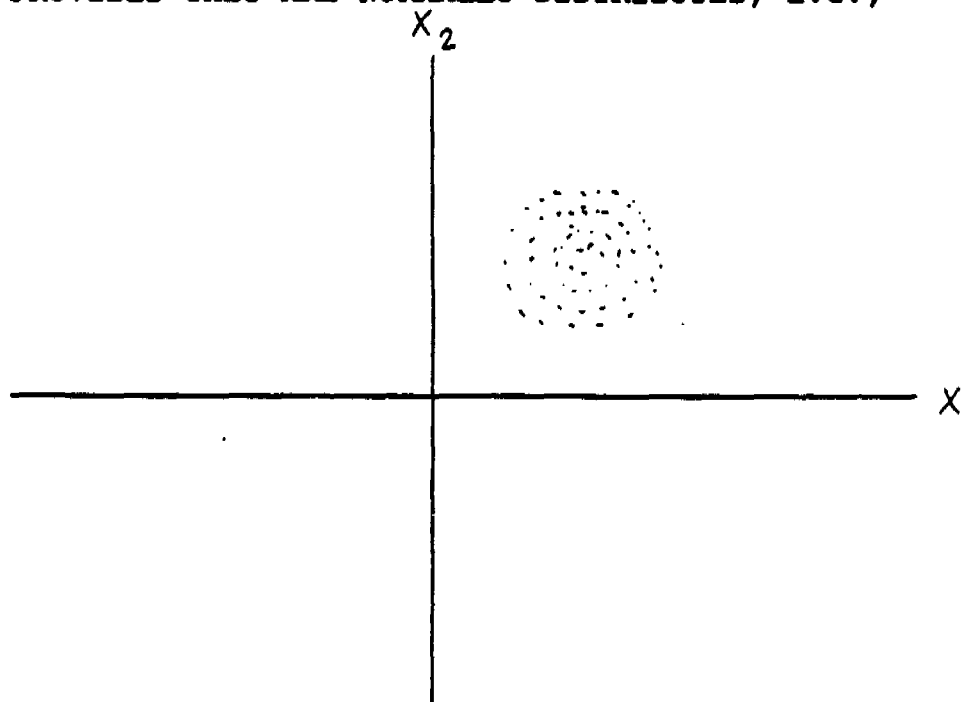
What is multivariate analysis? all methods that simultaneously analyze multiple observations

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1: WHY MULTIVARIATE CONTROL ?

CONSIDER A SITUATION WHERE THERE ARE ONLY TWO VARIABLES OF INTEREST, SAY X_1 AND X_2 . NOW IF X_1 OPERATES INDEPENDENTLY OF X_2 THEN THEIR CORRELATION COEFFICIENT R WILL BE CLOSE TO ZERO AND THE SCATTERPLOT OF DATA ON THESE TWO VARIABLES WOULD APPEAR AS A CIRCLE, PROVIDED THEY ARE NORMALLY DISTRIBUTED, E.G.,

