Martin Marietta
Ocean, Radar & Sensor Systems
Post Office Box 4840 Syracuse, NY 13221-4840

LOCKHEED MARTIN

Bldg. 5 - Room H6
Electronics Park
Syracuse, New York 13221
April 21, 1995

Mr. Robert W. Schick, PE
Bureau of Western Remedial Action
Division of Hazardous Waste Remediation
New York State Dept. of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

RE: Interim Remedial Measure (IRM) Certification Report
Remedial Treatment Systems in AOC #7
Farrell Road Site, Geddes, New York
NYSDEC Site No. 7-34-055

Dear Mr. Schick:

In accordance with Paragraph III of the Consent Order (Index #A7-0308-93-10) for the Martin Marietta Corporation, Farrell Road Site (Registry #7-34-055), enclosed are four copies of the IRM Certification Report ("IRM Report") for the construction of the remedial treatment system in AOC #7 . Please contact either Pat Salvador or me if you have any questions.

Sincerely,
MARTIN MARIETTA

Brian A. Kent, Mgr.,
Environment, Health & Safety

/cl
Encl

pc: Charles Branaugh, P.E. - NYSDEC
Director, Bureau of Environmental Exposure Investigation
Sandra Lee Fenske - Martin Marietta
Henriette Hamel - NYSDOH
Michael Lesser - NYSDEC
Virginia Robbins - Bond, Schoeneck & King

RUST ENVIRONMENT & INFRASTRUCTURE

RUST Environment & Infrastructure Inc.
12 Metro Park Road
Albany, NY 12205
Tel. (518) 458-1313 • FAX (518) 458-2472

April 21, 1995

Patrick Salvador, P.E.
Martin Marietta Corporation - EHS
Electronics Park
Building EP-5 Room H6
Syracuse, New York 13221

Re: AOC #7 IRM Implementation Certification Report
Farrell Road Plant site, Geddes, New York
Site No. 7-34-055

Dear Mr. Salvador:

This letter is to summarize installation and start-up of an automatic product recovery system at Area of Concern (AOC) #7 of the Farrell Road Plant in the Town of Geddes, New York. This work was performed by Rust E&I of New York (RUST) on behalf of Martin Marietta Corporation (MMC) as an Interim Remedial Measure (IRM) approved by the New York State Department of Environmental Conservation (NYSDEC) in a February 9, 1995 letter (Appendix A). The work entailed installation of a small prefabricated building at an existing monitoring well and installation of an automatic product recovery system in the well. The work was completed in February 1995. Photographs of the complete installation are shown in Appendix B.

Background

During the remedial investigation of the Farrell Road Plant, No. 2 Fuel Oil was observed to be present in a limited area around the location of a former underground storage tank (UST 51), which is designated as AOC #7. MMC's consultant prepared an *IRM Workplan* to address this area, (ERM, 5/3/94). The IRM Workplan called for a two staged approach. First, a passive recovery system, the "Petrotrap," would be installed and operated manually. Second, if required, the IRM would include installation of an active recovery system. A Petrotrap was installed in MW-2 and operated from July 1994 until installation of the automatic product recovery system in February 1995. Based on performance of the Petrotrap, MMC proposed in a February 1, 1995 letter (Appendix A) to NYSDEC that the second stage of the IRM (installation of an automatic product recovery system) be implemented. This was approved by the NYSDEC in a letter dated February 9, 1995 (Appendix A).

IRM Implementation

The following is a chronological summary of the activities which were completed in installing the automatic product recovery system at AOC #7:

February 14, 1995

A Building Permit was obtained from the Town of Geddes for the building (Appendix A).

February 16, 1995

Work began at the site on this day. Crusher run stone was placed and hand spread to form a level grade for the system enclosure. Electrical conduit was run from an existing panel through a boiler room and outdoors through an existing hole in the Building 2 wall. The existing electrical panel was locked and tagged out while connections were made. The prefabricated building was delivered and installed over well MW-2.

February 17, 1995

Work done on this day was mainly for electrical. The aerial wiring to the AOC #7 building was completed. The electric meter and the main circuit breaker were mounted on an exterior wall of the AOC #7 building.

