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Interoffice  
Communication

Subject: LINE I MODERNIZATION OPERATING MANUAL

VISTA

Attached is the operating manual for Line I. Any comments or corrections should be given to J. G. Cole.

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tb

cc: ~~JP~~, JWW, JEN, CLW, JGC, MLN, VLT, FGJ, SCH, EBB, KWB,  
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ccl: TFL, REP, RBN

Attachment



## LINE 1 MODERNIZATION

### OPERATING MANUAL

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## LINE 1 MODERNIZATION OPERATING MANUAL

### I. Introduction

#### A. General Process Description

The purpose of PVC resin compounding is to produce a fused, homogeneous mixture of PVC resin, plasticizer, stabilizer, coloring, filler and other miscellaneous small additives. The basic steps used to make compound are:

1. Blending - The raw materials are combined and mixed in a ribbon blender to make a uniform mixture called preblend.
2. Fusion - The preblend is charged to the banbury. The banbury uses mechanical energy to fuse the preblend into a "rubber"-like mass.
3. Milling - The fused material is then sent to the roll mill where two continuous ribbons (1/8" thick 9" wide) are made.
4. Pelletizing - The ribbons are cooled and fed to the dicers which cut the ribbons into pellets. The pellets are then sold by bags, gaylords, or railcars. The pellets are reprocessed by our customers into wire insulation, shoe soles, and various other products.

#### B. Objectives of Modernization

Compound Line 1 was originally designed and built in the early sixties. Since that time, few design changes have been made on the line until the Line 1 Modernization Project. This project redesigned Line 1 to conform to the current, stricter safety standards. The safety areas addressed by the Line 1 Modernization Project are listed below.

1. The potential for an operator to be exposed to lead containing dust was significantly reduced. The modernization project moved the blenders to a position above the banbury so that the preblend material will gravity flow into the blender. This eliminated the need for the skip hoist bucket and the problems associated with the leaks in the bucket. The banbury was also raised out of its basement to ground level. This allowed the banbury and surrounding area to have better ventilation when the area needs to be cleaned.
2. The above changes also reduce the safety hazards due to mechanical equipment. Eliminating the skip hoist system reduced the safety hazards due to moving chains, pulleys, and buckets. The potential for accidents due to mechanical equipment was also reduced by replacing the bucket conveyor system between the banbury and the roll mill with a belt conveyor. This was possible since the banbury was raised to ground level.



3. Another area that is safer after the modernization is the plasticizer weigh-up area. A new automated weigh tank was installed which eliminated the possibility of overflowing the weigh tank. The previous manual setup required the operator to close the inlet valve when the weigh tank was full. If the operator was not available due to other duties, the weigh tank would overflow and create a slip hazard. New transfer pumps were also installed to eliminate the slip hazard caused by the leaks of the previous vertical pumps.
4. New switchgear with lockout capabilities were installed on Line 1. The motor switchgear are located in a new motor control center south of P-1. The new switchgear will allow items on Line 1 to be locked out of service with much less confusion. The previous switchgear were not in one location and could not all be locked out with one type of lock.
5. A new mill plow system was installed to replace the jump conveyor on the roll mill. The new system does not require the operator to come in close contact with the mill, thus eliminating a potential burn hazard.
6. The ventilation systems on Line 1 were improved. A new ventilation hood and ducting were installed on the banbury feed chute. This hood and the blender dump hood were tied into the dry ventilation system. This system filters the dust from the air before venting to the atmosphere. The ventilation hood on the roll mill was tied into the wet ventilation system. The wet ventilation system removes the hot vapors from the air before venting to the atmosphere. The previous ventilation systems vented directly to the atmosphere.
7. The noise level in the dicer room was reduced. The product transfer blowers were moved out of the dicer room to the roof. This reduced the noise level in the dicer room.



## II. Safety Considerations

The Line 1 Modernization Project reduced or eliminated many of the safety hazards for Line 1, but additional safety precautions and procedures are still required to operate Line 1 in a safe manner. The operator has the responsibility to operate Line 1 in a manner that will not endanger himself or his fellow workers. Areas that need special precautions are:

- A. Lead-Dust Exposure: When working with any lead containing powders or in situations where there is a large amount of dust, such as adding bagged material to the blender, always wear the proper breathing equipment.
- B. Burns: When working around the roll mill, steam lines, or any high temperature areas, extra caution is required to prevent burns. Gloves should be worn as required safety equipment.
- C. Fumes: Always check to make sure that the proper ventilation systems are operating.
- D. Cuts: Care should be taken when operating or in the vicinity of the dicers. The extra caution is required to keep limbs and clothing out of the dicers. Extra caution is also required when adding bagged material to the blenders. The proper safety knife should be used when cutting the bags.

Specific instructions on the safety procedures and precautions required to run Line 1 will be presented in the operating procedures. Before operating any equipment, make sure that all safety precautions and procedures have been followed and be alert for any potential safety hazards.



### III. Process and Equipment Operation Description

#### A. Raw Material Charge Systems

The primary ingredients in PVC compounding are PVC resin and plasticizer. Both of these ingredients are produced at the Aberdeen plant. Other ingredients such as color, filler, lubricants, and stabilizers are added in relatively small amounts, but can have very important impacts on the properties of the compound produced. Each compound that is produced has a specific recipe. The formulation sheet states the type and amount of all the required ingredients. The ingredients are charged to a ribbon blender which mixes the ingredients to a uniform mixture called preblend. The weigh-up of the resin and various plasticizers is controlled by an automatic weigh system. The other dry ingredients such as color and filler are added by hand to the blenders.

##### 1. Resin

The resins used by the three compound lines are stored in four silos on the east side of the compound area. The formulation sheet for each compound specifies the type and amount of resin required for each blender charge. The amount of resin used in each charge is measured in the resin weigh bin. The resin is transferred from the storage silos to the resin weigh bin by a vacuum blower. The amount of resin required for a blender charge is entered into the automated system at the beginning of each product run. The automatic system controls the resin weigh up by operating the vacuum blower.

The resin weigh bin is located directly above the blenders. The weigh bin is connected to the proper blender by the blender operator. The blender operator then opens the resin weigh bin discharge valve on the control panel. The resin gravity flows from the weigh bin to the blender.

##### 2. Plasticizer & Stabilizer

Each compound produced by Line 1 requires liquid ingredients such as plasticizers and stabilizers. Most of the plasticizers are stored in the plasticizer tank farm. The stabilizers and a few of the plasticizers are stored in totes or drums. The liquid ingredients are weighed up in the plasticizer weigh tank and then transferred to the plasticizer heat tank. The plasticizer heat tank heats the liquid mixture before it is charged to the blender. Heating the liquid helps the resin absorb the mixture more rapidly.

The automated weigh system that controls the resin weigh up also controls the plasticizer weigh up. The type and amount of each liquid ingredient is entered into the automated system before each product run.



The plasticizers from the tank farm are piped to the plasticizer weigh tank. The automated weigh system operates the automatic valves that supply the plasticizers from the tank farm. The liquid ingredients in totes are hooked up to one of two stabilizer weigh-up pumps. These pumps supply the plasticizer weigh tank. The automated weigh system operates the pumps and automatic valves supplying these ingredients. When the weigh-up sequence is initiated by the blender operator, the automated weigh system weighs each ingredient into the plasticizer weigh tank. When the proper amount of one ingredient is supplied to the tank, the next ingredient is weighed up with the previous ingredients still in the tank. When weigh-up is complete, the contents of plasticizer weigh tank is transferred to the plasticizer heat tank. The operator turns on the agitator and the steam supply to the jacket of the heat tank. The contents are heated to and maintained at setpoint temperature.

At the beginning of a blender charge, the blender operator allows a certain amount of resin to be charged to the blender before he starts the plasticizer charge. The operator selects the blender to be charged and starts the plasticizer charge from the control panel. The plasticizer charge switch opens the discharge valve on the plasticizer heat tank and starts the plasticizer transfer pump. The automated system stops the discharge pump when the plasticizer charge is complete. When the charge is complete, an air purge cleans out the transfer line from the discharge of the transfer pump to the blend tanks. The automated system controls the timed air purge. The air purge is required since the heat tank is on the ground level while the blend tanks are on the third level. A new weigh-up sequence is started while the plasticizer is being charged to the blender.

### 3. Bagged Ingredients

After the resin and plasticizer mixture has been added to a blender, the blender is allowed to mix until the resin absorbs all the liquid ingredients. The resin has absorbed all the liquid when the mixture looks like a dry powder with no clumps. At this point, the blender agitator is turned off and the bagged ingredients are added by hand. Ingredients such as color, fillers, and lubricants are added by hand to the hand dump station. When all the ingredients specified by the formulation sheet are added, the agitator is started and the contents of the blender are allowed to mix.

### B. Blender Operation

The two ribbon blenders are located on the third level directly above the banbury. The blenders mix all of the ingredients for a compound until a uniform mixture is made. This mixture is called preblend.





The blenders are jacketed vessels. The jackets are supplied with steam and cooling water. The steam is used to bring the preblend mixture up to the setpoint temperature. The heated blender helps the resin absorb the plasticizer mixture at a faster rate. Cooling water is also supplied to the jacket. If a blender is required to mix for a long period of time, the temperature of the mixture will increase due to friction. The cooling water can cool the mixture to the set point temperature.

When a blender is ready to be charged, the blender operator turns the "blender select" switch on the control panel to the appropriate blender. The operator also checks to make sure the blender agitator is on. The resin weigh bin is manually connected to the appropriate blender and resin charge is started from the control panel. Approximately one thousand pounds of resin is added to the blender before the plasticizer charge is started. The plasticizer charge is also started from the control panel. The charge valves and pumps are turned off by the automated system when the charge is complete. The blender is allowed to mix until the resin is "dry" or free of clumps. This means that the resin has absorbed all of the liquid plasticizer. When the mixture is "dry", the operator stops the agitator and adds the bagged ingredients. The ingredients are added through the hand dump station on the blenders. When the bagged material has been added, the operator starts the agitator.

The preblend mixture is mixed in the blender for approximately fifteen minutes. At that time, the agitator is turned off and a sample is taken for lab testing. The agitator is then turned back on and the preblend mixes until the lab reports whether the preblend is within specifications. If the preblend is out of specification, adjustments are made by adding resin, plasticizer, or other ingredients until the preblend is within specifications. Once the blender is found to be within the required specifications by the lab, the "blender ready" switch is pushed on the control panel. This allows the blender to be used to charge the banbury.

#### C. Banbury Operation

##### 1. Banbury Charge

The banbury charge weigh up is controlled by a second automatic weigh system. This system controls the amount of the banbury charge as well as the sequencing. The preblend is transferred from the blenders to a preblend weigh hopper by volumetric feeders. The preblend weigh hopper is directly above the banbury and directly below the two blenders.

An indicator light on the first floor control panel will tell the mill operator when a blender is ready to charge the banbury.



The mill operator will start the weigh-up sequence from the first floor control panel. The preblend weigh-up is automated. The amount of each banbury charge is entered into the automated weigh system at the beginning of the product run. The automated system weighs up the prescribed amount of preblend. When the banbury sequence is ready for the next charge, the automated system opens the discharge valve of the preblend weigh bin. The preblend flows by gravity into the banbury. When the preblend weigh bin is empty, the automated system closes the discharge valve to the bin and starts a new weigh-up sequence.

## 2. Banbury Operation

The banbury uses mechanical energy to fuse or melt the preblend into a "rubber-like" mass. The banbury is on ground level directly below the preblend weigh bin and the blenders. The sequencing of the banbury is controlled by the same automated system that controls the preblend weigh-up. The preblend is mixed in the banbury until the preblend is properly fused. The temperature of the material indicates when the preblend has been properly fused. When the temperature setpoint is reached, the drop gate on the bottom of the banbury opens and the fused material drops to a belt conveyor beneath the banbury. The gate then closes and a new banbury charge sequence is started by the automated system. The fused preblend, called a pig, is carried by the belt conveyor to the roll mill.

### D. Roll Mill Operation

The roll mill is used to further blend the fused material and to produce two ribbons approximately 1/8" thick and 9" wide. The mill has two steam heated rollers, one slightly hotter than the other. The action of the rollers pulls the pig between the rollers, the fused material sticks to the hotter roller. A strip is taken from the hotter roller and is taken to a second isolated section of the mill. This action further blends the material. Two strips are taken off the second section and go to the cooling water trough. The ribbons are sent through two cooling water troughs in series. The ribbons are cooled before they are fed to the dicers.

### E. Dicer Operation

The dicers cut the ribbons into pellets. There are two dicers for Line 1. The ribbons leaving the cooling water trough are pulled through a series of rollers. These rollers are used to dry the ribbons. Air is blown on the ribbons to remove part of the water and then the ribbons are vacuumed to insure that the ribbons are dry enough to be cut and transferred without problems. The ribbons are then fed to the dicers where the ribbons are cut into pellets. The pellets drop out of the dicer into a screener.



F. Pellet Transfer

The pellets drop into a vibrating screener from the dicers. The oversize material is removed while the pellets drop through the screen to a star valve. The pellets are pneumatically transferred to the bulk silo, the bagging silo, or the boxing silo. The material from the silo is either sold by railcars, fifty pound bags, and gaylord boxes.



IV. Operating Procedures

- A. Probatcher Entry and Operation
- B. Resin Weigh-Up
- C. Plasticizer Weigh-Up
- D. Plasticizer Heat-Up
- E. Blender Charge
- F. Blender Adjustments
- G. Banbury Charge and Operation
- H. Roll Mill Operation
- I. Dicer Operation and Pellet Transfer



#### IV. A. Probatcher Operation

The Probatcher is used to control the weigh-up of resin and plasticizer for Line 1. The probatcher is located on the blender floor level. It consists of a control unit which includes a CRT screen, a keyboard, and a plant unit which has indicators for the resin weigh bin and the plasticizer weigh tank (see drawing IV.A.1-1). The Probatcher controls the resin weigh-up by controlling the resin transfer blower. The Probatcher monitors the amount of resin in the weigh bin and turns the transfer blower off at the appropriate time. The Probatcher, also controls the weigh-up of plasticizer and stabilizer by controlling the inlet valves to the weigh tank as well as the plasticizer supply valves.

The Probatcher's memory can store the required amounts of resin and plasticizers for up to one hundred compounds. The majority of the compounds that will be produced will have their formulations in the probatcher's memory before the start of a production run. The Probatcher operation is divided into three sections:

1. Operating Procedures - This section will give details on how to operate the Probatcher when the compound formulation is already in the Probatcher's memory.
2. Formulation Entry - This section will give details on how to enter a formulation into the Probatcher's memory.
3. Manual Operation of Scales - This section will describe how to manually operate the probatcher scales.

##### IV. A. 1. Operating Procedures

The viewing screen is divided into two sections, the left side for the resin weigh bin, the right side for the plasticizer weigh tank. The screen has eight touch switches on each side. These switches and the keyboard are used to operate the Probatcher. The Probatcher is left in the "standby" mode when not being used. The Probatcher can operate one scale at a time or both scales at the same time. Most of the following instructions assume that only the left side of the Probatcher screen is operating. The instructions apply to both the resin and plasticizer sides. The left side is referred to as system "A", while the right side is referred to as system "B".

- a. Turn the Setup/Test keyswitch to "off". (This keyswitch is on the control unit with the CRT screen).
- b. With the weigh vessels in the "STANDBY" mode, the screen looks like drawing IV.A.1.-2.
- c. To begin batching, push the "OPERATE" touchswitch on the left side of the screen.



- IV. A. 1. d. The screen will now look like drawing IV.A.1.-3. Enter the security code and hit the return key. The code that is entered will not appear on the screen, but the cursor will move. If the wrong security code is entered, an "INVALID SECURITY CODE" message will appear. Press the "OPERATE" switch and try again.
- e. When the correct security code is entered, the screen will appear as in drawing IV.A.1.4. The touchswitches on the left side will allow the operator to enter the following modes:
- 1) "SELECT FORMULA" - used to enter the formula number and start batching. The number of batches to be produced may be entered here.
  - 2) "FORMULA NAMES" - used to view names of all formula numbers and names assigned to this weight vessel.
  - 3) "MANUAL CONTROL" - used to zero the scale at the beginning of a run.
  - 4) "RESUME BATCHING" - appears only when a series of multiple batches is interrupted (an interrupt occurs at the end of a batch). This button allows batching to continue.
  - 5) "CANCEL BATCHING" - appears at the same time as "RESUME BATCHING". This switch will cancel out the resume batching function. When pressed, both legends disappear.
  - 6) "STANDBY" - used to return vessel to the standby mode.
- f. To zero the scale before starting, press "MANUAL CONTROL". The top touchswitch is the "DEADLOAD ZERO" switch. Press that switch to zero the scale. Press "EXIT" to return to the operate screen.
- g. To select the proper formula number with the formula name, press switch "FORMULA NAMES". Drawing IV A.1.-5. illustrates how the screen will look.
- Twenty formula names may appear on the screen at one time.
  - Switches "NEXT PAGE" and "PREVIOUS PAGE" are used to view the formula names if there are more than 20 formulas.
  - The formula number ANNN, has the first letter represent the weigh scale "A" and NNN represents a three digit number.
  - The formula name, XXXXXXXXXXXXXXXX, is a 14 digit alpha-numeric name that corresponds to the name on the formula sheet.
  - The "EXIT" switch returns the screen to the "OPERATE" mode.
- h. The "FORMULA NAMES" screen can be viewed to determine the correct formula number for the compound to be produced. When the proper number is found, press the "EXIT" switch. This will return the screen to the operate mode.



- IV. A. 1. i. Press "SELECT FORMULA" in order to start a batch. When this button is pressed, the message "FORMULA A" appears under the "OPERATE" title.
- j. The cursor indicates the first entry location. Enter the formula number and press the "RETURN" key on the keyboard. The screen will then change as illustrated in drawing IV.A.1.-6. The formula name will automatically fill in after the number is entered.
- k. The cursor is now on the "BATCHES" line. Enter the total number of the batches for the production run, then press "RETURN" on the keyboard. If this number is not entered, the default is 1.
- l. To check the formula in the Probatcher against the formulation sheet, press the "FORMULA MAKE-UP" switch.
- The screen will change as illustrated in IV.A.1.-7.
  - The first page will contain 20 lines of data concerning batch program steps.
  - If more pages are necessary to display the entire batch program, the "NEXT PAGE" and "PREVIOUS PAGE" buttons reveal the program in blocks of 20 lines.
  - The "EXIT" Switch is used to return to the startup screen.
  - (AREA 2) indicates the steps in the program sequence. The steps are as follows:
- 1) NN ING.ANN XXXXXXXXXXXXXXXX  
 REQUIRED NNNNNN  
 -NN refers to the batch step  
 -ING refers to ingredient  
 -ANN refers to the weigh vessel "A"  
 ingredient number  
 -XXXXXXXXXXXXXX refers to the ingredient name.  
 -NNNNNN refers to the required amount of the ingredient
  - 2) NN HOLD TIME NNNN  
 -NN refers to the batch step  
 -NNNN refers to the length of the time delay
  - 3) NN CONTACT N XXXXXXXXXXXX  
 -NN refers to the batch step  
 -N refers to the contact number (always 1)  
 -XXXXXXXXXXXXXX refers to what the contact does
  - 4) NN DUMP TO EMPTY  
 -NN refers to the batch step  
 -Message refer to emptying a vessel



IV. A. 1. 1.

5) NN END

-NN refers to the batch step

-Message indicates the end of the batch program.