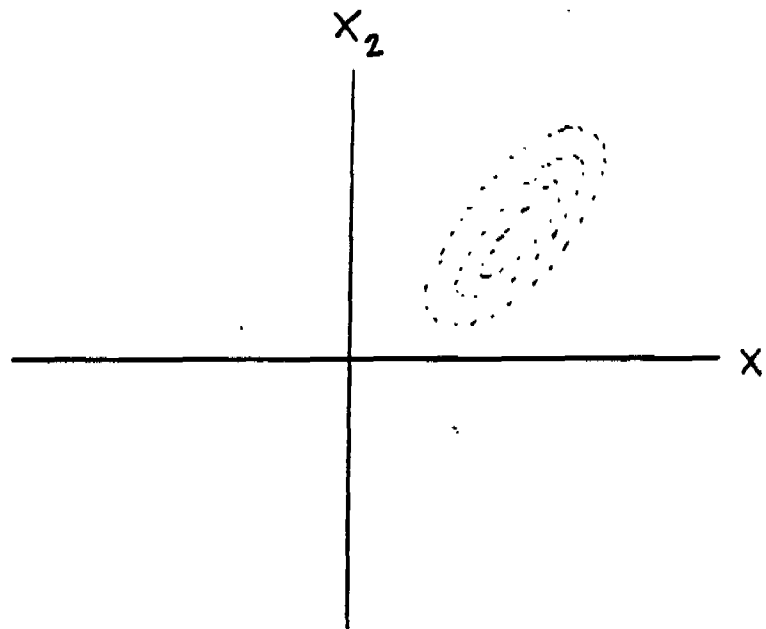


NORMALITY WILL BE ASSUMED ON ALL VARIABLES SEPARATELY AND JOINTLY.

NOW SUPPOSE THE TWO VARIABLES X_1 AND X_2 ARE NOT INDEPENDENT. THE CORRELATION COEFFICIENT AS MEASURED BY R WILL BE DIFFERENT FROM ZERO AND THEIR SCATTERPLOT WILL TAKE AN ELLIPTICAL SHAPE SUCH AS:

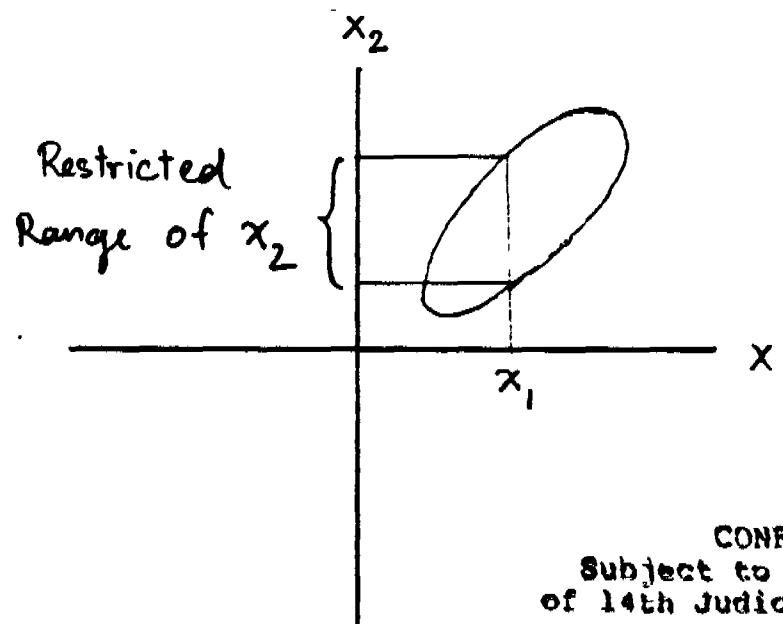
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THIS ELLIPTICAL SHAPE WILL TILT UP IF $R > 0$ AND TILT DOWN IF $R < 0$.

THE IMPORTANT THING TO NOTE IS THAT IF X_1 IS AT A PARTICULAR VALUE THEN X_2 DOES NOT RANGE OVER ITS ENTIRE RANGE.