February 22, 1995

Work began on running electrical conduit at the building. The ground fault interrupt (GFI) outlet and the outdoor light fixture were installed. The Automatic Level Seek (ALS) was clamped to the well casing and the SpillBuster Jr. product pump was suspended in the well using the ALS reel mechanism per the manufactures installation specifications. A steel drum and secondary containment (drum overpack) were set in the building.

February 23, 1995

Miscellaneous finishing items were also completed this day. The Town of Geddes Building Inspector was on site and approved the construction at AOC #7.

February 24, 1995

Secondary containment tubing was placed on the SpillBuster Jr. discharge pipe between the well head and the storage drum. A warning sign was posted, a fire extinguisher was installed and a hand light and miscellaneous supplies (i.e. sorbent pads, gloves, etc.) were also placed at the site. The system was started up at 3:00 pm and left running on a 10.7 hour cycle interval.

Design Modifications

The system was installed in general accordance with the IRM Workplan and the February 1, 1995 proposal submitted by MMC to NYSDEC. The completed installation is shown on the attached Record Drawings (Figure 1 and 2). Modifications to the original plan are as follows:

1. Heat tracing was not installed initially. Due to the timing of start-up (near the end of freezing weather) and the anticipated efficiency of the system in recovering oil without water, this item was not initially installed. If water is observed in the storage drum on a regular basis, heat taping or other weather protective measures will be employed.

2. An overpack drum was substituted for the secondary containment tray. A tray was not used since the commercially available trays were not of suitable size for installing in the building. The tray would have allowed removal of full drums of product directly from the building. The system, as constructed, will require hand transfer (using a drum pump) of product from the on-line storage drum to a drum for shipping. Based upon the anticipated product yield of the well, this hand transfer of product is expected to be a relatively infrequent (monthly or less) requirement.

Operation and Maintenance

After start-up of the system on February 24, 1995 the system was inspected on a daily basis for a week to confirm that the system was operating correctly. The product pump includes a "Super-Skim" feature, which overrides the normal cycle and causes the pump to run for 30 seconds or until all product is removed. Per the manufacture's recommendation, this feature was activated during start-up to provide a test of the product pump's operation. During use of the "Super-Skim", small amounts of water were drawn into the product discharge line. This water froze, and in turn caused a fuse in the pump panel to trip. This situation was remedied by replacing the fuse, removing the water, and ceasing use of the "Super-Skim" feature.

Inspections were performed on a weekly basis for the first month of operation and on a twice week basis thereafter. During each upcoming inspection, an Inspection Checklist (Appendix C) will be filled out along with the Product Recovery Log (Appendix C). If any problems are noticed due to

alarms not functioning or leaks in the system, then the system will be shut down until problems can be rectified. Items included on checklist are:

- **Physical Inspection** - includes the condition of individual pieces of equipment to confirm satisfactory conditions or identify items that need attention (building, control panel, product pump, ALS, storage drum, overpack, piping, and lights).

- **Waste Inventory** - record the level of product in storage drum, number of drums, and number of days in storage of oldest drum.

- **SpillBuster Jr. Setting** - record the cycle time, probe raising time, and amount of product per cycle.

- **SpillBuster Jr. Pump** - note inspection items recommended by the manufacture to insure the pump is operating properly. These items include; checking that the pull rope is on the reel correctly, checking that the pump cable has adequate slack and is not becoming entangled on other equipment; and check the control box to verify that the low limit light is on and that the high limit light is off.

- **Well Data** - record the monthly monitoring of depth to product, depth of water, and product thickness.

Also included on the checklist is an area for additional comments. A copy of the manufactures SpillBuster Jr. manual (Appendix D) will remain on-site to provide detailed information on troubleshooting activities. The results of the Operation and Maintenance activities will be provided in the monthly progress reports required as part of the IRM Consent Order. SpillBuster Jr. recommends that the "Super Skim" switch be used periodically to manually operate the pump to verify that the pump is functional. Since the "Super Skim" tends to pull water into the system, pump operations will be verified instead by timing inspection to coincide with the normal system cycle.