- m. Comparing the formulation sheet to the display will confirm if the same formula is used. If the formulas do not match, go to section IV.A.2, Formulation Entry to enter the new formula. If the two formulas do match, continue to the next procedure.
- n. Press the "EXIT" switch. The screen will now be in the startup screen. (drawing IV.A.1.-6.)
- o. If the formulation sheet agrees with the Probatcher's formulation, press the "START" switch. The screen will change as indicated in drawing IV.A.1.- 8.
  - "ALTERNATE DISPLAY" replaces the graphics with a list of the steps. This allows the operator to review the formula while the probatcher is weighing material.
  - "INTERRUPT BATCH" will stop the batching at the end of the batch. An interrupt message is printed on the screen. At the end of the batch, the screen will look like drawing IV.A.1.- 9. Three choices may then be made:
    - 1) "SUSPEND BATCHING" will return control back to the main operate screen (drawing IV.A.1-4). The number of batches will be retained if the batching needs to be continued.
    - 2) "RESUME BATCHING" simply picks up with the next batch.
    - 3) "CANCEL BATCHING" returns the screen back to the main operate screen (drawing IV.A.1.-4.) (drawing IV.A.1.-4.) and cancels the remaining batches.
  - "STOP" halts batch operation and brings up two choices "RESTART" on the top button and "CANCEL BATCH" on the bottom button.
    - a. "RESTART" will continue the current batching. The restart switch will allow the probatcher to continue where it stopped.
    - b. "CANCEL BATCH" kills the batch in mid-stride and returns the screen to the main operate screen (drawing IV.A.1.-4.).
- p. The "RESUME BATCHING" switch on the main operate screen (drawing IV.A.1.-4.) only appears after batching has been interrupted by the Interrupt Batch switch and then suspended. Press the "RESUME BATCHING" switch if batching is to continue. The screen will look like drawing IV.A.1.-10.



- IV. A. 1. p. - "START" will resume the batching  
 - "EXIT" will return the main operate screen (drawing IV.A.1.-4.)
- q. Condensed Operating Procedures
- from "STANDBY" mode
  - Press "OPERATE" (drawing IV.A.1-2)
  - Enter the security code and hit the return key (drawing IV.A.1.-3.)
  - Press "FORMULA NAMES" (drawing IV.A.1.-4.)
  - Determine formula number for formula name
  - Press "EXIT" (drawing IV.A.1.-5.)
  - Press "FORMULA SELECT" (drawing IV.A.1.-6.)
  - Enter formula number (drawing IV.A.1.-6.)
  - Enter number of batches (drawing IV.A.1.-6.)
  - Press "FORMULA MAKEUP" (drawing IV.A.1.-6.)
  - Compare probatcher formulation to the formulation sheet. If the formula does not match, press "EXIT" (drawing IV.A.1.-7.) and go to section IV.A.2. Formulation Entry. If the formulas agree, continue.
  - Press "EXIT" (drawing IV.A.1.-7.)
  - Press "START" (drawing IV.A.1.-6.)
  - This starts the batching
  - The screen will look like drawing IV.A.1.-8.

#### IV. A. 2. Formulation Entry

The Probatcher has the capacity to have up to one hundred compound formulations stored in its memory. Section IV.A.1. Operating Procedures gives the details on how to call up a formulation from the Probatcher's memory and use that formulation to start batching. This section will describe how to enter a formulation into the Probatcher's memory. This procedure will be needed when a new compound is made. This procedure may also be required if there is a power failure and the battery backup fails. The following instructions are for entering a formula into the left portion of the screen, or weigh scale "A". The right portion, weigh scale "B", is assumed to be in the "STANDBY" mode. Although a compound formulation is entered for one weigh scale at a time, the instructions are valid for either one.

- a. With the probatcher in the "STANDBY" mode, turn the "setup/test" keyswitch to the "on" position (keyswitch is on the control unit with the CRT screen). The screen will now look like drawing IV.A.2.-1.
- b. Push the "SETUP" switch. The screen will now look like drawing IV.A.2.-2. Only one side of the screen can be in the "SETUP" mode at one time. To work on the second side after the first side has been worked on, return the first side to the "STANDBY" mode.



IV. A. 2. c. The options from the setup screen are:

- 1) SYSTEM FEATURES
- 2) FORMULA FEATURES
- 3) INGREDIENT FEATURES
- 4) INVENTORY FEATURES
- 5) MEMORY CARTRIDGE
- 6) STANDBY

Option 2., FORMULA FEATURES, is the only option needed to enter a formula. The other options are also explained in this section. If you are only interested in entering a formula, go to Section IV.A.2.e.

Option 6., STANDBY, returns the probatcher to the "STANDBY" mode.

d. "SYSTEM FEATURES" is used to change the security code, set the empty tolerance of the weight vessel, and to set the clock. Press "SYSTEM FEATURES" on the setup screen (drawing IV.A.2.-2.)

- 1) Press "OPERATE SECURITY" on the system features screen (drawing IV.A.2.-3.). Enter the new security code and hit the return key.
- 2) Press "EMPTY TOLERANCE" on the system features screen (drawing IV.A.2-3)

Enter the maximum permissible weight that the vessel can contain and be considered empty. Enter the value and hit the return key. The value will be compared with a value equal to ten percent of the vessel's capacity. The smaller of the two numbers is the vessel's empty tolerance.

- 3) Press "CLOCK" on the System Features screen. Enter the following information:

(Hour):(Min)  
(Day) (Month) (Year)

The format is as follows:

NN : NN  
NN XXX NN

Enter the hour, hit the return key (military time)

Enter the minute, " " "

Enter the day, " " "

Enter the month, " " " (3 ltr abbrev.)

Enter the year, " " " (last 2 digits)

The information is not stored in memory until all five fields are entered.

- 4) Push the "SETUP" switch to return to the setup screen (drawing IV.A.2.-2.)



- IV. A. 2. e. To enter a new formula or change an old one, press "FORMULA FEATURES" on the setup screen. The screen will now look like drawing IV.A.2.-4. The options from this screen are as follows:
- . FORMULA NO. & NAME
  - . FORMULA NAMES
  - . SETUP

The "SETUP" switch returns the probatcher to the setup mode (drawing IV.A.2.-2.)

- 1) To determine what the next formula number should be or what formula number corresponds to an existing formula, press the "FORMULA NAMES" switch. The screen will now look like drawing IV.A.1.-5. This screen lists all of the existing formulas that have been entered. Determine what the next formula number should be and press the "EXIT" switch. The screen now shows the "FORMULA FEATURES" screen (drawing IV.A.2.-4.).
- 2) Press "FORMULA NO. & NAME". The word FORMULA and the letter A or B will appear. The cursor is positioned after the letter A. Enter the formula number (maximum 3 digits) and hit the return key. When the return key is hit, the formula memory is checked to see if this is an existing number. If it is, the formula name is displayed. If not, the message "NEW FORMULA" appears in reverse video. Enter the new formula name (14 digits, letters or numbers) and hit the return key. NOTE: the existing alpha-numeric name can be revised by simply entering a new name. To retain the existing name as is, either press the return key immediately before entering anything, or simply press another switch. If the "NEW FORMULA" message was called up in error because of an incorrect formula number entry, press the "FORMULA NO. & NAME" switch again. Do not press the return key. The screen now looks like drawing IV.A.2.-5.

There are two ways to enter a new formula, from scratch or by modifying a copy of an existing formula. Copying an existing formula is handled by the "COPY FORMULA" switch.

- 3) Entering a formula from scratch: Press the "BATCH PROGRAM" switch. The screen now looks like drawing IV.A.2.-6. When the "BATCH PROGRAM" switch is pushed, step one is displayed as the END function. The touch switches for the Batch Program screen are:
  - . Next Step
  - . Previous Step
  - . Insert Step
  - . Delete Step
  - . Change Step
  - . Exit.



## IV. A. 2. e. 3)

(Con't.)

The "NEXT STEP" and "PREVIOUS STEP" switches allows the program to be stepped through. The "INSERT STEP" switch inserts a program step immediately before the step that was on the screen. The "DELETE STEP" switch will delete the step on the screen. The "CHANGE STEP" switch allows the step to be changed from one type to another (such as an ingredient step to a hold time step). The "EXIT" switch returns the screen to the Formula Features screen.

A formula consists of a series of steps (maximum of 99 steps). There are five types of steps:

- a) ingredient
- b) hold time
- c) hold contact
- d) dump
- e) end

Area 1 of the Batch Program Master screen (drawing IV.A.2.-6.) states what type of step is associated with that step number. Area 2 states the required data for that step. The data required for each type of step is as follows:

| Area 1     | Area 2                  |                 |
|------------|-------------------------|-----------------|
| Ingredient | Number                  | ANN             |
|            | Name                    | XXXXXXXXXXXXXX  |
|            | Required                | NNNNNN (lbs.)   |
|            | Preliminary             | NNNNN (lbs.)    |
|            | Preact                  | NNNN (lbs.)     |
|            | Tolerance               | NNNN (lbs.)     |
| Hold:      | Time                    | NNNN (seconds)  |
| Hold:      | Contact                 | N (Contact No.) |
|            | Name                    | XXXXXXXXXXXXXX  |
|            | Out On                  | N (yes or no)   |
|            | Out Off                 | N (yes or no)   |
|            | Out on, in on, out on   | Y (yes or no)   |
|            | Out on, in off, out on  | N (yes or no)   |
|            | Out on, in on, out off  | N (yes or no)   |
|            | Out on, in off, out off | N (yes or no)   |
| Dump       | Empty                   | Y (yes or no)   |
| End        | -                       |                 |

The valid data ranges for Area 2 are as follows:

| Description      | Minimum  | Maximum              |
|------------------|----------|----------------------|
| Number           | A1       | A20                  |
| Required         | 1 (lb)   | 100% vessel capacity |
| Preliminary      | 1 (lb)   | 20% vessel capacity  |
| Preact           | 1 (lb)   | 10% vessel capacity  |
| Tolerance        | 1 (lb)   | 10% vessel capacity  |
| Hold Time        | 1 (sec.) | 9999 (sec)           |
| Contact Hold No. | 1        | 9 (as configured)    |



## IV. A. 2. e. 3) (Con't.)

The definition of the terms in Area 2 are as follows:

- a) Ingredient No. - machine reference for a particular ingredient. Ingredients begin with "A" or "B" depending on which weigh vessel is used. The ingredient number can be obtained from the Ingredient Features switch on the Setup Screen (drawing IV.A.2-2). The procedure to obtain the ingredient number will be discussed later.
- b) Ingredient Name - Human readable name for the ingredient (14 characters long, letters or numbers, such as y10-P or resin).
- c) Ingredient Required - Weight of ingredient required at this step.
- d) Ingredient Preliminary - Weight of the ingredient in the vessel that is required for a 2-speed feeder to switch from fast feed to dribble feed.
- e) Ingredient Preact - amount of weight prior to the required weight that causes the feeder to stop. This allows the material in the header or pipe to drain into the vessel and not overshoot the required weight.
- f) Ingredient Tolerance - value of a  $\pm$  envelope around the required weight. If the actual weight is not in the envelope, an error alarm results.
- g) Hold Time - length of time that the sequence will pause before going to the next step.
- h) Hold Contact - the only hold contact that is configured is #1. This contact keeps the plasticizer weight bin from accepting a weigh-up sequence until the heat tank is empty and the "Lo-Level" light comes on the control panel. Of the six possible options in area 2 to put a Y in, the third option is correct.
- i) Dump Empty - "Y" tells the controller to completely empty the vessel.

IV. A. 2. e. 4) Entering a New Formula (Condensed)

- a) These instructions apply to both the resin and plasticizer sides.
  - . Always start with both screens in the "STANDBY" mode. Press the bottom touchswitch until each screen is in the "STANDY" mode.
  - . Turn the "SETUP/TEST" keyswitch to the "ON" position.
  - . Press the "SETUP" touchswitch.
  - . Press the "FORMULA FEATURES" touchswitch.
  - . Press the "FORMULA NAMES" touchswitch.
  - . Determine what the next formula number should be.



## IV. A. 2. 3. 4) (Con't.)

- . Press the "EXIT" touchswitch.
- . Press the "FORMULA NO. & NAME" touchswitch.
- . The cursor will be blinking at the formula number position, enter the new formula number and hit the "RETURN" key.
- . If the formula number has not been used before, the words "NEW FORMULA" will appear. Enter the new formula name and hit the "RETURN" key. If the number has already been used, the formula name will appear. You can change the name of the formula or press the "FORMULA NO. & NAME" touchswitch and enter the formula number again.
- . After the new formula name has been entered, press the "BATCH PROGRAM" touchswitch.

## b. To enter a resin formula:

- . Press the "INSERT STEP" switch. The screen now looks like drawing IV.A.2.-7.
- . Press the "INGREDIENT" switch.
- . The cursor should be blinking by the ingredient number. Press the number "1" and hit the "RETURN KEY". The ingredient number for resin is "1". The word "RESIN" should appear on the name line.
- . The cursor should now be blinking at the required amount. Enter the number of pounds of resin and hit the "RETURN" key.
- . The cursor should now be on the preact line. Enter the preact number and hit the "RETURN" key.
- . The cursor should now be on the tolerance line. Enter the tolerance number and hit the "RETURN" key.
- . Press the "NEXT STEP" touchswitch. The "END" step should appear.
- . Press the "INSERT STEP" touchswitch. The screen now looks like drawing IV.A.2.-7.
- . Press the "DUMP" touchswitch. The word "EMPTY" will appear with a "Y" after it. The cursor will be blinking under the "Y".
- . Press the "RETURN" key. This step will default to "DUMP TO EMPTY".
- . Press the "EXIT" touchswitch.
- . Press the "FORMULA MAKE-UP" touchswitch. The formula steps will appear. Confirm that the right steps and amounts were entered.
- . Press the "EXIT" touchswitch.
- . If a mistake was made,
  - Press the "BATCH PROGRAM" touchswitch.
  - Press the "NEXT STEP" touchswitch until the step to be changed is on the screen.



- If an amount is wrong, press the "RETURN" key under the amount to be changed. Enter the new amount, hit the "RETURN" key, and press the "EXIT" touchswitch.
- If a step needs to be changed, press the "CHANGE STEP" touchswitch.

c. To enter a plasticizer formula:

- . Repeat Part a.
- . Press the "INSERT STEP" switch. The screen now looks like drawing IV.A.2.7.
- . Press the "HOLD CONTACT" touchswitch. This contact will keep the probatcher from weighting up a new batch until the heat tank "LO-LEVEL" light is on.
- . Enter the number "1" and hit the return key.
- . Enter the letters "HOLD" and hit the return key. This will label this program step as a hold step.
- . Hit the return key 2 times. The blinking cursor should be by the line reading "OUT ON, IN ON, OUT ON"  
If the blinking cursor is not on that line, hit the "return" key until it is on that line.
- . Enter the letter "Y" and hit the return key.
- . Press the "NEXT STEP" touchswitch.

Steps to Add Plasticizers From the Tank Farm

- . Press the "INSERT STEP" touchswitch.
- . Press the "INGREDIENT" touchswitch.
- . The cursor should be blinking on the "NUMBER" line. Enter the ingredient number and hit the "return" key. The ingredient number for each plasticizer is:

| <u>Number</u> | <u>Plasticizer</u> |
|---------------|--------------------|
| 1             | 10-8P              |
| 2             | DIDP               |
| 3             | SPARE              |
| 4             | 610-P              |
| 5             | SOYA EPOXY         |
| 6             | TOTM               |
| 7             | 810P               |

These numbers match the order the plasticizer valve switches are on the control panel. When the number is entered, the plasticizer name should appear when the "return" key is hit.

- . The cursor should now be blinking on the "REQUIRED" line. Enter the number of pounds required for that plasticizer and hit the "return" key.
- . The cursor should now be blinking on the "PRELIMINARY" line. Enter the number "20" and hit the "return" key.



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Steps to Add Plasticizers From the Tank Farm (Con't.)

- . The cursor should now be blinking on the "PREAMT" line. Enter the number "5" and hit the "return" key.
- . The cursor should now be blinking on the "TOLERANCE" line. Enter the number "3" and hit the "return" key.
- . Look over the numbers that were entered. If you need to change anything, hit the "return" key until the blinking cursor is on that line. Then enter a new number and hit the "return" key.
- . Press the "NEXT STEP" touchswitch.

If you need to add another plasticizer from the tank farm, go through the "Steps to Add Plasticizers From the Tank Farm" again.

Steps to Add Liquid From Tanks or Drums

- . Press the "INSERT STEP" touchswitch.
- . Press the "INGREDIENT" touchswitch.
- . The cursor should be blinking on the "NUMBER" line. Enter the ingredient number and hit the "return" key. The ingredient number for each pump is:

| <u>Number</u> | <u>Pump</u> |
|---------------|-------------|
| 8             | P-101       |
| 9             | P-102       |

The names "STAB 1" or "STAB 2" will appear when the "return" key is hit.

- . The cursor should now be blinking on the "REQUIRED" line. Enter the number of pounds required for that plasticizer and hit the "return" key.
- . The cursor should now be blinking on the "PREAMT" line. Enter the number "5" and hit the "return" key.
- . The cursor should now be blinking on the "TOLERANCE" line. Enter the number "3" and hit the "return" key.
- . Look over the numbers that were entered. If you need to change anything, hit the "return" key until the blinking cursor is on that line. Then enter a new number and hit the "return" key.
- . Press the "NEXT STEP" touchswitch.

If you need to add another liquid ingredient from a tote or a drum, go through the "Steps to Add Liquids From Tanks or Drums" again.

After all the ingredients have been entered:

- . Press the "INSERT STEP" touchswitch.
- . Press the "DUMP" touchswitch. This will allow the probatcher to empty the weight tank contents in the heat tank. The letter "Y" will appear which indicates dump until empty.
- . Hit the "return" key.
- . Press the "EXIT" touchswitch to get out of the program.
- . Press the "FORMULA MAKE-UP" touchswitch.
- . Compare the formula to the formulation sheet.



Steps to Add Liquid From Tanks or Drums (Con't.)

If the formula is correct:

- . Press the "SETUP" touchswitch.
- . Press the "STANDBY" touchswitch.
- . Turn the "setup/test" keyswitch to off.