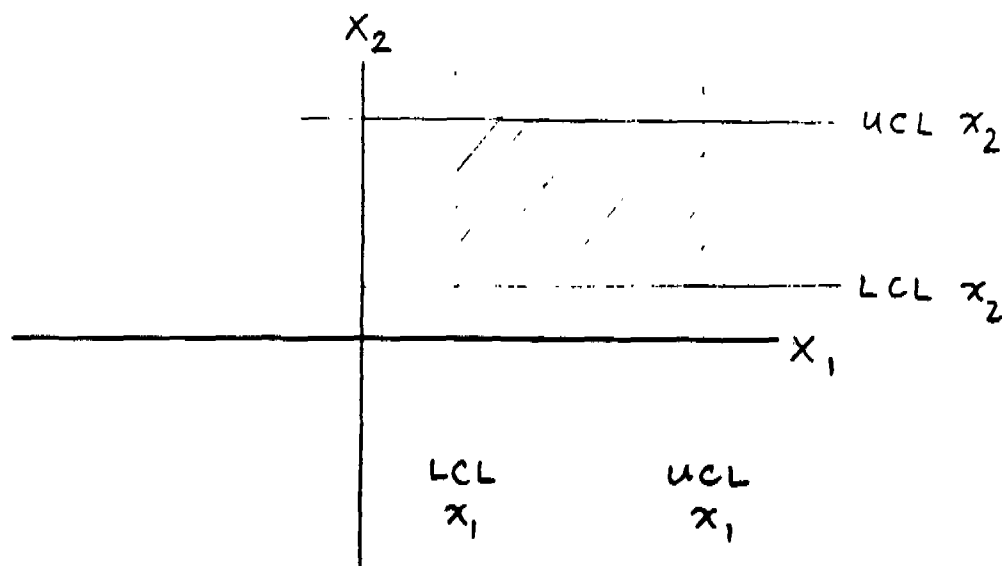


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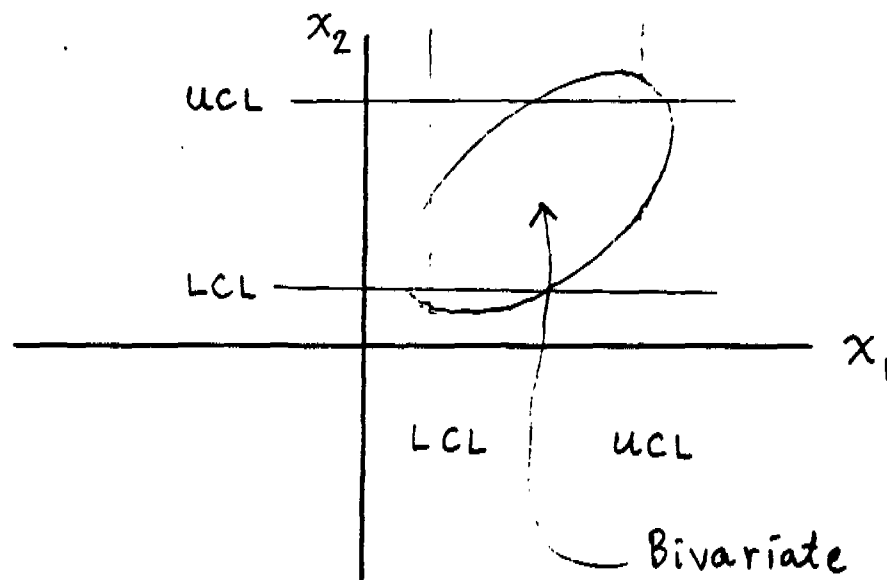
IT IS FOR THIS REASON THAT WE MUST LOOK AT TWO CORRELATED VARIABLES TOGETHER INSTEAD OF SEPARATELY.

2: MULTIVARIATE CONTROL

AGAIN LET'S CONSIDER THE BIVARIATE CASE, TWO VARIABLES X_1 AND X_2 . IF INDIVIDUAL CONTROL CHARTS ARE RUN ON THE VARIABLES SEPARATELY, THEN THE JOINT CONTROL REGION WOULD APPEAR AS A BOX, I.E.,



NOW IF THE VARIABLES ARE INDEPENDENT (UNRELATED) THEN THE BOX CONTROL REGION IS CORRECT. BUT IF X_1 AND X_2 ARE DEPENDENT (CORRELATED, $|R| > 0$) THEN THE JOINT CONTROL REGION SHOULD BE A CONCENTRATION ELLIPSE SIMILAR TO THE SCATTERPLOT



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Bivariate control
Region.

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WITH THESE TWO GRAPHS SUPERIMPOSED ON ONE ANOTHER, IT IS EASY TO SEE THAT THE RECTANGLE REGION WOULD GIVE INCORRECT SIGNALS SAYING EVERYTHING IS IN CONTROL WHEN IN FACT ITS NOT.