Waste Handling

The AOC #7 SpillBuster Jr. system will generate two waste streams: product recovered from MW-2 and, personal protection equipment (PPE). All waste will be handled in accordance with MMC procedures. When enough product has accumulated for disposal (one 55 gallon drum), the Waste Disposal Coordinator designated by MMC will be contacted to arrange proper handling and disposal of the material.

When the storage drum on the SpillBuster Jr. system is full, the product will be transferred from the storage drum by hand pump into another drum. This drum will be relocated into the dedicated

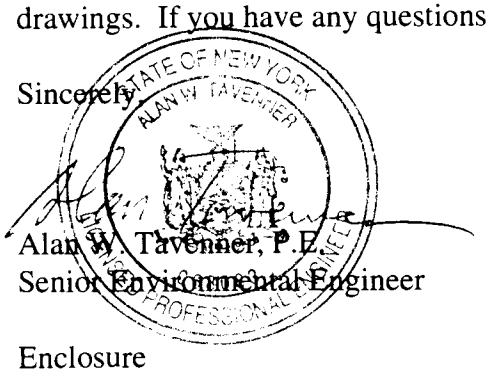
storage area until such time as it will be disposed of. This drum will typically be removed from the site within 30-days of being filled and will not be left on site in excess of 90 days.

Non-hazardous waste, PPE, and disposable supplies will be generated by maintenance activities on the equipment. These waste materials will be placed in steel drums and staged in the dedicated storage area.

Conclusion

The system was installed, started up, and is being operated in accordance with the approved IRM Workplan and the MMC proposal dated February 1, 1995 and as shown on the enclosed record drawings. If you have any questions please call me at (518) 458-1313.