If the formula entered is incorrect:

- . Press the "BATCH PROGRAM" touchswitch.
- . Press the "NEXT STEP" touchswitch until the step that needs to be changed is on the screen.
- . Hit the return key until the blinking cursor is on the line to be changed.
- . Enter the correct number and hit the "return" key.
- . Press the "EXIT" touchswitch.
- . Press the "SETUP" touchswitch.
- . Press the "STANDBY" touchswitch.
- . Turn the "setup/test" keyswitch to off.

Formula entry is now complete.



IV. A. 2. e. 5. Entering a formula by copying an existing formula and modifying it.

- a) From the Formula Features screen, press the "COPY FORMULA" switch. The screen will look like drawing IV.A.2.-8. The new formula number and name will appear at the top of the screen. The letter "A" or "B" will appear beside the "SOURCE FORMULA" switch. Enter the formula number of the formula to be copied after the letter and press the return key. If the formula number is a valid number, the appropriate formula name will appear. If a non-existent formula number is entered, then the name field remains blank and the message "INVALID SOURCE FORMULA" appears. In this case, press the "SOURCE FORMULA" switch to re-open entry of an existing formula.

The "COPY" switch only appears after a valid source formula is entered. Press the "COPY" switch to enact the copy. When the copy is complete, control passes automatically to the Formula Features screen (drawing IV.A.2.-4.).

Press the "CANCEL" switch at any time to return to the Formula Features screen.

- b) Press the "BATCH PROGRAM" switch. When the Batch Program screen is called up (drawing IV.A.2.-6), step one is displayed if there is an existing formula. If there is not an existing formula, step one is displayed as the END function. The "NEXT STEP" and "PREVIOUS STEP" switches are used to step through the program.

To change the parameters of a given step (parameters are in Area 2), simply put the cursor on the line to be changed and type in the new values (cursor is moved from line to line by pressing the "Return" key). Only the Area 2 parameters may be changed this way, to change the step function from an Ingredient to a Time Hold, use the "CHANGE STEP" switch.

To change a step function, press the "CHANGE STEP" switch. The screen will now look like drawing IV.A.2-9. Select the desired step function (Ingredient, Hold Time, Hold Contact, Dump, or End) and press the appropriate switch. The existing step function is now replaced by the function selected with prompting for the required data. The Batch Program menu is now displayed. The data is entered followed by pressing the Return Key to advance to the



next line, until all the data has been entered. The "CHANGE STEP" switch should be used to change existing steps and to enter steps into a blank formula.

To delete an existing step, press the "DELETE STEP" switch. All the following steps are moved upward and the new current step is displayed.

To insert a step before an existing one, press the "INSERT STEP" switch. The screen will now look like drawing IV.A.2-7. If the "CANCEL" switch is pressed, the Insert Function is cancelled and the existing step and Batch Program menu is displayed. The desired function is selected by depressing one of the switches (Ingredient, Hold Time, Hold Contact, Dump, or End). The selected function and the Batch Program menu are displayed. The data is entered as it is for the Change Step function.

- IV. A. 2. e. 6. The "BATCH TOLERANCE" switch on the Formula Features Screen (drawing IV.A.2.-5.) appears when the new formula name and number was entered. The batch tolerance represents a  $\pm$  envelope around the total batch weight that is allowable just prior to a dump. If the actual weight is outside this envelope, an alarm occurs. To enter a value, press "BATCH TOLERANCE". Then enter the number (maximum 4 digits) and press the return key.
7. To view, print, or erase a specific formula, press the "FORMULA MAKEUP" switch on the Formula Features screen, (drawing IV.A.2-5). The screen should then look like drawing IV.A.2-10.

Twenty lines of a formula may appear on one page. If the formula has more than twenty lines, the "NEXT PAGE" and "PREVIOUS PAGE" switches allow the entire formula to be viewed.

The "PRINT" switch causes a hard copy of the entire formula to be printed. The "PRINT & CLEAR" switch causes a hard copy of the entire formula to be printed, but then erases the formula from memory. The "EXIT" switch returns control to the Formula Features screen.



## IV. A. 2. e. 7. (Con't.)

The formula steps shown by this method are in a condensed form. The form for an ingredient addition is:

NN ING.ANN XXXXXXXXXXXXXXXX  
REQUIRED NNNNNN

where the first NN is the step number, the NN following ING.A (or ING.B) is the ingredient number, XXXXXXXXXXXXXXXX is the ingredient name, and NNNNNN is the required weight of the ingredient.

The form for a hold time step is as follows:

NN HOLD TIME NNNN

where NN is the step number and NNNN is the number of seconds the hold time lasts.

The form for a hold contact is:

NN CONTACT N XXXXXXXXXXXX

where NN is the step number, N is the contact number, and XXXXXXXXXXXX is the contact name.

The form for a dump to empty step is:

NN DUMP TO EMPTY

where NN is the step number.

The form for the end of a batch program is:

NN END

where NN is the step number.

- f. Ingredient Features is one of the switches on the main Setup screen (drawing IV.A.2.-2). Pressing the "INGREDIENT FEATURES" switch makes the screen look like drawing IV.A.2.-11. To view the list of ingredients for that vessel (A or B), press the "INGREDIENT NAMES" switch. The screen then displays all of ingredients for that vessel and the corresponding number. Press the "EXIT" switch to return to the Ingredient Features screen.

To add a new ingredient or change the name of an existing one, press the "INGREDIENT NO. & NAME" switch. The letter A or B will appear by the switch. Enter the ingredient number (maximum 2 digits) and press the Return key. If it is an existing ingredient number, the ingredient name will appear. If it is a new number, the name field will remain blank. In either case, enter the new or changed name and press the Return key.

- g. Inventory Features can be accessed from the main Setup Screen (drawing IV.A.2.-2.). When the "INVENTORY FEATURES" switch is pressed, the screen looks like drawing IV.A.2.-12. The three switches, "FORMULA USAGE", "INVENTORY USED", AND "ALARM SUMMARY" contain data on the formulas run, the weights produced and



## IV. A. 2. 3. 7. (Con't.)

consumed, and the alarms. The three screens, when activated, look like drawings, IV.A.2.-13, IV.A.2.-14., and IV.A.2.-15. The switches for each screen are self explanatory. The "PRINT & CLEAR" switch on each screen resets the date at the top and erases the past data.

- h. The "MEMORY CARTRIDGE" switch on the Setup Screen (drawing IV.A.2.-2) calls up the "Memory Cartridge" screen (see drawing IV.A.2.-16.). The "WRITE TO CARTRIDGE" and "READ FROM CARTRIDGE" switches can copy all of formulas for both vessels from the Probatcher's memory to a back-up cartridge, or from a back-up cartridge to the Probatcher's memory. The configuration of the Probatcher and the data on the cartridge must match or the data cannot be read from the cartridge. The "VERIFY CARTRIDGE" switch is used to check a cartridge to see if the data on it is valid, without actually loading it into memory.



## IV. A. 3. Manual Operation of Scales

To operate the blender level control panel in the manual mode for material weigh up, the following instructions explain how to operate the scales. The scales are located in the Plant Unit of the Probatcher (see drawing IV.A.3-1).

- 1) Select "MANUAL" on the MAN/AUTO switch on the plant unit (see drawing IV.A.3-1).
- 2) Select the Net mode by pressing the "G/N" button. The small indicator above the N lights to show the net weight.
- 3) Press the Auto Tare switch prior to any ingredient feed. The display will show a zero value.
- 4) Manually feed material into vessel. (Manual feed controls are on blender level control panel).
- 5) Press the Auto Tare again prior to each ingredient addition.
- 6) Select the Gross mode with "G/N" button. The small indicator above the G lights to show the gross weight.

## IV. B. Resin Weigh-up

1. At the beginning of a product run
  - a. Determine type of resin required from the formulation sheet.
  - b. Determine which silo has the selected resin from the shift supervisor.
  - c. Connect silo to Line 1 vacuum blower system (see drawing IV.B.1.)
  - d. Manually open slide valve on the discharge of silo.
  - e. Confirm probatcher uses same amount of resin as formulation sheet (section IV.A.1).
2. AUTO. Resin weigh up will be handled by the system when the system is in the "Auto" mode (SW-109 on the blender level control panel). Resin weigh up can be handled one of two ways in the "Auto" mode:
  - a. Probatcher has the total number of blenders entered. Resin weigh up will start as soon as resin weigh bin is empty and discharge valve closes.
  - b. Probatcher does not have total number of blenders entered. Operator will initiate a weigh up sequence by entering an additional blender into the probatcher (see section IV.A.).



- IV. B. 3. MANUAL. Resin weigh-up is controlled by the operator with the system in the "Manual" mode (SW-109 on the blender level control panel).

The following sequence should be followed:

- a.) Confirm resin weight bin discharge valve is closed (SW-201 on the blender level control panel).
- b.) Start the resin transfer blower (SW-202 on the blender level control panel).
- c.) When the resin weight bin scale indicates the proper amount of resin has been weighed up, turn the blower off (weight scale is mounted by the control panel).



## IV. C. Plasticizer Weigh-Up

1. At the beginning of a product run:
  - a. Determine types of plasticizers and stabilizers required from the formulation sheet.
  - b. If any of the required plasticizers or stabilizers are in totes or drums, connect them to the two weigh-up pumps. Note which of the two pumps the tote or drum was connected to (see drawing IV.C.1.).
  - c. Confirm that the probatcher uses the same type and amount of plasticizers and stabilizers as the formulation sheet. Confirm that the correct pump is used by the probatcher if a drum or tote is required. The probatcher calls the east pump "STAB PUMP 1" and calls the west pump "STAB PUMP 2".
2. AUTO - Plasticizer weigh-up will be handled by the system when the system is in the "Auto" mode (SW-109 on the blender level control panel). Weigh up can be handled one of two ways in the "Auto" mode:
  - a. Probatcher has the total number of blenders entered. Weigh up sequence will start as soon as the "LO-LEVEL" light on the Plasticizer Heat Tank comes on.
  - b. Probatcher does not have the total number of blenders entered. Operator will initiate a weigh-up sequence by entering an additional blender into the probatcher. The weigh up sequence will not start until the Plasticizer Heat Tank "LO-LEVEL" light is on.
3. MANUAL - Plasticizer weigh up will be handled by the operator when the system is in the "Manual" mode (SW-109 on the blender level Control Panel). The operator must:
  - a. Confirm that the weigh tank discharge valve (SW-101 on the control panel) and the heat tank bypass valve (SW-104 on the blender level control panel) are closed.
  - b. Operate plasticizer fast-feed or slow-feed valves (SW-102 or SW-103 on the blender level Control Panel).
  - c. Open and close required plasticizer valves as needed. The plasticizer weigh bin scale is mounted by the control panel (switches SW-110 through SW-116 on the blender level Control Panel).
  - d. Open and close valves for plasticizers or stabilizers in totes or drums as needed (SW-105, SW-106 on the blender level Control Panel). The two pumps are started automatically when the charge valve for that pump is opened.



## IV. D. Plasticizer Heat-Up

1. AUTO. With the system in the "Auto" mode (SW-109 on the blender level control panel), the plasticizer will be transferred to the heat tank as soon as the weigh-up is complete. The following procedure must be followed to start the heat-up sequence.
  - a. Push the plasticizer heat-up switch (SW-108 on the blender level control panel). This starts the heat tank agitator and the steam to the jacket of the heat tank. The heat tank must have plasticizer in it before heatup can start.
  - b. The plasticizer temperature setpoint is adjusted on the "Heat Tank Temperature Indicator" on the control panel. (TIC-121 on the blender level control panel).
2. MANUAL - With the system in the "Manual" mode (SW-109 on the blender level control panel), the following procedure must be followed to transfer plasticizer from the weigh tank to the heat tank and start the heatup process.
  - a. Confirm that the heat tank is empty (Heat Tank Lo-Level, indicator PL-121 on the blender level control panel).
  - b. Confirm that the Heat Tank By-pass valve and the Heat Tank Discharge valve are closed (switches SW-104 and SW-121C on the blender level control panel).
  - c. Open the weigh tank discharge valve (SW-101 on the blender level control panel) to start transferring plasticizer from the weigh tank to the heat tank.
  - d. Close the weigh tank discharge valve when the weigh tank scale indicator (mounted beside the control panel) gives a zero reading.
  - e. Put the system in the "Auto" mode (SW-109 on the blender level control panel).
  - f. Push the plasticizer heat-up switch (SW-108 on the blender level control panel). This starts the agitator and the steam to the jacket of the heat tank.
  - g. The plasticizer temperature setpoint is adjusted on the "Heat Tank Temperature Indicator" on the blender level control panel.



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## IV. E. Blender Charge

1. Select the blender to be charged. Make sure the "Blender Ready" switch is not on (SW-310 or 300 on the control panel).
2. Turn "Blender Select" switch to the proper blender (SW-125 on the blender level control panel).
3. Connect resin weigh bin to the proper blender (see drawing IV.E.1.).
4. Start the blender agitator (switch SW-301 or SW-302 on the blender level control panel).
5. Start resin transfer by opening resin bin discharge valve (SW-201 on the blender level control panel).
6. Wait for 1000 lbs. of resin to be transferred to the blender (scale indicator is beside the control panel), start plasticizer charge in either the "auto" or "manual" mode.
  - a. AUTO. With the system in the "auto" mode, start the plasticizer charge by pushing the "plasticizer charge" switch (SW-127 on the blender level control panel). The heat tank temperature must be above set point. The system will then:
    - Open heat tank discharge valve
    - Open the blender charge valve
    - Start plasticizer transfer pumps
    - A flow switch will close the heat tank discharge valve when the plasticizer charge is complete.
    - The pumps will be turned off
    - A timed air purge will clear the line from the transfer pumps to the blenders.
    - After a preset amount of time, the air purge will be stopped.
    - The blender charge valves will be closed.
  - b. MANUAL - With the system in the "Manual" mode, the following procedures are required for plasticizer charge to the blenders,
    - Open the heat tank discharge valve (SW-121C on the blender level control panel).
    - Push the "Plasticizer Transfer Pump" switch (SW-121P on the blender level control panel) to start the transfer pump. The pump will only run while the button is depressed.
    - Continue to hold the button depressed for approximately one minute after the heat tank lo-level indicator comes on (PL-121 on the blender level control panel) or until the plasticizer flow finishes.
    - Close the heat tank discharge valve (SW-121C on the blender level control panel) and stop the transfer pump.
    - Start the air purge of the transfer line by opening the air purge valve (SW-124 on the blender level control panel).
    - Keep the air purge valve switch depressed for 90 seconds (SW-124 on the blender level control panel).



## IV. E. 6. b. (Con't.)

- Turn the blender select switch to "OFF" (SW-125 on the blender level control panel).
- 7. Check the blender temperature setpoint on the blender temperature indicators (TIC-301 and TIC-302).
- 8. Close the resin bin discharge valve (SW-201 on the control panel) when the scale indicates the weigh bin is empty.
- 9. Let the contents of the blender mix until the plasticizer is completely absorbed by the resin (until the powder looks dry, approximately 15-30 minutes).
- 10. Add the bagged ingredients after the plasticizer has been completely absorbed by the resin. The following procedure should be followed.
  - a. Determine type and amount of materials needed from the formulation sheet.
  - b. Obtain 3-M air hat and disposable coveralls.
  - c. Turn the blender agitator off SW-301 or SW-302 on the blender level control panel. This is for the operator's safety and to allow any foreign material that is dropped into the blender to be retrieved.
  - d. Add bagged material to the vented dump station. Bagged material includes the ingredients from the color weigh room and any additional bagged ingredients required by the formulation sheet. Be sure to wear the 3-M air hat while handling any bagged material.
  - e. Lay the empty bags down to minimize the amount of dust. Many bags will contain lead compounds and contact with these compounds should be minimized.
  - f. After the bagged ingredients are added, count the empty bags to check that the right amount of each ingredient on the formulation sheet was added.
  - g. Have the cover pulled over the grate while the hand dump station is not in use.
  - h. Start the blender agitator (SW-301 or SW-302 on the blender level control panel).
- 11. Allow the contents of the blender to mix until the setpoint temperature is reached (TIC-301 or TIC-302 on the blender level control panel).
- 12. Take a sample for lab analysis. This sample should be taken from the sample line on the bottom of the blenders. A ram valve allows the material to be sampled.
- 13. Allow blender to mix until lab confirms that blender is within specifications. If blender is not within specifications, see Section IV. F. Blender Adjustments.
- 14. Push "blender ready" button to allow the blender to be used for charging the Banbury (SW-310 or SW-311 on the blender level control panel).



## IV. F. Blender Adjustment

If the blender sample is out of the specification for that compound, the lab will contact the blender operator. The lab will recommend specific adjustments to be made. The recommendations will involve adding more resin if the compound is too "soft" or plasticizer if the compound is too "hard". The following procedures describe how to make the adjustments:

## 1. Resin Addition

a. If the resin weigh bin is empty, put the system in the "Manual" mode (SW-109 on the blender level control panel).

- Confirm the resin weigh bin discharge valve is closed (SW-201 on the blender level control panel).
- Transfer required amount of resin into the weight bin by starting the resin transfer blower (SW-202 on the blender level control panel.)
- Connect the discharge of the weigh bin to the blender needing the adjustment.
- Open the resin weigh bin discharge valve (SW-201 on the blender level control panel).
- When the weigh bin scale (mounted by the control panel) indicates that the weigh bin is empty, close the weigh bin discharge valve (SW-201 on the blender level control panel).
- Allow the blender to mix for fifteen minutes after the resin adjustment.
- Take a sample for lab analysis.
- Allow the blender to mix until the lab confirms that the batch is within specifications.
- If the lab confirms that the batch is within specifications, and the blender temperature is at its setpoint, push the "blender ready" button. (SW-310 or SW-311 on the blender level control panel).
- If the system was in the "Auto" mode before the adjustment was made, put the system back into the "Auto" mode (SW-109 on the blender level control panel).

b. If the resin weigh bin is not empty and both blenders have material in them, the following procedure is used to make a blender adjustment:

- Put the system in the "Manual" mode (SW-109 on the blender level control panel).
- Connect the discharge of the resin weigh bin to the blender needing the adjustment.
- Subtract the amount of the resin adjustment from the amount of resin in the weigh bin (weigh bin scale is mounted by the control panel).
- Open the resin weigh bin and discharge valve (SW-201 on the control panel) and allow resin to enter the blender until the weigh bin scale reads the number calculated in the previous step.



## IV. F. 1. b. (Con't.)

- Close the resin weigh bin discharge valve (SW-201 on the blender level control panel).
- Turn on the resin transfer blower (SW-202 on the blender level control panel) and add resin to the weigh bin until the weigh bin scale reads the amount that was indicated before the adjustment was made.
- If the system was in the "Auto" mode before the adjustment was made, put the system back into the "Auto" mode (SW-109 on the blender level control panel).
- Allow the blender to mix for fifteen minutes after the resin adjustment.
- Take a sample for lab analysis.
- Allow the blender to mix until the lab confirms that the batch is within specifications.
- If the lab confirms that the batch is within specifications and the blender temperature is at its setpoint, push the blender ready button (SW-310 or SW-311 on the blender level control panel).