NOW THIS CAN BE DONE BY HAND, THAT IS THE COMPUTING OF THE ELLIPSE, IF WE HAVE A BIVARIATE SITUATION. IN MOST CASES WE'RE DEALING WITH A TRULY MULTIVARIATE SITUATION, MAKING IT IMPOSSIBLE TO DO BY HAND.

3: THE MULTIVARIATE SITUATION

IN THE MULTIVARIATE SITUATION WE HAVE p , THE NUMBER OF VARIABLES, GREATER THAN TWO. EACH OBSERVATION ON p -VARIATES TAKES THE FOLLOWING FORM:

OBS.1	x_1	x_2	x_3		x_p
OBS.2	x_1	x_2	x_3		x_p
.					
.					
.					
.					
OBS.n	x_1	x_2	x_3		x_p

THIS GIVES A DATABASE OF n OBSERVATIONS ON p -VARIABLES. FROM THIS DATABASE A CORRELATION MATRIX CAN BE COMPUTED. ITS FORM IS GIVEN BELOW:

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$$\begin{bmatrix} 1 & R_{12} & R_{13} & . & . & . & R_{1p} \\ R_{21} & 1 & R_{23} & . & . & . & R_{2p} \\ . & . & . & . & . & . & . \\ . & . & . & . & . & . & . \\ . & . & . & . & . & . & . \\ R_{p1} & R_{p2} & R_{p3} & . & . & . & 1 \end{bmatrix}$$

WHERE R_{ij} IS THE CORRELATION BETWEEN X_i AND X_j . NOTE THEE $\text{CORR}(X_i, X_i)$ IS ONE, SINCE EVERY VARIABLE IS PERFECTLY CORRELATED WITH ITSELF.

MOST OF THE WORK DONE IN MULTIVARIATE QUALITY CONTROL USES THE CORRELATION MATRIX AS DEFINED ABOVE OR ITS COUNBTERPART THE VARIANCE CO-VARIANCE MATRIX. (NOT DISCUSSED HERE.) THE CONTROL REGIONS ARE VERY DEPENDENT ON THESE MATRICIES.

THE ELLIPITICAL REGION THHAT IS GENERATED IN THE TWO DEMENSION SITUATION (X_1, X_2) BE COMES AN ELLIPISOID IN THREE DIMENSION (X_1, X_2, X_3) AND A HYPER-ELLIPISOID IN HIGHER DIMENSION. THESE ARE THE GEOMETRICAL NAMES OF THE CONTROL REGIONS. AS STATED EARILIER, IT IS NEARLY IMPOSSIBLE TO COMPUTE THESE REGIONS BY HAND. BUT WE DO HAVE COMPUTER PROGRAMS THAT ARE CAPABLE OF GENERATING THESE REGIONS. SCOUT IS ONE OF THEM.

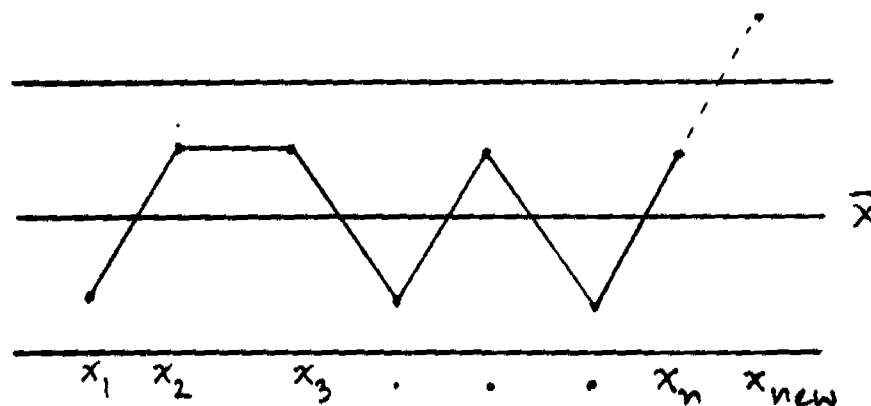
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4: THE SCOUT PROGRAM, A TOOL FOR MULTIVARIATE QUALITY CONTROL.