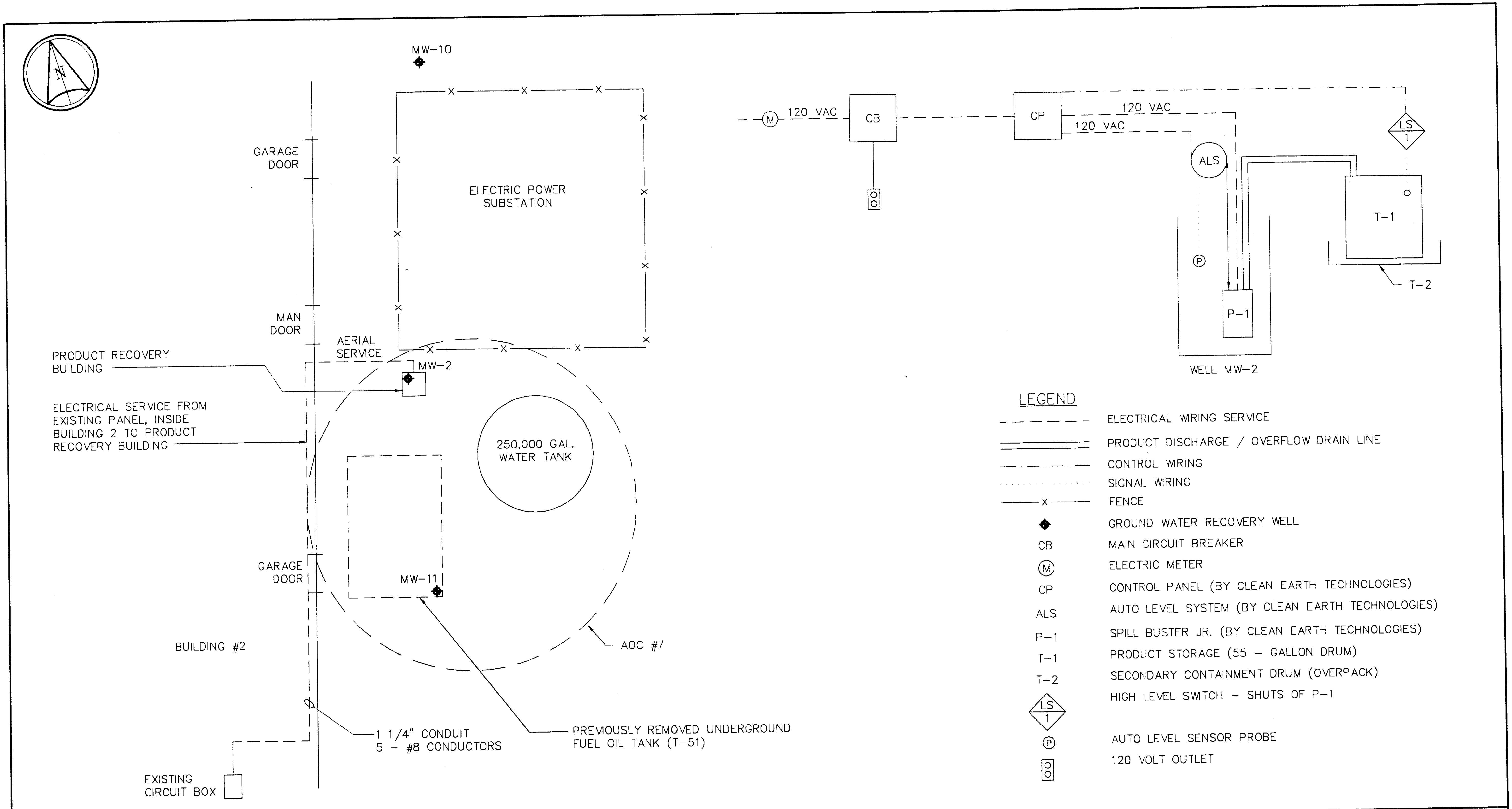
Sincerely,



Alan W. Tavenner, P.E.
Senior Environmental Engineer

Enclosure

G:\HSMITH\BASKET\ACO7\CERT.LTR



MW-10
GARAGE DOOR
ELECTRIC POWER SUBSTATION
MAN DOOR
AERIAL SERVICE
MW-2
PRODUCT RECOVERY BUILDING
ELECTRICAL SERVICE FROM EXISTING PANEL, INSIDE BUILDING 2 TO PRODUCT RECOVERY BUILDING
250,000 GAL. WATER TANK
GARAGE DOOR
MW-11
BUILDING #2
AOC #7
1 1/4" CONDUIT
5 - #8 CONDUCTORS
PREVIOUSLY REMOVED UNDERGROUND FUEL OIL TANK (T-51)
EXISTING CIRCUIT BOX
M
120 VAC
CB
CP
120 VAC
120 VAC
LS 1
ALS
T-1
P
T-2
P-1
WELL MW-2
LEGEND
ELECTRICAL WIRING SERVICE
PRODUCT DISCHARGE / OVERFLOW DRAIN LINE
CONTROL WIRING
SIGNAL WIRING
X
FENCE
GROUND WATER RECOVERY WELL
CB
MAIN CIRCUIT BREAKER
M
ELECTRIC METER
CP
CONTROL PANEL (BY CLEAN EARTH TECHNOLOGIES)
ALS
AUTO LEVEL SYSTEM (BY CLEAN EARTH TECHNOLOGIES)
P-1
SPILL BUSTER JR. (BY CLEAN EARTH TECHNOLOGIES)
T-1
PRODUCT STORAGE (55 - GALLON DRUM)
T-2
SECONDARY CONTAINMENT DRUM (OVERPACK)
LS 1
HIGH LEVEL SWITCH - SHUTS OF P-1
P
AUTO LEVEL SENSOR PROBE
120 VOLT OUTLET

NO.	REVISIONS	MADE	CHK	DATE
1	RECORD DRAWING			

	NAMES	DATE
DRAWN:	RAC	4-7-95
DESIGN:		
CHKD:		
PE:		
APP'D:		
APP'D:		
APP'D:		