## 2. Plasticizer Addition

- a. To make plasticizer or stabilizer adjustments, the plasticizer weigh tank must be empty. If the weigh tank is full or in the process of filling, allow the process to continue until the contents of the weigh tank are transferred to the plasticizer heat tank.
- b. Put the system in the "Manual" mode (SW-109 on the control panel.)
- c. Confirm that the weigh tank discharge valve (SW-101 on the blender level control panel) and the heat tank bypass valve (SW-104 on the blender level control panel) are closed.
- d. Open the plasticizer slow feed valve (SW-103 on the blender level control panel). This switch must be held in to keep the valve open.
- e. Add the required amount of plasticizer or stabilizer for the blender adjustment by operating the plasticizer and stabilizer valves (SW-110 through SW-116, SW-105 and SW-106 on the blender level control panel). The plasticizer weigh tank scale (mounted by the control panel) will indicate how much plasticizer or stabilizer has been added.





- IV. F. 2. f. When the correct amount of plasticizers or stabilizers have been weighed up in the plasticizer weigh tank, close the plasticizer slow feed valve (SW-103 on the blender level control panel).
- g. Turn the "blender select" switch to the blender needing the adjustment (SW-125 on the blender level control panel).
- h. Open the heat tank bypass valve (SW-104 on the blender level control panel). The switch must be held in to keep the valve open.
- i. Push the "Plasticizer Transfer Pump" switch (SW-121P on the blender level control panel) to start the transfer pumps. Pumps will only run while the button is depressed.
- j. Continue to depress the transfer pump switch until the plasticizer weigh tank scale indicates that the tank is empty (scale is mounted by the control panel).
- k. Close the heat tank bypass valve (SW-104 on the blender level control panel).
- l. Start the air purge of the transfer line by opening the air purge valve (SW-124 on the blender level control panel).
- m. Close the air purge valve after 90 seconds (SW-124 on the blender level control panel).
- n. Turn the blender select switch to "off" (SW-125 on the blender level control panel).
- o. If the system was in the "Auto" mode before the plasticizer adjustment was made, return the system to the "Auto" mode (SW-109 on the blender level control panel).
- p. Allow the blender to mix for at least fifteen minutes or until the resin mixture looks dry or free of clumps.
- q. Take a sample for lab analysis.
- r. Allow the batch to mix until the lab confirms that the batch is within specifications.
- s. If the lab confirms that the batch is within specifications and the blender temperature is at its setpoint, push the blender ready button (SW-310 or SW-311 on the blender level control panel).



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## IV. G. Banbury Charge and Operation

The Banbury is operated from the first floor control panel. This control panel is along the east wall of the dicer room. The operation of the Banbury is an automated process. The following procedure describes the Banbury charge and operation.

1. Determine if a blender is ready to charge the Banbury. Blender "ready" lights (PL-310 and PL-311 on the control panel) indicate when a blender is ready to charge the Banbury.
2. Confirm that the following items are operating,
  - a. Banbury dust lube pump (SW-408 on control panel).
  - b. Banbury drop gate hydraulic pump (SW-409 on the control panel).
3. Start the Banbury if not already on (SW-401 on the control panel).
4. Start the pig conveyor if not already on (SW-518 on the control panel).
5. Put Banbury in the "Auto" mode (SW-411 on the control panel).
6. Confirm that the roll mill is operating and the rollers are at their temperature setpoint (see section IV.H. Roll Mill Operation).
7. Select the Banbury ram position. There is a Banbury ram first position switch (SW-412B on the control panel) and a Banbury ram second position switch (SW-412C on the control panel). These switches control the ram down position. The switches have two positions, low and high. The ram down low selection forces the Banbury ram to its lowest position and heats the preblend the fastest. The ram down high selection does not force the Banbury ram as low and will heat the preblend at a slower rate. The high and low position for the Banbury ram can be used to coordinate the amount of fused material sent to the roll mill by controlling how fast the Banbury can fuse the preblend.

There are two Banbury ram position switches, first position and second position. The Banbury ram goes through a timed cycle:

- First position, (ram down high or low, SW-412B) 5 minutes.
- Ram up, 5 seconds.
- Ram float, 10 seconds.
- Second Position, (ram down high or low, SW-412C) 3 minutes.

At any point in the cycle, if the setpoint temperature is reached on the Banbury, the sequence will be stopped and the fused material dropped to the pig conveyor.



- IV. G. 7. Select the high or low position on the "Banbury Ram First Position" switch (SW-412B on the control panel). The heatup time for the preblend is not expected to exceed the first position timed cycle. The capability of having a longer two stage heatup time was installed for future use.
8. Confirm that the weigh controller has the correct Banbury charge weight entered. The charge weight is displayed in the upper left hand corner of the weigh controller (mounted by the control panel). The charge weigh may be changed by pressing the push buttons above and below each digit in the display.
9. Confirm that the Banbury temperature setpoint is correct (TIC-401 Banbury Temperature Indicator on the control panel).
10. Start the weigh up process by pushing the "Preblend Weigh up" switch (SW-303) then press the open switch for the blender discharge valve for the blender to be used (SW-307 or SW-308 on the control panel). The automated system will operate all of the following:
- Selected blender discharge valve
  - Preblend feeder
  - Preblend weigh hopper scale
  - Preblend weigh hopper discharge valve
  - Banbury charge door
  - Banbury ram
  - Banbury drop gate
- If the banbury does not receive a charge when the weight setpoint has been reached, open and close the Banbury drop gate (SW-404). This will start a new cycle.
11. Monitor the weight of each Banbury charge (Preblend weigh hopper scale mounted by the control panel). If a charge is short, the Banbury may not be able to fuse the material. If a short batch is weighed up, more preblend can be added by manually operating the blender discharge valve (SW-307 or SW-308 on the control panel). These valves are intended for isolated short batches. If the Banbury batches are consistently short, adjust the weight entered in the weight controller. The automatic system will not let a batch below the setpoint charge the Banbury.
12. Monitor the amount of preblend in the blenders by one of two ways:
- Blender current indicators (II-301 and II-302 on the control panel). The indicators give the percent current drawn by the blender agitator motor. As the blender empties, the percent current will reduce.
  - Monitor the number of Banbury batches charged from that blender. The Banbury temperature recorder (TR-401 on the control panel) will record the Banbury cycles.
13. Monitoring the blenders will give an indication when the blenders will be empty. A blender is known to be empty when the "Preblend Feeder" indicator (PL-301 or PL-302 on the control panel) signals that the feeder is operating, but the preblend weigh hopper scale indicates that the weight in the hopper is not changing. The preblend feeder run time alarm



(AAT 301/2 on the control panel) indicates that the weigh bin has not reached the setpoint weight with the feeder running for three minutes. This might indicate that the blender is empty.

14. When a blender is emptied, inform the blender operator so he can take the blender out of the "ready" mode (SW-310 and SW-311 on the blender level control panel).
15. When a blender is emptied and another blender is not ready, stop the preblend weigh-up (SW-303 on the control panel). If there is another blender available, press the open switch for the other blender discharge valve (SW-307 or SW-308). The new blender will start where the old one left off.

- IV. G. 16. The following procedure should be followed when charging a batch to the Banbury when the Banbury is cold.
  - a. Allow one batch of preblend to be weighed up.
  - b. Allow that batch to be charged to the Banbury.
  - c. As soon as the charge is complete, stop the preblend weighup (SW-303 on the first floor control panel).
  - d. If the batch does not fuse, the following sequence will add more preblend to the Banbury.
    - Set the weigh scale at the desired weight for the preblend addition.
    - Start the preblend weigh-up process (SW-303 on the first floor control panel) and open the correct blender discharge valve (SW-307 or SW-308).
    - When the weighup is complete, turn the Banbury to the "CLEANOUT" mode (SW-411 on the first floor control panel).
    - Manually raise the ram (SW-412A on the first floor control panel). This switch should normally be left in the Off position.
    - Reset the timer for the first position by pressing the first position switch to "OFF" (SW-412B on the first floor control panel). Then press the "HIGH" or "LOW" position switch for the ram's first position (SW-412B on the first floor control panel).
    - Switch the Banbury to the "AUTO" mode (SW-411 on the first floor control panel). The batch in the weigh scale should then be charged to the Banbury. The timer was reset so a new cycle will begin. If the batch in the Banbury fuses, reset the weigh scale to the appropriate amount. If the batch in the Banbury does not fuse, repeat procedure 16.d.
  - e. Restart the weigh up process after the batch fuses.
17. The Banbury may be stopped at any point in the sequence by turning the "auto/cleanout" switch to "cleanout" (SW-411 on the control panel). When the switch is returned to "Auto", the sequence will begin where it was stopped. The "cleanout" switch opens the charge door and puts the ram in the "float" position.



## IV. H. Roll Mill Operation

The roll mill is operated from the first floor control panel used by the Banbury. The following procedure describes the roll mill operation:

1. Confirm roll mill lube pump is on (SW-514 on the control panel).
2. Confirm that the roll mill is operating (SW-501 on the control panel).
3. Confirm that the east roll and west roll are at their temperature setpoints. (TIC-502 and TIC-503 temperature indicators on the control panel). The compound shift supervisor should know the proper temperatures.
4. When the rollers are on temperature the pig conveyor can start supplying the "Pigs" or fused material to the top of the roll mill.
5. The fused material will stick to the west roll where further blending will take place. When the first pig gets to the roll mill when there is no material on the mill, the operator has to reach under the mill to start the material around the west roller. (Use protective gloves.)
6. Start the mill plow transferring material from the feed side of the roll mill to the discharge side of the roll mill after the feed side has a uniform covering on the west roller. This allows further blending of the material.
7. The roll mill has a safety switch to stop the mill. The safety switch is a string approximately seven feet high. The string extends the length of the roll mill on the west side. The safety switch will stop the roll mill. There is also a reverse switch for the rollers (SW-503 on the control panel). This switch will turn the roll mill in the reverse direction as long as the button is depressed.
8. Two 9" ribbons can be taken off the discharge side of the roll mill. Knives are used to adjust the width. The width of the ribbons are used to adjust the amount of material taken off the roll mill.
9. The ribbons are fed over a motorized roller to a cooling water trough. The motorized roller has a variable speed controller mounted on the dicer room wall by the control panel. The ribbons make several passes through the first cooling trough before going through the second motorized pull roller into the dicer room. The control for the second variable speed pull roller is on the east wall inside the dicer room.
10. The ribbons are allowed to cool in the second cooling trough before being diced. The water chiller should be used to adjust the temperature of the water in the troughs.
11. Hang the end of the belt over the side of the second cooling trough.



## IV. I. Dicers and Screeners

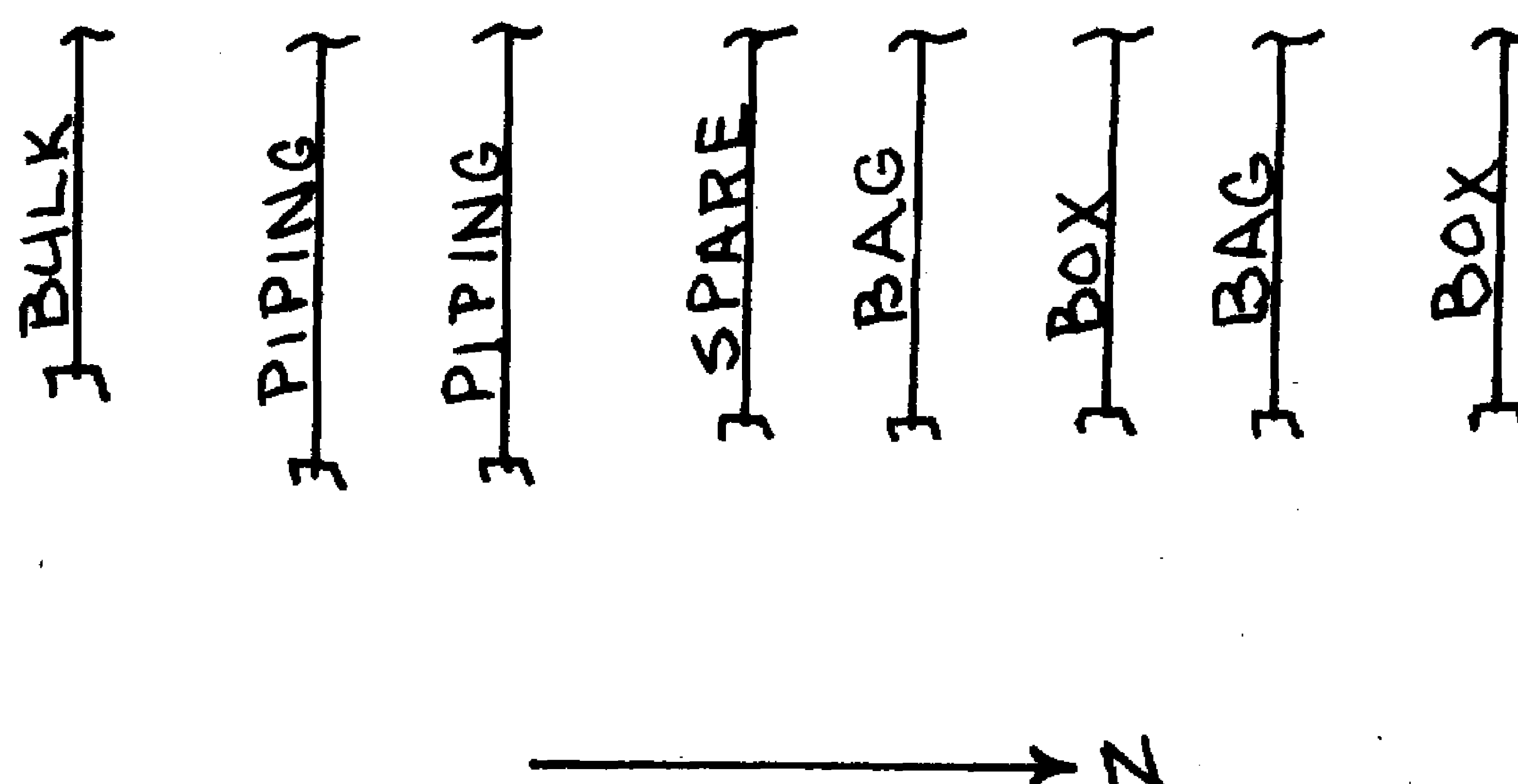
The dicers, screeners, and blowers are controlled by a panel in the dicer room (see drawing IV.I.1). Ear protection is required in the dicer room. The following procedure describes dicer operation:

1. Connect the blower(s) at the base of the screeners to the appropriate transfer line(s). There are two transfer lines for the boxing hopper, two for the bagger, and one to the bulk silos (see drawing IV.I.2). The schedule for Line 1 should state how the particular product is being shipped.
2. If the product is being sent by railcar or truck, ask the shift supervisor which bulk silo to use. One blower is used for both dicers going to the bulk silos. The proper hose connection must also be made at the bulk silos (see drawing IV.I.3.).
3. Turn selector switch (SS-1 on the dicer control panel) to the desired dicer(s).
4. Push the vacuum pump start switch (VP-501 and/or VP-502 on the dicer control panel). This starts the water to the vacuum pumps and starts the pumps if the pressure is adequate.
5. Push the dicer start switches (from the dicer control boxes). These switches start the screeners, the star valves, and the dicers if the dicer covers are closed. The dicers will not operate if the vacuum pumps are not pulling a vacuum.
6. Turn the air valve on for the air wipe. Do not try to dice material with the air wipe off.
7. Allow the ribbon to cool approximately one minute in the second cooling trough before being fed to the dicers.
8. Thread the ribbon through the air wipe and vacuum wipe for the particular dicer.
9. Pull approximately six feet of ribbon through the air and vacuum wipes. Do not let the ribbon touch the floor and become contaminated.
10. Feed the ribbon into the dicer by putting the ribbon under the guide roll and pressing the green button on the dicer to start dicing the ribbon. The variable speed dicers are controlled from the dicer control boxes. The lower left knob of each box controls the dicing speed.
11. The water chiller is also started from the dicer control panel. Monitor the temperature of the cooling water and make adjustments as necessary.



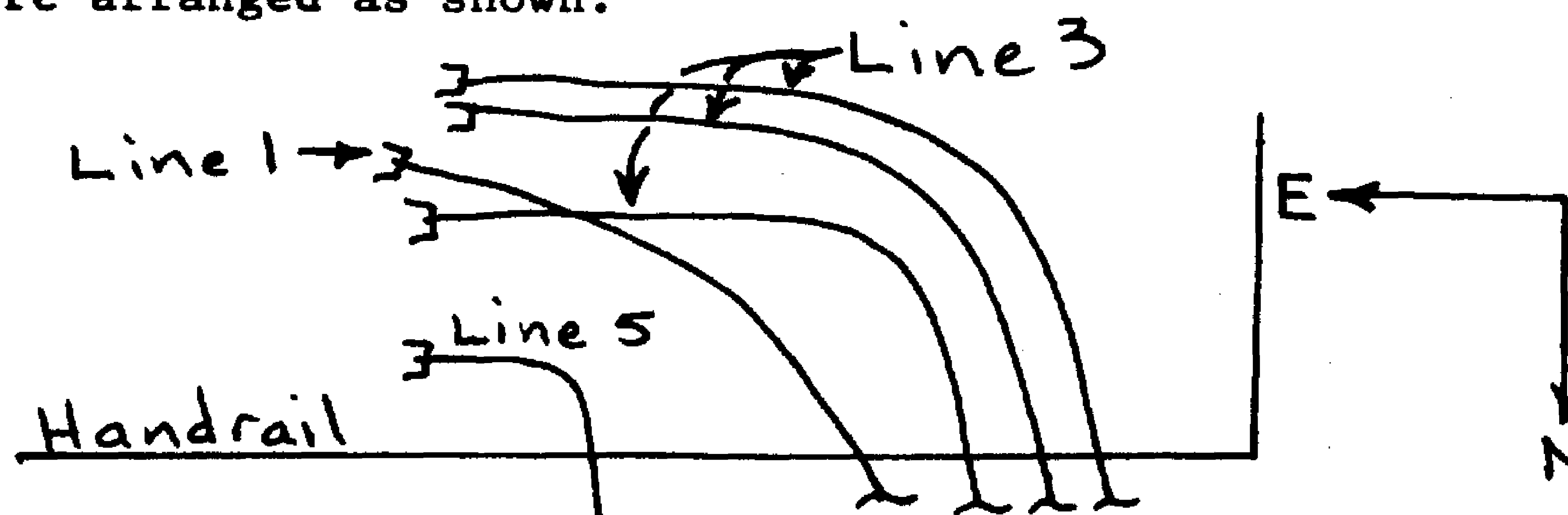
IV. I. 2. Dicer Room Hose Connections

The hose connections for the bulk, boxing, and bagging silos are on the east wall of the dicer room. They are arranged as shown:

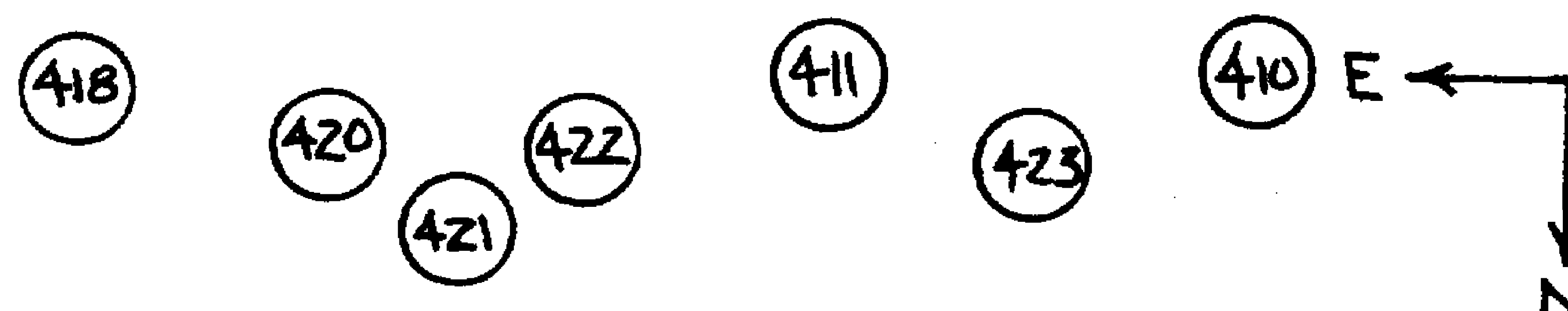
IV. I. 3. Bulk Silo Hose Connections

The hose connections for the three compound lines are on the north side of the silo platform. The lines going to the silos are labeled, the lines coming from the compound lines are not.