FIRST OF ALL THE SCOUT PROGRAM IS FREE. (PUBLIC DOMAIN) IT WAS CREATED BY LOCKHEED ENGINEERING AND SCIENCE COMPANY FOR THE EPA'S QUALITY ASSURANCE AND METHODS DEVELOPMENT DIVISION. ITS MAIN PURPOSE IS TO DETECT OUTLIERS (DISCORDANT OBSERVATIONS). OUTLIERS ARE DEFINED AS OBSERVATIONS THAT ARE HIGHLY UNUSUAL WHEN COMPARED TO THE REST OF THE DATA. THIS IS VERY CLOSE AKIN (ESSENTIALLY THE SAME) TO DETECTING WHEN THE PROCESS IS OUT OF CONTROL.

TO BETTER UNDERSTAND THIS CONSIDER THE FOLLOWING CONTROL CHART FOR A UNIVARIATE SITUATION:



HISTORICAL DATA $x_1, x_2, \dots, x_n$ ARE USED TO ESTABLISH THE CONTROL CHART. NOW SUPPOSE WE HAVE A NEW OBSERVATION, SAY x_{NEW} , AS INDICATED ON THE CONTROL CHART. IF THIS BE THE CASE, THEN THE PROCESS IS OUT OF CONTROL. NOW CONSIDER THE HISTORICAL DATA WITH x_{NEW} , i.e.,

$x_1, x_2, x_3, \dots, x_n, x_{\text{NEW}}$

IF x_{NEW} IS ATYPICAL TO THIS GROUP ($x_1, x_2, x_3, \dots, x_n$) THEN IT WILL BE

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DESIGNATED AS AN OUTLIER WHEN COMPARED TO THE GROUP.

IT IS IN THIS WAY THAT SCOUT CAN BE USED TO MONITOR A MULTIVARIATE SITUATION. IF A NEW OBSERVATION IS DECLARED AN OUTLIER THEN THE PROCESS IS OUT OF CONTROL, OTHERWISE CONTROL IS BEING MAINTAINED, i.e., THE NEW OBSERVATION IS LIKE THE HISTORICAL DATA SET.

5: THE USE OF SCOUT

TO BEGIN USING SCOUT FOR MULTIVARIATE QUALITY CONTROL, ONE MUST FIRST UNDERSTAND ITS FUNDAMENTALS. IT IS BASICLY A RUN PROGRAM AND IS MENU DRIVEN. A WRITTEN TEXT IS INCORPORATED UNDER THE MENU 'SYSTEMS' WHICH GOES INTO SUBMENUS SUCH AS INTRODUCTION, FILE MANAGEMENT, DATA MANAGEMENT OUTLIER TESTING, etc. IF YOU'RE TO BE SUCCESSFUL IN USING SCOUT, THIS SECTION NEEDS TO BE READ AND RE-READ. COMPLETE UNDERSTANDING COMES WITH USE.

YOUR FIRST PROBLEM WILL BE ENCOUNTERED WITH FILE AND DATA MANAGEMENT. SCOUT DOES NOT ALLOW DIRECT ENTRY OF DATA INTO THE PROGRAM, NOR DOES IT ALLOW MAJOR INTERNAL CHANGES IN THE DATA FILE WHILE IN THE PROGRAM. SO ALL OF YOUR DATA FILES MUST BE CONSTRUCTED AND MANIPULATED OUTSIDE OF SCOUT. THIS CAN BE DONE USING SOME OTHER DATA MANAGEMENT PROGRAM SUCH AS LOTUS. SCOUT DOES REQUIRE THAT DATA FILES BE OF A CERTAIN FORMAT (GEO-EAS FORMAT) WHICH IS EXPLAINED WITH EXAMPLES IN 'SYSTEMS'.

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THE FOLLOWING IS A STEP-BY-STEP PROCEDURE FOR USING SCOUT TO CONTROL A MULTIVARIATE PROCESS.