STATE OF NEW YORK — LICENSED PROFESSIONAL ENGINEER — 4-21-95

AOC #7 INTERIM REMEDIAL MEASURE SITE PLAN AND RECOVERY SYSTEM DIAGRAM

MARTIN MARIETTA CORP.
FARREL ROAD PLANT

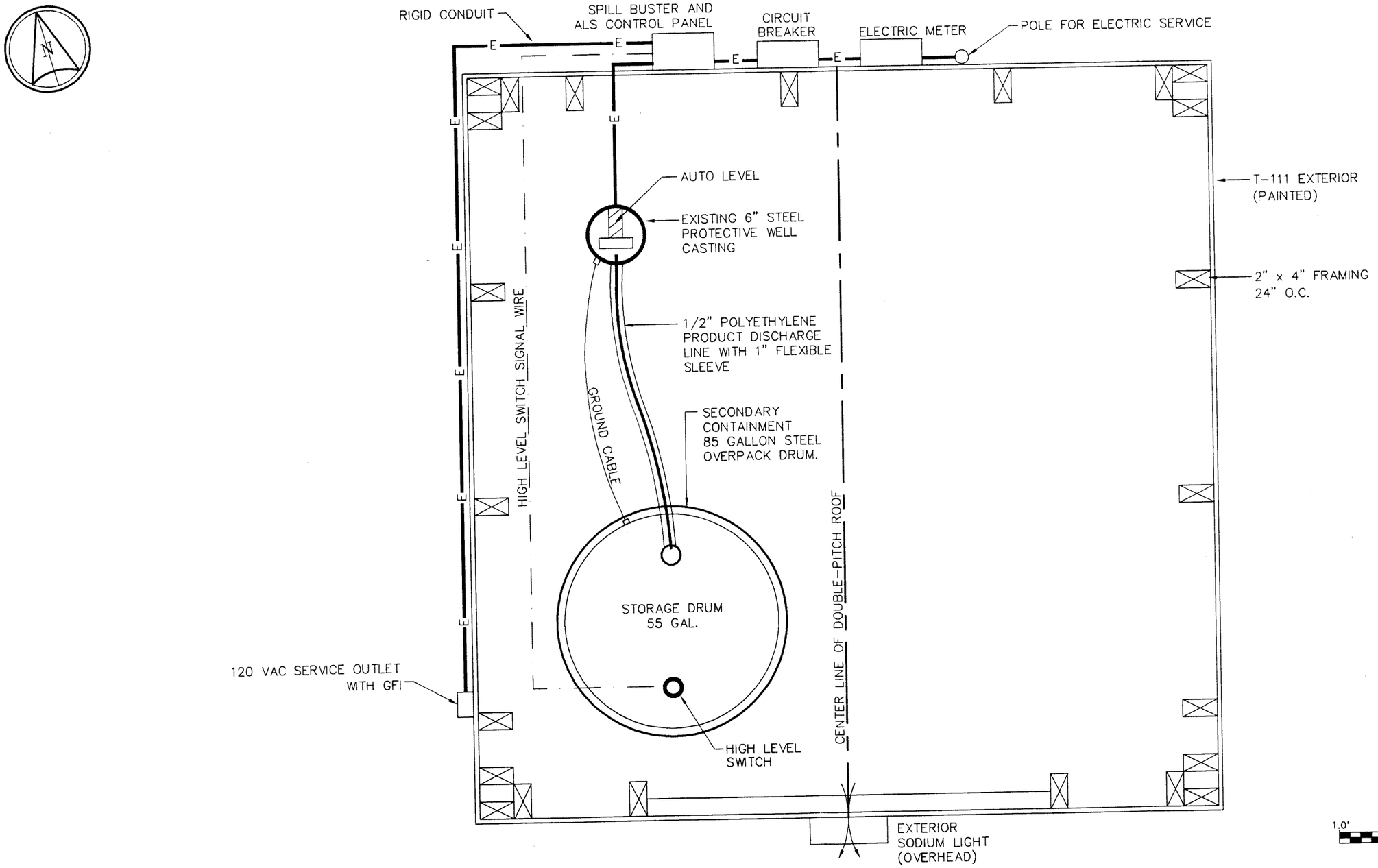
TOWN OF GEDDES NEW YORK

RUST ENVIRONMENT & INFRASTRUCTURE

PROJECT NUMBER 38564.207
DATE 1-23-95
RUST DWG NUMBER 38564-01
FILE NUMBER
CLIENT DWG NUMBER
SHEET NUMBER 1 OF 2

CAD FILE NAME: 38564-01.DWG

PLOT DATE:



NO.	REVISIONS	MADE	CHK	DATE
1	RECORD DRAWING			

NAMES	DATE
DRAWN: RAC	4-7-95
DESIGN:	
CHKD:	
PE:	
APP'D:	
APP'D:	
APP'D:	