From the top view looking down, the incoming transfer lines are arranged as shown:



From the bottom view looking up, the transfer lines going to the specific silos are as shown:



The shift supervisor will know which silo is to be used for each product.



## V. Product Change Procedures

### A. Blender

1. Put the blender control panel in the "Manual" mode (SW-109 on the blender level control panel).
2. Make sure blenders are not in the "Ready" mode (SW-310 and SW-311 on the blender level control panel).
3. Stop the blender agitators (SW-301 and SW-302 on the blender level control panel).
4. Cut the blender breaker off and lock out (Follow the "lock-out procedure including lockout tags).
5. Put goggles and gloves on when making a product change.
6. Hook up vacuum hose. Use vacuum when cleaning instead of plant air.
7. Vacuum top of blender lids.
  - a. Vacuum everything off lids, inside of charge hood, and charge grating.
  - b. Clean blender from top/down.
8. Disconnect resin chute from blender lid. The lid will not open all the way if the chute is connected.
9. Raise all blender lids.
10. Scrape blender lid, walls, and ribbon.
  - a. Scrape all material you can off walls, ribbon and lids before vacuuming the blender out.
  - b. Turn the ribbon with long handle scraper. Get help if needed.
  - c. Do not get into the blender.
11. Clean exhaust line.
  - a. Hit lightly on exhaust line to knock off dust.
  - b. Hit back of blender above plasticizer line, knock and scrape anything you can down.
  - c. Do not hit ductwork too hard.
12. Wipe the lids down with rags until clean.
13. Wipe down ribbon and walls with rags.
  - a. Turn ribbon as needed.
  - b. Clean plasticizer charge line.
  - c. Look for anything that might cause contamination.
14. Vacuum all material out of the blender until it is clean.
15. Call your supervisor to inspect.
16. Lower blender lids
17. Take lock off breaker
18. Turn breaker on and remove lockout tags.



## V. B. Preblend Feeders and Weigh Bin

1. Make sure preblend is not being fed to the Banbury (SW-303 on the first floor control panel).
2. Cut the feeder breakers off and lock out.
3. Clean line connecting blenders and preblend feeders by lightly hitting sides of line.
4. Remove the rubber hose connection connecting the line to the preblend feeders.
5. Disassemble the feeder housing around the screws.
6. Scrape down the sides of the feeder and the screw.
7. Vacuum the feeder.
8. Wipe down the feeder walls and screw with rags.
9. Replace the top of the preblend feeder and reconnect the flexible hose connection.
10. Remove the magnets in between the preblend feeder and the weigh bin.
11. Wipe down the magnets with rags.
12. Lightly hit the connecting preblend feeder to the magnet housing.
13. Vacuum magnet housing.
14. Wipe down the magnet housing.
15. Replace magnets.
16. Lightly hit the line connecting the magnet housing and the preblend weigh bin.
17. Open the top of the preblend weigh bin.
18. Scrape any material from the weigh bin.
19. Vacuum the inside of the weigh bin.
20. Wipe down the inside of weigh bin with rags.
21. Close the top of the weigh bin.
22. Lightly hit the chute connecting the weigh bin to the Banbury.
23. Open ram valve on sample line. Allow any material to fall into a bucket.
24. Unlock the breakers and turn them on.

## C. Banbury

1. Turn the Banbury off (SW-401 on the first floor control panel). The following things will occur:
  - Banbury motor is stopped
  - Drop gate is opened
  - Charge door is opened
  - Ram is in the float position
2. Turn the Auto/Cleanout switch to "CLEANOUT" (SW-411 on the first floor control panel). This enables the Banbury ram manual switch. Switch SW-412A can now control the Banbury ram position.
3. Turn the belt conveyor off (SW-518 on the control panel).
4. Open the vent hood for the Banbury charge door.
5. Lower the Banbury ram (SW-412A on the first floor control panel). The inside of the Banbury may be cleaned when the ram is down.



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- V. C.
6. Put gloves and goggles on for a product change.
  7. Scrape the walls and top down
  8. Vacuum the sides, top, charge door, and vent hood.
  9. Wipe the sides, top, charge door, and vent hood with rags.
  10. Raise Banbury ram (SW-412A on the first floor control panel).
  11. Scrape and clean ram and the bottom of the charge door.
  12. Vacuum up all dust around the Banbury.
  13. Clean the Banbury seals using plant air.
  14. Clean in and around the drop gate; hydraulic cylinder on gate lock, clean chute under the gate.
  15. Sweep up around Banbury.
  16. Call the compounder and supervisor to inspect before start-up.

D. Belt Conveyor

1. Turn the belt conveyor on (SW-518 on the first floor control panel).
2. Using process water, wash the conveyor belt until clean.
3. Wash the rollers on the conveyor belt.
4. Rinse the conveyor belt again.
5. Sweep up around belt conveyor.

E. Roll Mill

1. Pull safety switch to stop roll mill (safety switch is a string approximately head high). This will stop the roll mill and serves as a test of the safety switch.
2. Put gloves and goggles on.
3. Clean inside and outside of mill hood.
4. Clean pan under rollers.
5. Clean cross bar, mill plow, and knives. Clean all material off ends of mill roll.
6. Wipe mill roll down with rags.
7. Call compounder or supervisor to inspect mill before start-up.
8. Start mill. (SW-501 on first floor control panel).

F. Dicers and Screeners

1. Lock out the dicers, sifter, and star valves (Dicers DI-501 and DI-502). Follow lock-out procedures and put a tag on the start switch (start switches on the dicer control panel).
2. Put gloves and goggles on.
3. Disconnect the chute connecting the dicer and sifter.
4. Take the sifter top off. Handle top carefully.
5. Remove screen and pan. Also handle the screen carefully.



- V. F. 6. Clean dicer blades.
- a. Open the blade cover
  - b. Rotate the dicer blades with your hand and use air to blow pellets from between blades and from around urger rollers. Watch for pinch points.
7. Clean urger rollers by vacuuming under the urger roller plate and then using air to clean remaining pellets from urger roller.
  8. Remove star valve boot from star valve (boot may be left on sifter).
  9. Vacuum all pellets from bottom of sifter.
  10. Clean the star valves by vacuuming. Some pellets may be wedged between blades and star valve housing.
  11. Clean the transfer lines by disconnecting the lines and checking couplings and flexible lines for pellets.
  12. Hook up the transfer lines to the blowers.
  13. Turn the product blower(s) on (B-501, B-502 or B-503 on the dicer control) and blow through all the lines (two lines to the boxing silo, two lines to the bagging hopper, and one line to the bulk silo).
  14. Turn the blower(s) off after the lines are cleaned.
  15. Clean sifter screen and check for holes.
  16. Call your compounder or supervisor to inspect the sifter before putting sifter back together.
  17. After the sifter has been inspected, put the pan, screen, and top back on the sifter.
  18. Connect the chute from the dicer to the sifter.
  19. Unlock the dicers, star valves, and sifters. Take locks and tags off.
  20. Clean the dicer house by sweeping and vacuuming. Do not blow pellets in under sifter, dicer, platform or water tank.
  21. Clean blower filters with air.
  22. Clean blower relief valves by vacuuming loose pellets out of relief ports.

G. Boxing and Bagging Hoppers

1. Put on goggles and gloves.
2. Drop the doors on both hoppers. Both hoppers must be cleaned on each product change.
3. Pull the magnet out of bagging hopper.
4. Drop the bottom on the bagging hopper.
5. Go up on the roof. Walk on the walkways.
6. Clean the lines going into the top of the hoppers.
7. Go back downstairs. Again walk on the walkways when on the roof.
8. Clean the magnet
9. Use a rubber mallet to clean the hoppers. Use plant air if necessary.
10. Call the compounder or supervisor to inspect the hoppers before putting them back together.
11. Put magnets in back in the bottom of the bagging hopper.





- V. G. 12. Fasten up the doors on the hoppers. Tape may be required around the doors to keep them from leaking.
13. Clean the pinch tube and the bottom of the bagger with the vacuum.
14. Fasten up the back of the bagging hopper.
15. Clean area around bagger, scales, and boxing hopper.

#### H. Pellet Cleanout

For certain product changes, a more extensive cleaning is required. Cleanout pellets are added to the blenders and run through the entire compound line. Typical product changes that require pellet cleanout are changing from a dark color compound to a light color compound and changing from a compound that contains a large amount of filler to a compound that contains a small amount of filler. Check with the shift supervisor to determine if the product change requires running the cleanout material. If cleanout material is required, the following procedure should be followed:

1. Follow normal product change procedures (section V., parts A through G).
2. Add bagged cleanout pellets to the blenders.
3. Allow the blenders to mix for twenty minutes.
4. Run the pellets through the compound line as if it were a normal product. Transfer the pellets to the bagging silo.
5. When completed, bag the cleanout material in the bagging silo.
6. Repeat the normal product change procedures (Section V., parts A through G). The equipment that handles the preblend powder should be essentially free of powder. Repeating the product change procedures will not be as time consuming.
7. Call the shift supervisor to inspect the line.



## VI. Alarm Definitions

### A. Blender Floor Control Panel Alarms

1. "Plasticizer Weigh Tank, T-101 Level High": This alarm indicates a high level in the plasticizer weigh tank. The alarm does not stop flow to the weigh tank. If the alarm is activated during an automated weigh-up, press the "STOP" touchswitch on the side of the operating screen. If the alarm is activated during a manual weigh-up, stop the flow to the weigh tank.
2. "Plasticizer Heat Tank T-121 Temperature High": This alarm indicates a high temperature in the plasticizer heat tank. This signal should also turn off the steam supply to the heat tank jacket. The operator should check the heat tank temperature controller (TIC-121 on the control panel) to see if the setpoint temperature is correct and if the temperature is high. If the temperature is high, the operator should confirm that the steam supply to the heat tank jacket is turned off (PL-123A & B on the control panel).
3. "B Ribbon Blender, BL-302 Temperature High": This alarm indicates a high temperature in the "B" ribbon blender. This signal should also turn off the steam supply to the blender. The operator should check the blender temperature controller (TIC-302 on the control panel) to see if the setpoint temperature is correct and if the temperature is high. If the temperature is high, the operator should confirm that the steam supply to the blender is turned off (PL-302 A & B on the control panel).
4. "A Ribbon Blender, BL-301 Temperature High": This alarm indicates a high temperature in the "A" ribbon blender. The response should be similar to the response for "B" ribbon blender. The temperature controller for "A" blender is TIC-301 while the steam valve indicator is PL-301 A&B.
5. "PLC-101 Trouble": This alarm indicates that the modicon for the blender level control panel is not operating. The system should be switched to manual (SW-109 on the control panel). The shift supervisor should be notified. All of the weigh up steps will have to be made in the manual mode while the modicon is not operating.

### B. First Floor Control Panel Alarms

1. "PLC-301 Trouble": This alarm indicates that the modicon for the first floor control panel is not operating. The preblend weigh up should be stopped (SW-303 on the control panel). The shift supervisor should be notified.
2. "Dicer Number 1, DI-501" and "Dicer Number 2, DI-502": These alarms indicate the status of the two dicers. Both dicers should be operating at the same time since two ribbons will be taken off the roll mill. The operation of the dicers should be investigated if only one dicer is operating.



- VI. B.
3. "Banbury Mixer, MX-401, Temperature High": This alarm indicates that the batch in the Banbury is overheating. The operator should check the Banbury setpoint temperature and the actual temperature (TIC-401 on the control panel). If the temperature in the Banbury is high, the Banbury drop gate should be opened (SW-404 on the control panel) to get the hot material out of the Banbury.
  4. "Banbury Lubricator Low Level": This alarm indicates that the Banbury Lubricator system has a low level. The operator should add more lubricator to the system.
  5. "Transformer Trouble": This alarm indicates a problem in the transformer. The operator should notify the shift supervisor immediately. An emergency work order should be issued to determine the cause of the alarm.
  6. "Banbury Lubricator Inoperative": This alarm signals that the lubrication system for the Banbury has not cycled for 130 minutes. The system should cycle each time the Banbury drop gate opens. The operator should check the lubricator level and also look for leaks.
  7. "Banbury Lubricator Pressure High": This alarm indicates that the lubricator pressure is high. The operator should check for line pluggage.
  8. "Product Blower B-501", "Product Blower B-502", and "Product Blower (Silo) B-503": These alarms indicate which blowers are operating. If both dicers are operating, either blower B-503 should be one, or both blowers B-501 and B-502. B-503 blows air to the bulk silo while B-501 and B-502 blow to the bagging and boxing silos.
  9. "Preblend Feeder Run Time, AAT-301/2": This alarm indicates that the preblend feeder for either blender A or B has run 3 minutes without reaching the set point weight. This might indicate that the blender is empty.
  10. "Banbury Mixer Hydraulic Oil Cooler Outlet Temperature High": This alarm indicates that the hydraulic oil for the Banbury drop gate has a high temperature. The operator should check the temperature of the oil leaving the cooler. If the temperature is high, the cooling water flow rate should be adjusted.
  11. "Banbury Mixer Hydraulic Oil Cooler Outlet Temperature Low": This alarm indicates that the hydraulic oil for the Banbury drop gate has a low temperature. The operator should check the temperature of the oil leaving the cooler. If the temperature is low, the cooling water flow rate should be adjusted.
  12. "Roll Mill Lubrication Oil Pressure High": This alarm indicates that the lubrication oil pressure downstream of the filters and cooler is high. The operator should check the pressure gauge downstream of the filter to determine if the pressure is high. If the pressure is high, the operator should check the flow through the rotometers to determine if the flow is obstructed.