1. CONSTRUCT A HISTORIAL DATA FILE (HDF)

RECALL THIS MUST BE DONE OUTSIDE SCOUT BUT FOLLOWING THE GEO-EAS FORMAT. TWO THINGS TO NOTE THAT ARE NOT INCLUDED IN SCOUT'S MANUAL, SCOUT WILL NOT ACCEPT A DATA FILE WITH ZERO AS A CONSTANT VALUE FOR A GIVEN VARIABLE. ALSO, CERTAIN MENUS WILL NOT WORK ON A DATA FILE WHEN A VARIABLE IS CONSTANT AT SOME VALUE OTHER THAN ZERO.

2. ONCE HDF IS CONSTRUCTED ENTER SCOUT. UNDER MENU 'OUTLIER', RUN AN OUTLIER TEST. THE PURPOSE OF THIS TO PURGE HDF OF ATYPICAL OBSERVATIONS. RECALL YOU'LL HAVE TO EXIT SCOUT AND CREATE A NEW FILE BY DELETING THE OUTLIERS. I'LL REFER TO THIS NEW FILE AS HDF(OUT). THERE ARE OTHER WAYS OF HANDLING THIS, E.G., SCOUT WILL AUTOMATICALLY FLAG ALL OBSERVATIONS THAT ARE DECLARED AS OUTLIERS AND YOU'LL HAVE THE OPTION OF EXCLUDING THEM FROM ANY CALCULATIONS OR STATISTICAL PROCEDURES. HOWEVER, I RECOMMEND REMOVAL. EXPLANATION WILL BE GIVEN LATER. SAVE HDF(OUT) AS A SCOUT FILE.

STUDY HDF(OUT). RUN SUB-MENU STATISTICS UNDER 'DATA'. EXPLORE THE GRAPHICS MENU. IF YOU UNDERSTAND RUN A PCA ON THE DATA. (DISCUSSED LATER). EXPLORATION DEPENDS ON YOUR STATISTICAL KNOWLEDGE BUT IS NOT NECESSARY TO ACHIEVE GOAL OF MULTIVARIATE QUALITY CONTROL.

3. CONSTRUCT DATA FILE OF NEW OBSERVATION(S) FOLLOWING THE SAME FORMAT AS HDF(OUT). I'LL REFER TO THIS NEW DATA FILE AS

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DATA(NEW). TAKE DATA(NEW) INTO SCOUT AND SAVE AS A SCOUT FILE.
APPEND DATA(NEW) TO HDF(OUT). REFER TO THIS NEW FILE AS HDF(APP).
SAVE AS A SCOUT FILE.

4. MOVE TO 'OUTLIER' MENU AND RUN OUTLIER TEST ON HDF(APP).
IF THE NEW OBSERVATION(S) IS NOT DESIGNATED AS AN OUTLIER, THEN THE
PROCESS IS IN CONTROL. IF THE NEW OBSERVATION(S) IS DECLARED AN
OUTLIER, RUN THE SUB-MENU 'CAUSAL'. 'CAUSAL' IS A SUB-MENU THAT
WILL PICK THE PARTICULAR VARIABLES(S) THAT STATISTICALLY CAUSED
THE OBSERVATION TO BE DISCORDANT. A NOTE OF CAUTION. THIS IS A
STATISTICAL PROCEDURE THAT WILL PRODUCE A STATISTICAL CAUSE OF
DISCORDANCE. IT IS NOT TO BE INTERPRETED LITERALLY. USE YOUR
KNOWLEDGE OF THE PROCESS - EXAMINE THE OBSERVATION - MAKE A
DECISION PERTAINING TO THE OBSERVATION.

YOU HAVE ACHIEVED YOUR OBJECTIVE WITH THE COMPLETION OF THE
ABOVE FOUR STEPS.

CONFIDENTIAL:
Subject to Protective Order
of 14th Judicial District Court
No. 91-1115

SL 002302