STATE OF NEW YORK — LICENSED PROFESSIONAL ENGINEER — 4-21-95

AOC #7 INTERIM REMEDIAL MEASURE ENCLOSURE AND EQUIPMENT ARRANGEMENT

MARTIN MARIETTA
FARREL ROAD PLANT
TOWN OF GEDDES NEW YORK

RUST ENVIRONMENT & INFRASTRUCTURE

PROJECT NUMBER 38564.207 DATE 1-23-95

RUST DWG NUMBER 38564-02 FILE NUMBER

CLIENT DWG NUMBER SHEET NUMBER 2 OF 2

CAD FILE NAME: 38564-2.DWG

PLOT DATE:

APPENDIX A

Correspondence and Permits

MARTIN MARIETTA
OCEAN, RADAR & SENSOR SYSTEMS

POST OFFICE BOX 4840
SYRACUSE, NEW YORK 13221-4840
TELEPHONE (315) 456-0123

Bldg. 5 - Room H6
Electronics Park
Syracuse, NY 13221
February 1, 1995

Mr. Robert W. Schick, PE
Bureau of Western Remedial Action
Division of Hazardous Waste Remediation
New York State Dept. of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

RE: Area of Concern #7, Product Recovery Program
Farrell Road Plant , Town of Geddes, New York
Site No. 7-34-055

Dear Mr. Schick:

Martin Mareitta Corporation (MMC) has prepared this letter is to summarize the progress of the ongoing product recovery program at the above referenced site and to propose implementation of the next phase in the program.

Background

During investigative activities at the Farrell Road Plant, No. 2 fuel oil was observed to be present in a limited area around the location of former underground storage tank (UST-51) which is designated as Area of Concern (AOC) #7. MMC prepared an *Interim Remedial Measures (IRM) Workplan* to address this area, (ERM, 5/3/94). The IRM Workplan called for a two staged approach. First, a passive recovery system, the "Petrotrap," would be installed and operated manually. Since it is often in some instances observed that product accumulations in a well are quickly removed and do not yield sustained amounts of product, installation of the Petrotrap was a reasonable first step in addressing AOC #7. The second stage called for in the IRM Workplan was installation of an active recovery system which would consist of a product skimmer pump.

Petrotrap Operations

In early July 1994, ERM-Northeast (ERM) installed a Petrotrap in monitoring well MW-2. An ERM technician serviced the unit weekly until October 21, 1994. On October 24, 1994, Dunn Engineering Company (Dunn) took over operation of the Petrotrap and is continuing operation at this time. As of January 13, 1995, a total of approximately 17.45 gallons of product has been recovered. Some operational problems have been encountered with the Petrotrap, principally waterlogging of the hydrophilic filter and a cracked housing . Despite these problems, the unit has generally functioned effectively in the removal of product. Operating records for the Petrotrap are summarized in Table 1. During this time the product layer has ranged in thickness from 0.01 to 0.88 feet. Weekly recoveries have been as much as 2.19 gallons.

Based upon this operating data, it is our conclusion that MW-2 will provide a sustained product yield and that it is appropriate to proceed with installation of an active recovery system. Even if the active system does not increase the actual yield, although we believe it will, the active system will provide a significant reduction in Operation and Maintenance (O&M) requirements and an increase in reliability.

The product skimmer pump specified in the IRM Workplan was a Spill Buster, Jr. with an Automatic Level Seek (ALS) System. Based on our review of the proposed equipment and equipment provided by other manufacturers, we feel the selection of the Spill Buster with ALS for this application is appropriate. In preparing this plan, additional measures were evaluated to enhance product recovery from this area. The only additional measure potentially applicable would be installation of a groundwater depression pump which would be intended to draw additional product to the recovery point. Our conclusion in the assessment was that this would generally be counterproductive. Since pumping lowers the water table, product presently floating on the water table or held in soil slightly above the water table would be left above the water table and held in the soil pores. While a slight depression of the water table may be beneficial when several feet of product must be recovered, in this situation we believe it will be most effective to let the product drain to the recovery point.

The remainder of this plan details installation, start-up and O&M information for the product skimmer pump proposed for installation. Figures 1 and 2 of the proposed installation are attached, as are specifications for the product recovery equipment which would be installed.