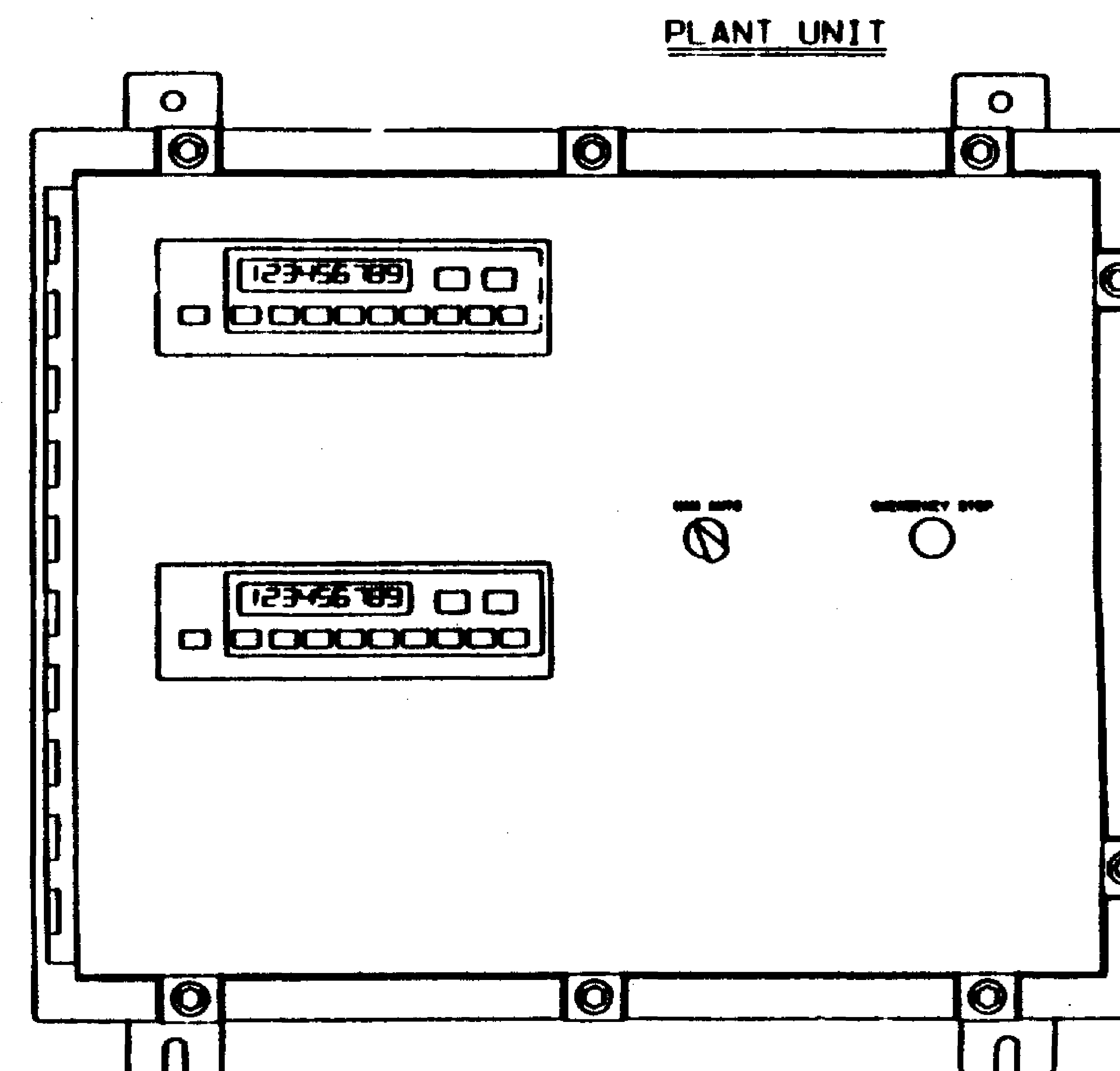
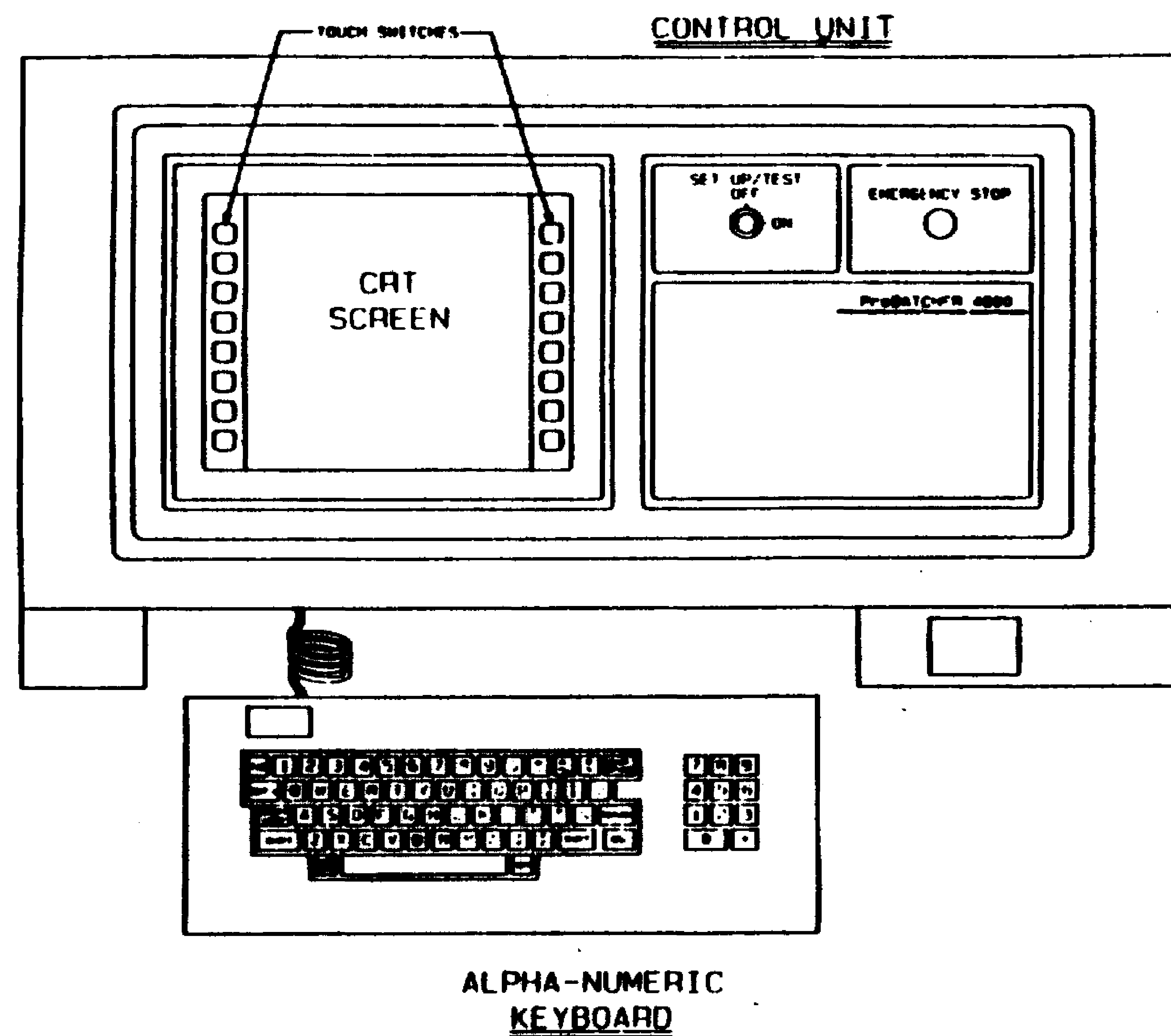


- VI. B. 13. "Roll Mill Lubrication Oil Pressure Low": This alarm indicates that the lubrication oil pressure downstream of the filters and cooler is low. The operator should check the pressure gauge downstream of the filter to determine if the pressure is low. If the pressure is low, the operator should check the oil level in the oil tank and the pressure drop across the oil filters. Low oil pressure is a shutdown trip for the roll mill.
14. "Roll Mill Lubrication Oil Temperature High": This alarm indicates that the roll mill lubrication oil has a high temperature. The oil cooler on the north side of the roll mill should be checked.
15. "Roll Mill Lubrication Oil Flow Rate Low": This alarm indicates that the roll mill is not getting enough oil. The level in the oil tank needs to be checked. Line pluggage should also be checked.





# DRAWING IV. A.1.-1.





DRAWING IV. A.1.-2.

STANDBY SCREEN

| * STANDBY *              |         | * STANDBY * |         |
|--------------------------|---------|-------------|---------|
| <input type="checkbox"/> | OPERATE |             | OPERATE |
| <input type="checkbox"/> |         |             |         |
| <input type="checkbox"/> |         |             |         |
| <input type="checkbox"/> |         |             |         |
| <input type="checkbox"/> |         |             |         |
| <input type="checkbox"/> |         |             |         |
| <input type="checkbox"/> |         |             |         |
| <input type="checkbox"/> |         |             |         |
| <input type="checkbox"/> |         |             |         |
|                          |         |             |         |

TIME



## STANDBY SCREEN

\* STANDBY \*

OPERATE

10

TIME



DRAWING IV. A.1.-4.

| MAIN OPERATE SCREEN      |                    |                                  |
|--------------------------|--------------------|----------------------------------|
|                          | * OPERATE *        | * STANDBY *                      |
| <input type="checkbox"/> | SELECT<br>FORMULA  | OPERATE <input type="checkbox"/> |
| <input type="checkbox"/> | FORMULA<br>NAMES   | <input type="checkbox"/>         |
| <input type="checkbox"/> |                    | <input type="checkbox"/>         |
| <input type="checkbox"/> | MANUAL<br>CONTROL  | <input type="checkbox"/>         |
| <input type="checkbox"/> | RESUME<br>BATCHING | <input type="checkbox"/>         |
| <input type="checkbox"/> | CANCEL<br>BATCHING | <input type="checkbox"/>         |
| <input type="checkbox"/> |                    | <input type="checkbox"/>         |
| <input type="checkbox"/> | STANDBY            | <input type="checkbox"/>         |
|                          |                    |                                  |
| TIME                     |                    |                                  |



# DRAWING IV. A. 1.-5.

| PAGE N OF N *FORMULA NAMES* |                      | *STANDBY*                        |
|-----------------------------|----------------------|----------------------------------|
| <input type="checkbox"/>    | NEXT PAGE            | OPERATE <input type="checkbox"/> |
| <input type="checkbox"/>    | PREVIOUS PAGE        |                                  |
| <input type="checkbox"/>    | No. FORMULA NAME     |                                  |
| <input type="checkbox"/>    | ANNN XXXXXXXXXXXXXXX |                                  |
| <input type="checkbox"/>    | :                    |                                  |
| <input type="checkbox"/>    | :                    |                                  |
| <input type="checkbox"/>    | :                    |                                  |
| <input type="checkbox"/>    | :                    |                                  |
| <input type="checkbox"/>    | EXIT                 | <input type="checkbox"/>         |
| TIME                        |                      | <input type="checkbox"/>         |



2

|                          | * OPERATE *                          | * STANDBY * |
|--------------------------|--------------------------------------|-------------|
| <input type="checkbox"/> | SELECT FORMULA                       | OPERATE     |
| <input type="checkbox"/> | FORMULA ANNN XXXXXXXX<br>BATCHES NNN |             |
| <input type="checkbox"/> | (GRAPHICS)                           |             |
| <input type="checkbox"/> |                                      |             |
| <input type="checkbox"/> |                                      |             |
| <input type="checkbox"/> |                                      |             |
| <input type="checkbox"/> |                                      |             |
| <input type="checkbox"/> | START                                |             |
| <input type="checkbox"/> | EXIT                                 |             |
|                          | TIME                                 |             |



DRAWING IV. A.1.-7.

FORMULA MAKE-UP DURING OPERATE

| PAGE N OF N *FORMULA MAKE-UP* |                       | *STANDBY*                        |
|-------------------------------|-----------------------|----------------------------------|
| <input type="checkbox"/>      | NEXT PAGE             | OPERATE <input type="checkbox"/> |
| <input type="checkbox"/>      | PREVIOUS PAGE         | <input type="checkbox"/>         |
| <input type="checkbox"/>      | FORMULA ANNN XXXXXXXX | <input type="checkbox"/>         |
| <input type="checkbox"/>      | BATCH PROGRAM         | <input type="checkbox"/>         |
| <input type="checkbox"/>      | (AREA 2)              | <input type="checkbox"/>         |
| <input type="checkbox"/>      |                       | <input type="checkbox"/>         |
| <input type="checkbox"/>      |                       | <input type="checkbox"/>         |
| <input type="checkbox"/>      |                       | <input type="checkbox"/>         |
| <input type="checkbox"/>      | EXIT                  | <input type="checkbox"/>         |
| TIME                          |                       |                                  |



|                          | * OPERATE *                               | * STANDBY * |
|--------------------------|-------------------------------------------|-------------|
| <input type="checkbox"/> | FORMULA ANNN XXXXXXXX                     | OPERATE     |
| <input type="checkbox"/> | BATCH NNN OF NNN                          |             |
| <input type="checkbox"/> | STEP NN OF NN XXXXXX                      |             |
| <input type="checkbox"/> |                                           |             |
| <input type="checkbox"/> | ALTERNATE<br>DISPLAY           (GRAPHICS) |             |
| <input type="checkbox"/> |                                           |             |
| <input type="checkbox"/> | INTERRUPT<br>BATCH                        |             |
| <input type="checkbox"/> |                                           |             |
| <input type="checkbox"/> | STOP                                      |             |

TIME



# DRAWING IV. A. 1-9.

## INTERRUPT OPERATOR CHOICES

| *OPERATE*                |                  | *STANDBY*                                                         |         |
|--------------------------|------------------|-------------------------------------------------------------------|---------|
| <input type="checkbox"/> | SUSPEND BATCHING | FORMULA ANNN XXXXX<br>BATCH NNN OF NNN INTER<br>STEP NN OF NN END | OPERATE |
| <input type="checkbox"/> |                  |                                                                   |         |
| <input type="checkbox"/> |                  |                                                                   |         |
| <input type="checkbox"/> |                  |                                                                   |         |
| <input type="checkbox"/> | RESUME BATCHING  |                                                                   |         |
| <input type="checkbox"/> | CANCEL BATCHING  |                                                                   |         |
| <input type="checkbox"/> |                  |                                                                   |         |
| <input type="checkbox"/> |                  |                                                                   |         |
|                          |                  |                                                                   |         |

TIME



|                          | * OPERATE * |                                           | * STANDBY * |                          |
|--------------------------|-------------|-------------------------------------------|-------------|--------------------------|
| <input type="checkbox"/> |             |                                           |             | <input type="checkbox"/> |
| <input type="checkbox"/> | START       | FORMULA ANNN XXXXXXXX<br>BATCH NNN OF NNN | OPERATE     | <input type="checkbox"/> |
| <input type="checkbox"/> |             |                                           |             | <input type="checkbox"/> |
| <input type="checkbox"/> |             | (GRAPHICS)                                |             | <input type="checkbox"/> |
| <input type="checkbox"/> |             |                                           |             | <input type="checkbox"/> |
| <input type="checkbox"/> |             |                                           |             | <input type="checkbox"/> |
| <input type="checkbox"/> |             |                                           |             | <input type="checkbox"/> |
| <input type="checkbox"/> | EXIT        |                                           |             | <input type="checkbox"/> |
|                          |             | TIME                                      |             |                          |





| * STANDBY *              |         | * STANDBY * |                          |
|--------------------------|---------|-------------|--------------------------|
| <input type="checkbox"/> | OPERATE |             | <input type="checkbox"/> |
| <input type="checkbox"/> | SETUP   |             | <input type="checkbox"/> |
| <input type="checkbox"/> | TEST    |             | <input type="checkbox"/> |
| <input type="checkbox"/> |         |             | <input type="checkbox"/> |
| <input type="checkbox"/> |         |             | <input type="checkbox"/> |
| <input type="checkbox"/> |         |             | <input type="checkbox"/> |
| <input type="checkbox"/> |         |             | <input type="checkbox"/> |
| <input type="checkbox"/> |         |             | <input type="checkbox"/> |
| <input type="checkbox"/> |         |             | <input type="checkbox"/> |
| TIME                     |         |             |                          |



# DRAWING IV. A.2.-2.

## MAIN SETUP SCREEN

| * SETUP *                |                     | * STANDBY * |                          |
|--------------------------|---------------------|-------------|--------------------------|
| <input type="checkbox"/> | SYSTEM FEATURES     | OPERATE     | <input type="checkbox"/> |
| <input type="checkbox"/> | FORMULA FEATURES    |             | <input type="checkbox"/> |
| <input type="checkbox"/> | INGREDIENT FEATURES |             | <input type="checkbox"/> |
| <input type="checkbox"/> | INVENTORY FEATURES  |             | <input type="checkbox"/> |
| <input type="checkbox"/> | MEMORY CARTRIDGE    |             | <input type="checkbox"/> |
| <input type="checkbox"/> |                     |             | <input type="checkbox"/> |
| <input type="checkbox"/> |                     |             | <input type="checkbox"/> |
| <input type="checkbox"/> | STANDBY             |             | <input type="checkbox"/> |
|                          |                     |             |                          |

TIME



| *SYSTEM FEATURES*        |                             | *STANDBY*                        |
|--------------------------|-----------------------------|----------------------------------|
| <input type="checkbox"/> | OPERATE SECURITY XXXXXXXXXX | OPERATE <input type="checkbox"/> |
| <input type="checkbox"/> | EMPTY TOLERANCE NNNN        | <input type="checkbox"/>         |
| <input type="checkbox"/> | CLOCK NN:NN<br>NN XXX NN    | <input type="checkbox"/>         |
| <input type="checkbox"/> |                             | <input type="checkbox"/>         |
| <input type="checkbox"/> |                             | <input type="checkbox"/>         |
| <input type="checkbox"/> |                             | <input type="checkbox"/>         |
| <input type="checkbox"/> |                             | <input type="checkbox"/>         |
| <input type="checkbox"/> |                             | <input type="checkbox"/>         |
| <input type="checkbox"/> | SETUP                       | <input type="checkbox"/>         |

TIME



12

| * FORMULA FEATURES *     |                    | * STANDBY * |
|--------------------------|--------------------|-------------|
| <input type="checkbox"/> | FORMULA NO. & NAME | OPERATE     |
| <input type="checkbox"/> | FORMULA NAMES      |             |
| <input type="checkbox"/> |                    |             |
| <input type="checkbox"/> |                    |             |
| <input type="checkbox"/> |                    |             |
| <input type="checkbox"/> |                    |             |
| <input type="checkbox"/> |                    |             |
| <input type="checkbox"/> | SETUP              |             |
| TIME                     |                    |             |



# DRAWING IV. A.2.-5.

## FORMULA FEATURES SCREEN DURING SETUP

| * FORMULA FEATURES *     |                      | * STANDBY * |                          |
|--------------------------|----------------------|-------------|--------------------------|
| <input type="checkbox"/> | FORMULA NO. & NAME   | OPERATE     | <input type="checkbox"/> |
| <input type="checkbox"/> | FORMULA NAMES        |             | <input type="checkbox"/> |
| <input type="checkbox"/> | COPY FORMULA         |             | <input type="checkbox"/> |
| <input type="checkbox"/> | BATCH TOLERANCE NNNN |             | <input type="checkbox"/> |
| <input type="checkbox"/> | BATCH PROGRAM        |             | <input type="checkbox"/> |
| <input type="checkbox"/> |                      |             | <input type="checkbox"/> |
| <input type="checkbox"/> | FORMULA MAKE-UP      |             | <input type="checkbox"/> |
| <input type="checkbox"/> | SETUP                |             | <input type="checkbox"/> |
|                          |                      |             |                          |

TIME



# DRAWING IV. A.2.-6.

## BATCH PROGRAM MASTER SCREEN (SETUP)

| STEP NO. NN *BATCH PROGRAM* |               | *STANDBY* |
|-----------------------------|---------------|-----------|
| <input type="checkbox"/>    | NEXT STEP     | OPERATE   |
| <input type="checkbox"/>    | PREVIOUS STEP |           |
| <input type="checkbox"/>    | INSERT STEP   |           |
| <input type="checkbox"/>    | DELETE STEP   |           |
| <input type="checkbox"/>    | CHANGE STEP   |           |
| <input type="checkbox"/>    |               |           |
| <input type="checkbox"/>    |               |           |
| <input type="checkbox"/>    | EXIT          |           |

FORMULA ANNN XXXXXX  
STEP NO. NN  
(AREA 1)  
(AREA 2)

TIME



# DRAWING IV. A.2.-7.

INSERT STEP SCREEN FOR BATCH PROGRAM (SETUP)

| * INSERT STEP *          |              | * STANDBY * |
|--------------------------|--------------|-------------|
| <input type="checkbox"/> | INGREDIENT   | OPERATE     |
| <input type="checkbox"/> | HOLD TIME    |             |
| <input type="checkbox"/> | HOLD CONTACT |             |
| <input type="checkbox"/> |              |             |
| <input type="checkbox"/> |              |             |
| <input type="checkbox"/> | DUMP         |             |
| <input type="checkbox"/> | END          |             |
| <input type="checkbox"/> | CANCEL       |             |
| TIME                     |              |             |



DRAWING IV. A.2.-8.

| *COPY FORMULA*           |                | *STANDBY*             |         |
|--------------------------|----------------|-----------------------|---------|
| <input type="checkbox"/> |                |                       | OPERATE |
| <input type="checkbox"/> | SOURCE FORMULA | FORMULA ANNN XXXXXXXX |         |
| <input type="checkbox"/> |                | ANNN XXXXXXXXXXXX     |         |
| <input type="checkbox"/> | COPY           |                       |         |
| <input type="checkbox"/> |                |                       |         |
| <input type="checkbox"/> |                |                       |         |
| <input type="checkbox"/> |                |                       |         |
| <input type="checkbox"/> |                |                       |         |
| <input type="checkbox"/> |                |                       |         |
| <input type="checkbox"/> | CANCEL         |                       |         |
|                          |                | TIME                  |         |



DRAWING IV. A.2.-9.

CHANGE STEP SCREEN FROM BATCH PROGRAM (SETUP)

| *CHANGE STEP*            |              | *STANDBY* |
|--------------------------|--------------|-----------|
| <input type="checkbox"/> | INGREDIENT   | OPERATE   |
| <input type="checkbox"/> | HOLD TIME    |           |
| <input type="checkbox"/> | HOLD CONTACT |           |
| <input type="checkbox"/> |              |           |
| <input type="checkbox"/> |              |           |
| <input type="checkbox"/> | DUMP         |           |
| <input type="checkbox"/> | END          |           |
| <input type="checkbox"/> | CANCEL       |           |
| TIME                     |              |           |



# DRAWING IV. A.2-10.

## FORMULA MAKE-UP SCREEN DURING SETUP

| PAGE N OF N * FORMULA MAKE-UP * |                                                              | * STANDBY *                      |
|---------------------------------|--------------------------------------------------------------|----------------------------------|
| <input type="checkbox"/>        | NEXT PAGE                                                    | OPERATE <input type="checkbox"/> |
| <input type="checkbox"/>        | PREVIOUS PAGE                                                |                                  |
| <input type="checkbox"/>        | FORMULA ANNN XXXXXXXX<br>BATCH PROGRAM<br>(FORMULA)<br>STEPS |                                  |
| <input type="checkbox"/>        | PRINT                                                        |                                  |
| <input type="checkbox"/>        |                                                              |                                  |
| <input type="checkbox"/>        | PRINT &<br>CLEAR                                             |                                  |
| <input type="checkbox"/>        | EXIT                                                         |                                  |
| TIME                            |                                                              | <input type="checkbox"/>         |



DRAWING IV. A.2-11.

INGREDIENT FEATURES SCREEN DURING SETUP

| *INGREDIENT FEATURES*    |                                              | *STANDBY* |                          |
|--------------------------|----------------------------------------------|-----------|--------------------------|
| <input type="checkbox"/> | INGREDIENT<br>NO. & NAME<br>ANN XXXXXXXXXXXX | OPERATE   | <input type="checkbox"/> |
| <input type="checkbox"/> | INGREDIENT<br>NAMES                          |           | <input type="checkbox"/> |
| <input type="checkbox"/> |                                              |           | <input type="checkbox"/> |
| <input type="checkbox"/> |                                              |           | <input type="checkbox"/> |
| <input type="checkbox"/> |                                              |           | <input type="checkbox"/> |
| <input type="checkbox"/> |                                              |           | <input type="checkbox"/> |
| <input type="checkbox"/> |                                              |           | <input type="checkbox"/> |
| <input type="checkbox"/> | SETUP                                        |           | <input type="checkbox"/> |
|                          |                                              |           |                          |

TIME



# DRAWING IV. A. Z.-12.

## INVENTORY FEATURES SCREEN DURING SETUP

| * INVENTORY FEATURES *   |                   | * STANDBY * |                          |
|--------------------------|-------------------|-------------|--------------------------|
| <input type="checkbox"/> | FORMULA<br>USAGE  | OPERATE     | <input type="checkbox"/> |
| <input type="checkbox"/> | INVENTORY<br>USED |             | <input type="checkbox"/> |
| <input type="checkbox"/> |                   |             | <input type="checkbox"/> |
| <input type="checkbox"/> | ALARM<br>SUMMARY  |             | <input type="checkbox"/> |
| <input type="checkbox"/> |                   |             | <input type="checkbox"/> |
| <input type="checkbox"/> |                   |             | <input type="checkbox"/> |
| <input type="checkbox"/> |                   |             | <input type="checkbox"/> |
| <input type="checkbox"/> | SETUP             |             | <input type="checkbox"/> |
| TIME                     |                   |             |                          |



# DRAWING IV. A.2.-13.

## FORMULA USAGE SCREEN DURING SETUP

| PAGE NOFN *FORMULA USAGE* |                  |                      |                  | *STANDBY*                        |
|---------------------------|------------------|----------------------|------------------|----------------------------------|
| <input type="checkbox"/>  | NEXT<br>PAGE     | FROM NN:NN NN XXX NN |                  | OPERATE <input type="checkbox"/> |
| <input type="checkbox"/>  | PREVIOUS<br>PAGE | NO.<br>ANNN          | BATCHES<br>NNNNN | <input type="checkbox"/>         |
| <input type="checkbox"/>  |                  |                      | WEIGHT<br>NNNNN  | <input type="checkbox"/>         |
| <input type="checkbox"/>  |                  |                      |                  | <input type="checkbox"/>         |
| <input type="checkbox"/>  | PRINT            |                      |                  | <input type="checkbox"/>         |
| <input type="checkbox"/>  |                  |                      |                  | <input type="checkbox"/>         |
| <input type="checkbox"/>  | PRINT &<br>CLEAR |                      |                  | <input type="checkbox"/>         |
| <input type="checkbox"/>  |                  |                      |                  | <input type="checkbox"/>         |
| <input type="checkbox"/>  | EXIT             |                      |                  | <input type="checkbox"/>         |

TIME



DRAWING IV. A. 2.-14.

INVENTORY USED SCREEN DURING SETUP

| * INVENTORY USED *       |                      |            | * STANDBY * |                          |
|--------------------------|----------------------|------------|-------------|--------------------------|
| <input type="checkbox"/> | FROM NN:NN NN XXX NN |            | OPERATE     |                          |
| <input type="checkbox"/> | NO.                  | ING.NAME   | USED        | <input type="checkbox"/> |
| <input type="checkbox"/> | ANNN                 | XXXXXXXXXX | NNNNNN      | <input type="checkbox"/> |
| <input type="checkbox"/> | :                    | :          | :           | <input type="checkbox"/> |
| <input type="checkbox"/> | PRINT                |            |             | <input type="checkbox"/> |
| <input type="checkbox"/> |                      |            |             | <input type="checkbox"/> |
| <input type="checkbox"/> | PRINT &<br>CLEAR     |            |             | <input type="checkbox"/> |
| <input type="checkbox"/> |                      |            |             | <input type="checkbox"/> |
| <input type="checkbox"/> | EXIT                 |            |             | <input type="checkbox"/> |
|                          |                      |            | TIME        |                          |



DRAWING IV. A. 2.-15.

ALARM SUMMARY SCREEN DURING SETUP

| PAGE N OF N *ALARM SUMMARY* |                                 | *STANDBY*                        |
|-----------------------------|---------------------------------|----------------------------------|
| <input type="checkbox"/>    | NEXT PAGE FROM NN'INN NN XXX NN | OPERATE <input type="checkbox"/> |
| <input type="checkbox"/>    | PREVIOUS PAGE (ALARM SUMMARY)   | <input type="checkbox"/>         |
| <input type="checkbox"/>    |                                 | <input type="checkbox"/>         |
| <input type="checkbox"/>    | PRINT                           | <input type="checkbox"/>         |
| <input type="checkbox"/>    |                                 | <input type="checkbox"/>         |
| <input type="checkbox"/>    | PRINT & CLEAR                   | <input type="checkbox"/>         |
| <input type="checkbox"/>    |                                 | <input type="checkbox"/>         |
| <input type="checkbox"/>    | EXIT                            | <input type="checkbox"/>         |
| TIME                        |                                 |                                  |

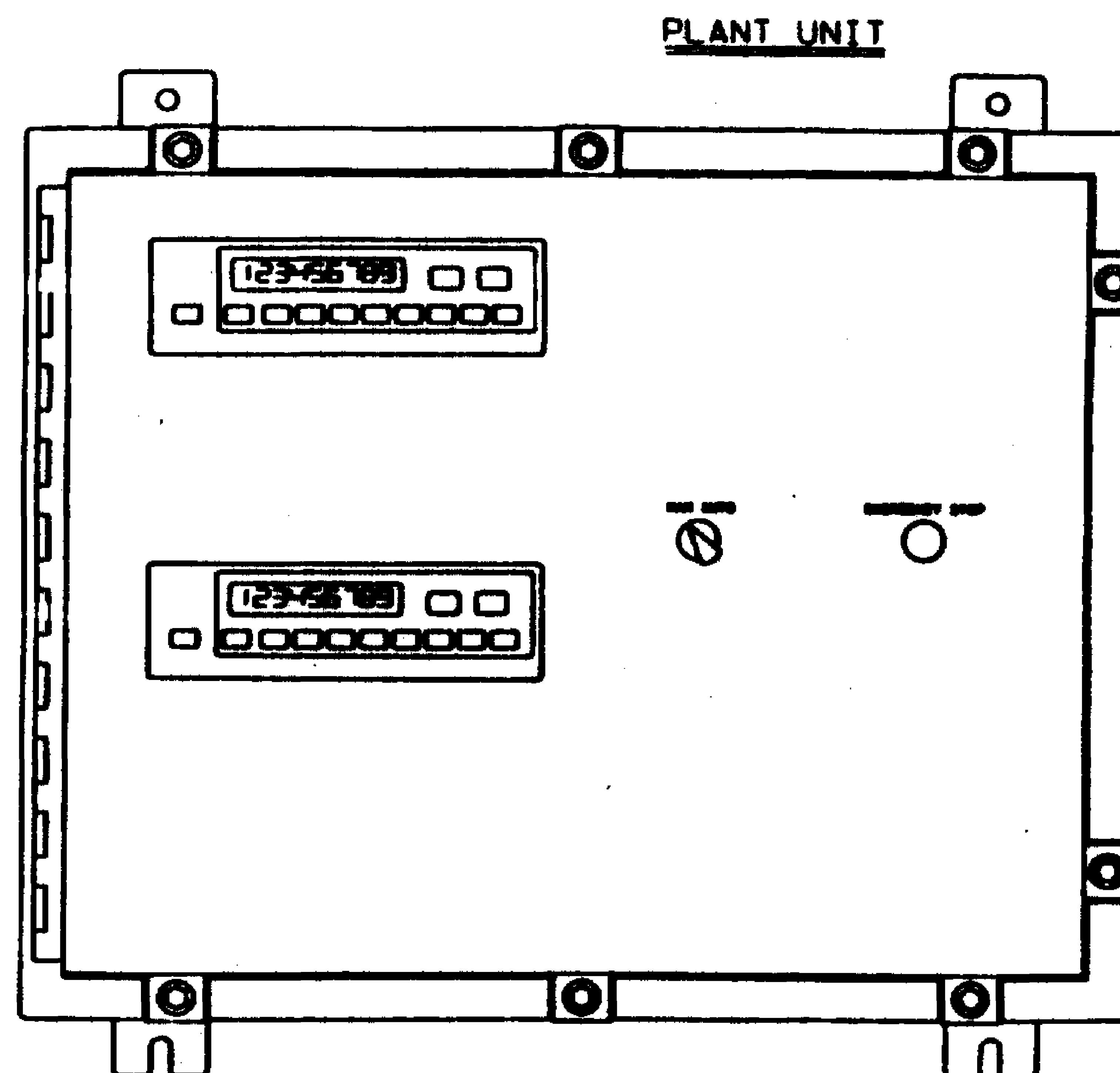




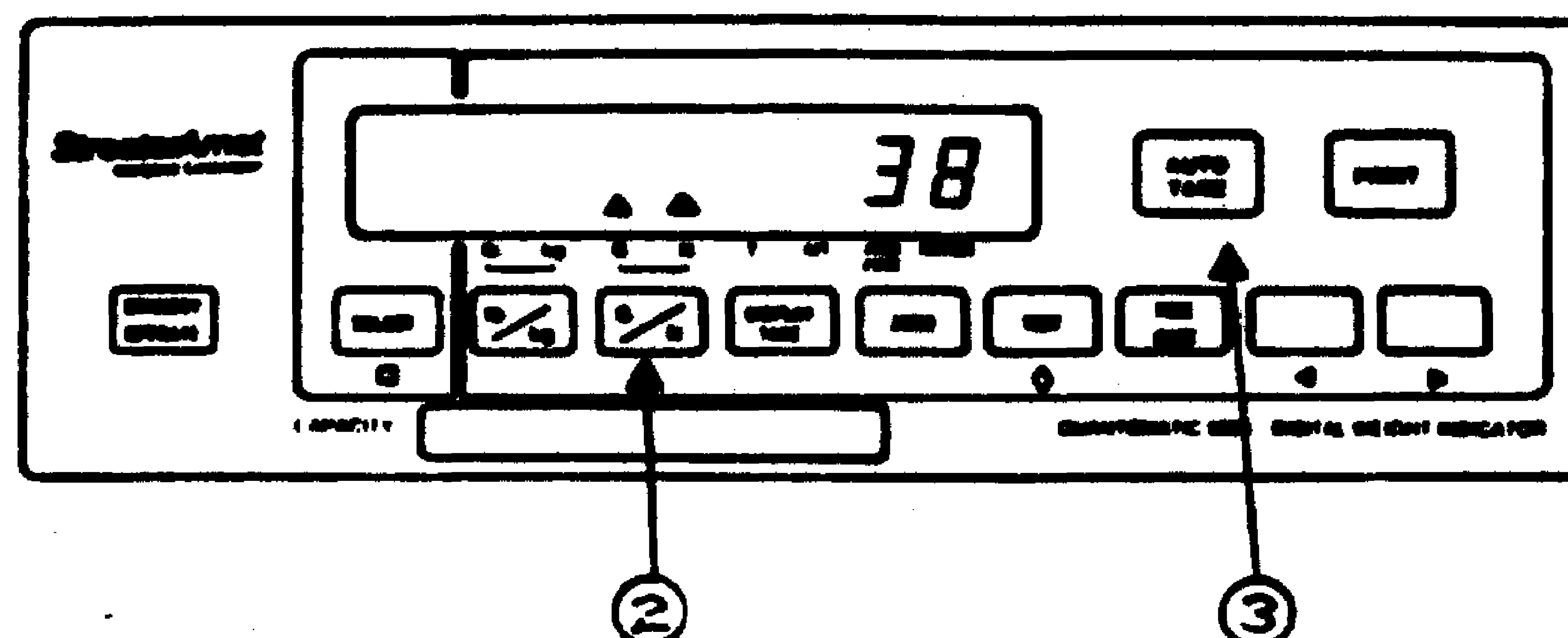
| *MEMORY CARTRIDGE*       |                        | *STANDBY*          |
|--------------------------|------------------------|--------------------|
| <input type="checkbox"/> | WRITE TO<br>CARTRIDGE  | <div>OPERATE</div> |
| <input type="checkbox"/> |                        |                    |
| <input type="checkbox"/> | READ FROM<br>CARTRIDGE |                    |
| <input type="checkbox"/> |                        |                    |
| <input type="checkbox"/> | VERIFY<br>CARTRIDGE    |                    |
| <input type="checkbox"/> |                        |                    |
| <input type="checkbox"/> |                        |                    |
| <input type="checkbox"/> | SETUP                  |                    |
|                          |                        |                    |



# DRAWING IV. A.3.-1.



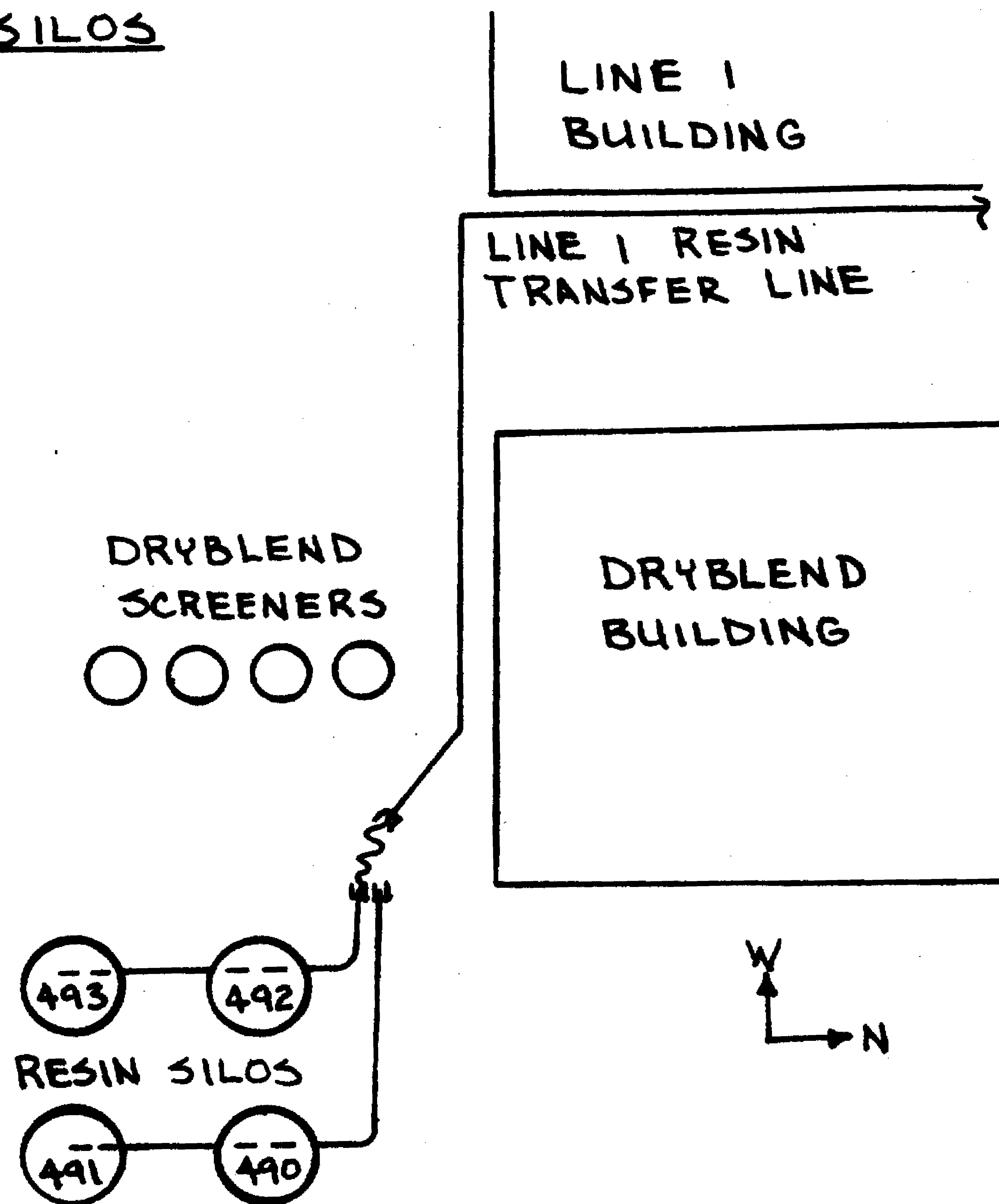
## CLOSE-UP OF SCALES





DRAWING IV.B.1.