Skimmer Pump and Facilities

The overall installation at AOC #7 would consist of four components:

1. Active Product Recovery System: Spill Buster Jr. with an ALS would be installed in existing monitoring well MW-2 at a depth of approximately 15.3 feet below the top casing. The pump would be supported with cable in accordance with the manufacturer's installation instructions. Polyethylene discharge tubing would be run from the pump discharge to a storage tank located at the well site. An ALS unit would be mounted on top of the MW-2 protective steel casing. The ALS is equipped with a down-well level probe which provides feedback to the ALS, which in turn raises or lowers the Spill Buster in the well by means of a cable and reel system. The ALS responds to water level changes of less than 0.1 foot. The Spill Buster and ALS are operated by a control panel supplied by the manufacturer.

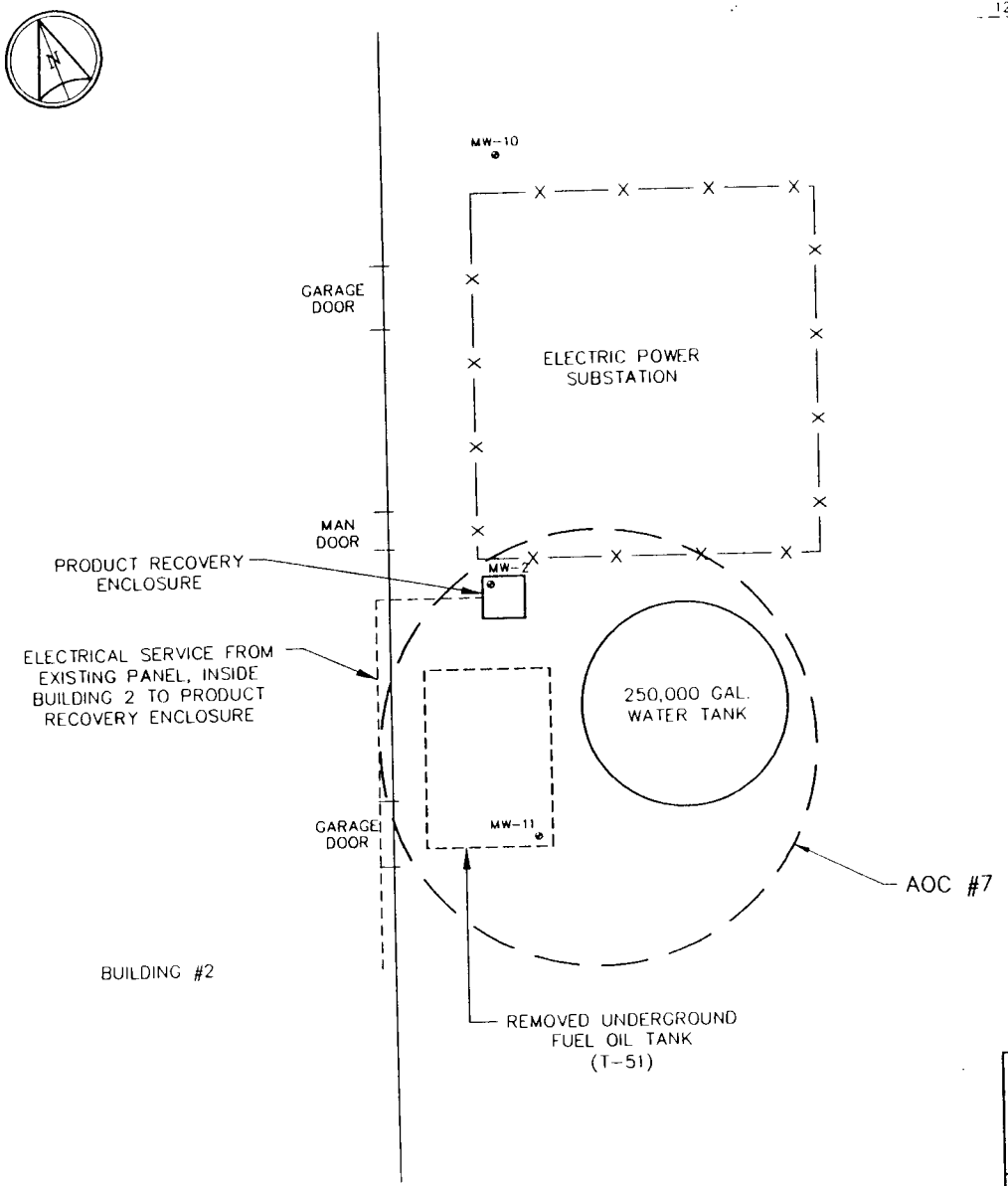
2. Enclosure - A pre-fabricated wood frame enclosure would be placed over well MW-2 to protect the equipment from weather and facilitate orderly service of the system. The enclosure would include a floor cut-out around the well and a roof cut-out panel over the well which could be removed if necessary to service the well.