RESIN SILOS



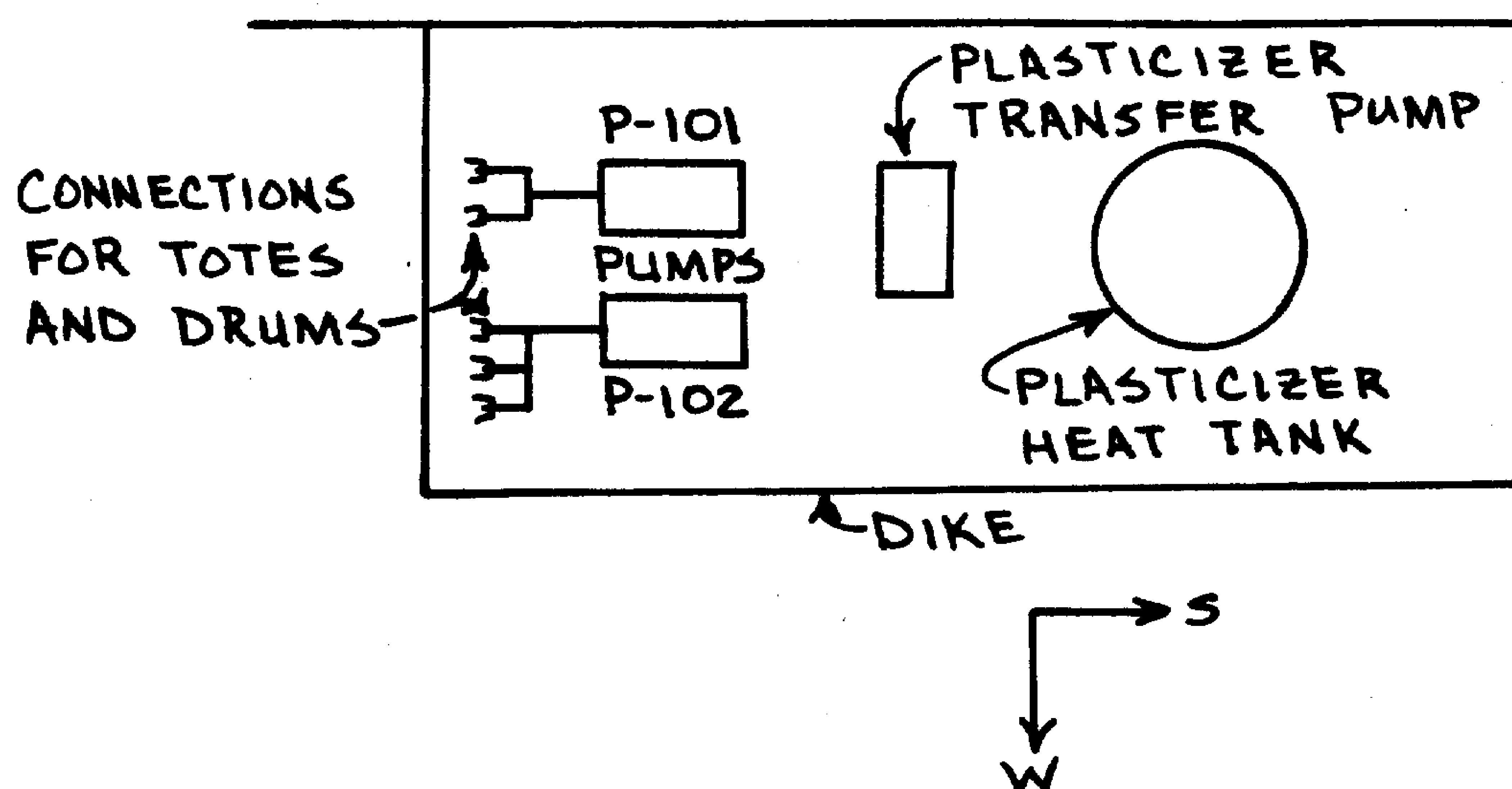
- AT THE BEGINNING OF A PRODUCT RUN
- MAKE THE PROPER HOSE CONNECTION TO TRANSFER RESIN FROM THE PROPER SILO.
  - OPEN MANUAL SLIDE VALVE ON THE DISCHARGE OF THE APPROPRIATE SILO.



DRAWING IV.C.1.

PLASTICIZER PUMPS

LINE 1 BUILDING, TOP VIEW

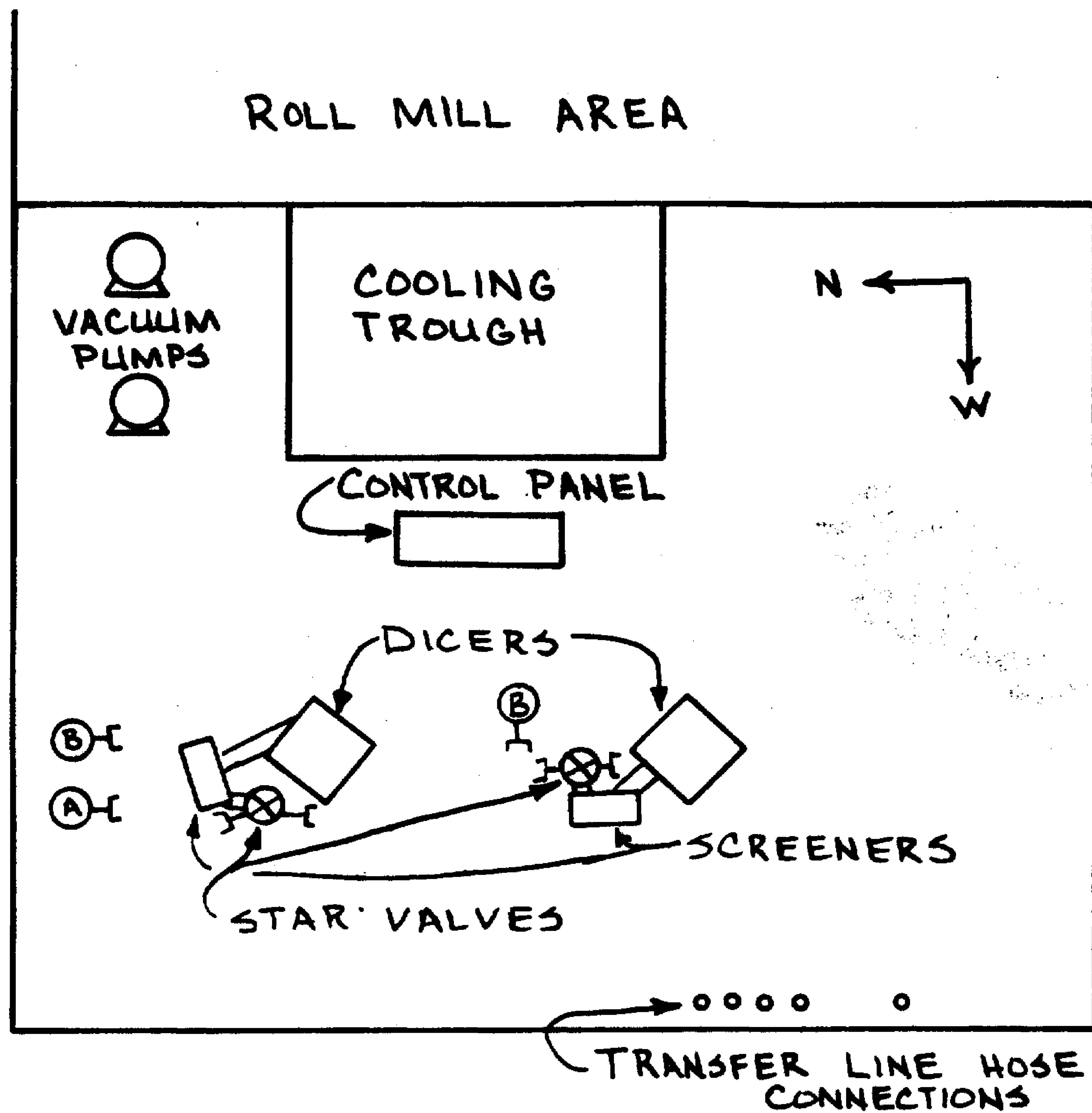


- PLASTICIZER PUMPS FOR PLASTICIZERS AND STABILIZERS IN TOTES OR DRUMS ARE ON GROUND LEVEL.



DRAWING IV.I.1.

DICER ROOM LAYOUT

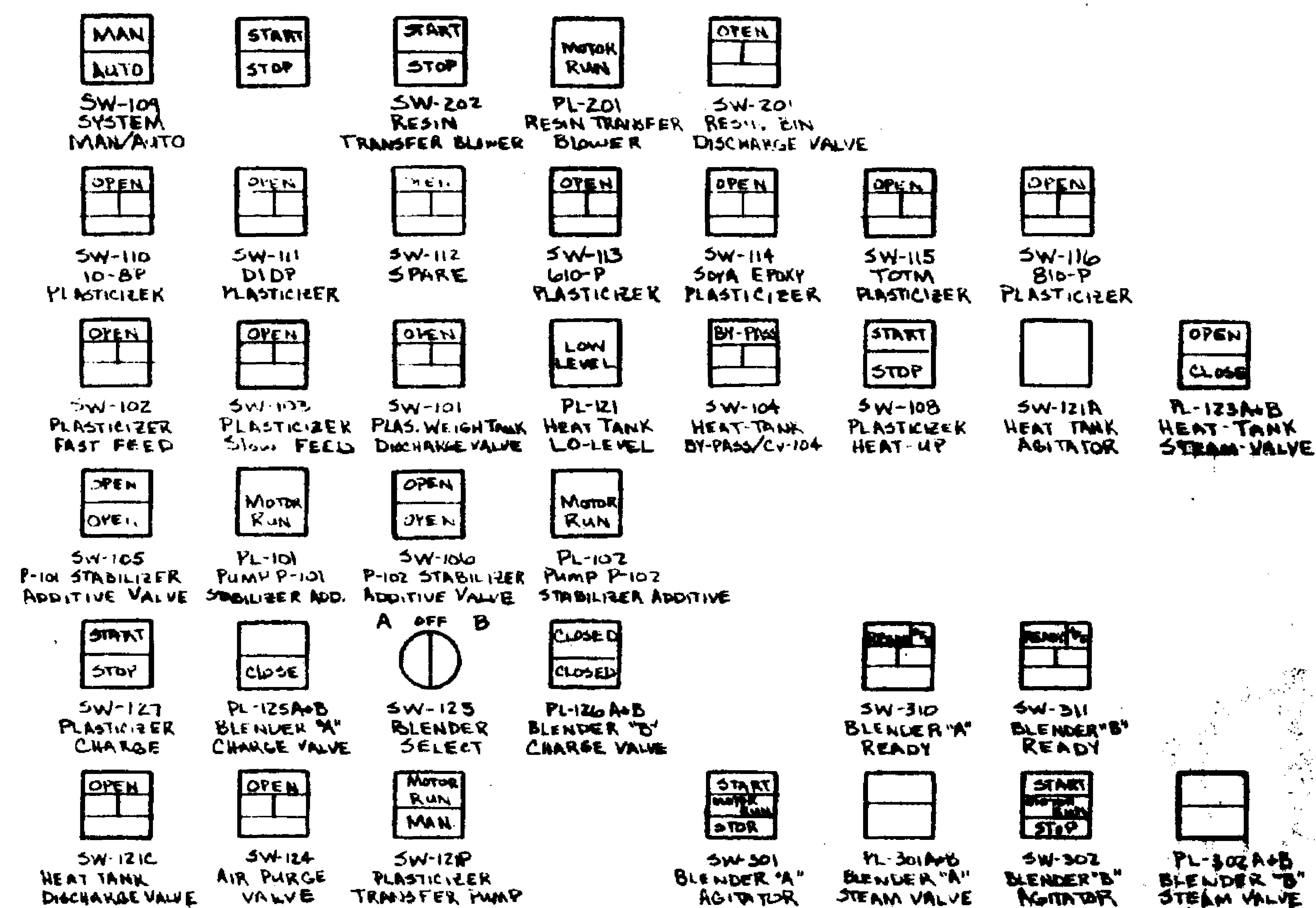


(A) - BULK SILO TRANSFER BLOWER

(B) - BOXING & BAGGING SILO TRANSFER BLOWER



# **BLENDER FLOOR CONTROL PANEL** **COMPOUND LINE #1 MODERNIZATION**



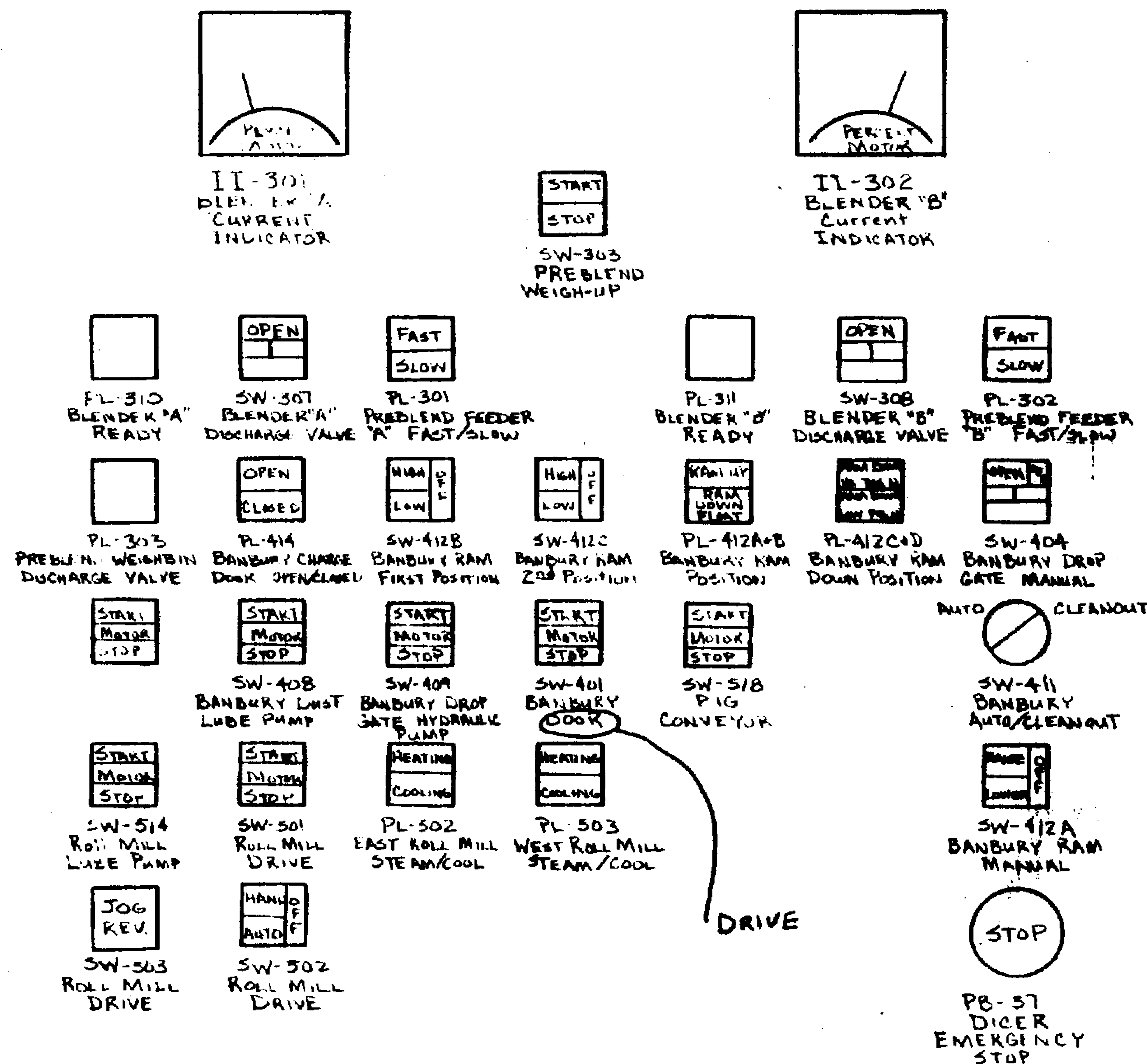
|                                          |                                         |                                       |
|------------------------------------------|-----------------------------------------|---------------------------------------|
| Plasticizer Weigh Tank, T-101 Level High | Plasticizer Heat Tank, T-121 Temp. High | "B" Ribbon Blender, BL-302 Temp. High |
|                                          |                                         | "A" Ribbon Blender, BL-301 Temp. High |
| PLC-101 Trouble                          |                                         | Test                                  |
|                                          |                                         | Acknowledge                           |

|                                               |                                     |                                           |                                         |
|-----------------------------------------------|-------------------------------------|-------------------------------------------|-----------------------------------------|
| TIC-121 Plasticizer Heat Tank Temp. Indicator | TIC-301 "A" Blender Temp. Indicator | IR-301 Green "A" Blender Current Recorder | TR-301 Red "A" Blender Temp. Recorder   |
|                                               | TIC-302 "B" Blender Temp. Indicator | IR-302 Red "B" Blender Current Recorder   | TR-302 Green "B" Blender Temp. Recorder |

**BLENDER FLOOR  
CONTROL PANEL  
COMPOUND LINE 1  
MODERNIZATION**



# **FIRST FLOOR CONTROL PANEL COMPOUND LINE #1 MODERNIZATION**



|                                 |                             |                                         |
|---------------------------------|-----------------------------|-----------------------------------------|
| PLC-301 Trouble                 | Product Blower B-501        | Roll Mill Lubrication Oil Pressure High |
| Dicer Number 1 DI-501           | Product Blower B-502        | Roll Mill Lubrication Oil Pressure Low  |
| Dicer Number 2 DI-502           | Product Blower (Silo) B-503 | Roll Mill Lubrication Oil Temp High     |
| Banbury Mixer MX-401 Temp. High |                             | Roll Mill Lubrication Oil Flow Rate Low |
| LAL 405                         | AAT 301/2                   | Test                                    |
| Transformer Trouble             | TAK 405                     | Acknowledge                             |
| UA 405                          | TAL 405                     |                                         |
| PAH 405                         |                             |                                         |

|                                       |                                     |                                           |       |                                         |                                         |
|---------------------------------------|-------------------------------------|-------------------------------------------|-------|-----------------------------------------|-----------------------------------------|
| TIC-401 Banbury Temperature Indicator | IK-401 RED Banbury Current Recorder | TR-401 Green Banbury Temperature Recorder | Spare | TIC-502 East Roll Temperature Indicator | TIC-503 West Roll Temperature Indicator |
|---------------------------------------|-------------------------------------|-------------------------------------------|-------|-----------------------------------------|-----------------------------------------|

**FIRST FLOOR  
CONTROL PANEL  
COMPOUND LINE 1  
MODERNIZATION**