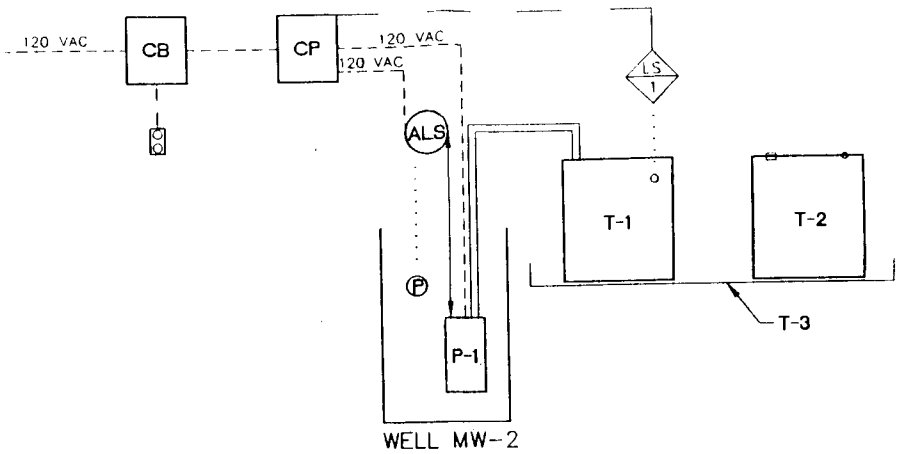
3. Product Storage - A DOT 17-H 55-gallon bung-top drum would be used as the operating storage tank for the system. The drum would be placed on a rack and drip-tray adjacent to the well. The drum would be fitted with a high-level switch which is supplied by the product recovery system manufacturer. This switch is connected to the control panel and shuts off the product recovery pump when tripped. The drip-tray would include a drain directly back intothe well in the event that some malfunction or leakage resulted in product collection into the drip tray.

   The polyethylene pump discharge line would be contained in flexible tubing, which would be open at both ends to allow any leak from the line to drain either to the drum or back into the well. This protective sleeve and the storage drum would be heat-traced to protect from freezing in the event water is inadvertently drawn into the system. The tank will be sealed at the top and equipped with a vent line leading through the wall so that product vapors are not vented into the building.

4. Miscellaneous Utilities - Electric service will be extended from an existing panel inside the warehouse (Building No. 2) to the well site. The circuit box, pump control, and service outlets will be mounted on a exterior wall of the enclosure. The enclosure will be locked at all times service personnel are not working on the system.

The details of the system to be installed are shown on the attached Figures 1 and 2.





PRODUCT DISCHARGE/OVERFLOW DRAIN LINE
MECHANICAL CONTROLLER
ELECTRICAL SERVICE WIRING
CONTROL WIRING
SIGNAL WIRING

CB MAIN CIRCUIT BREAKER
CP CONTROL PANEL (by Clean Earth Technologies)
ALS AUTO LEVEL SYSTEM (by Clean Earth Technologies)
P-1 SPILL BUSTER JR. SKIMMER (by Clean Earth Technologies)
T-1 PRODUCT STORAGE (active) 55 – GALLON DRUM
T-2 PRODUCT STORAGE (spare) 55 – GALLON DRUM
T-3 DRIP TRAY (121 gal. capacity)
LS 1 HIGH LEVEL SWITCH – SHUTS OFF P-1
Ⓟ AUTO LEVEL SENSOR PROBE
120 VOLT OUTLET

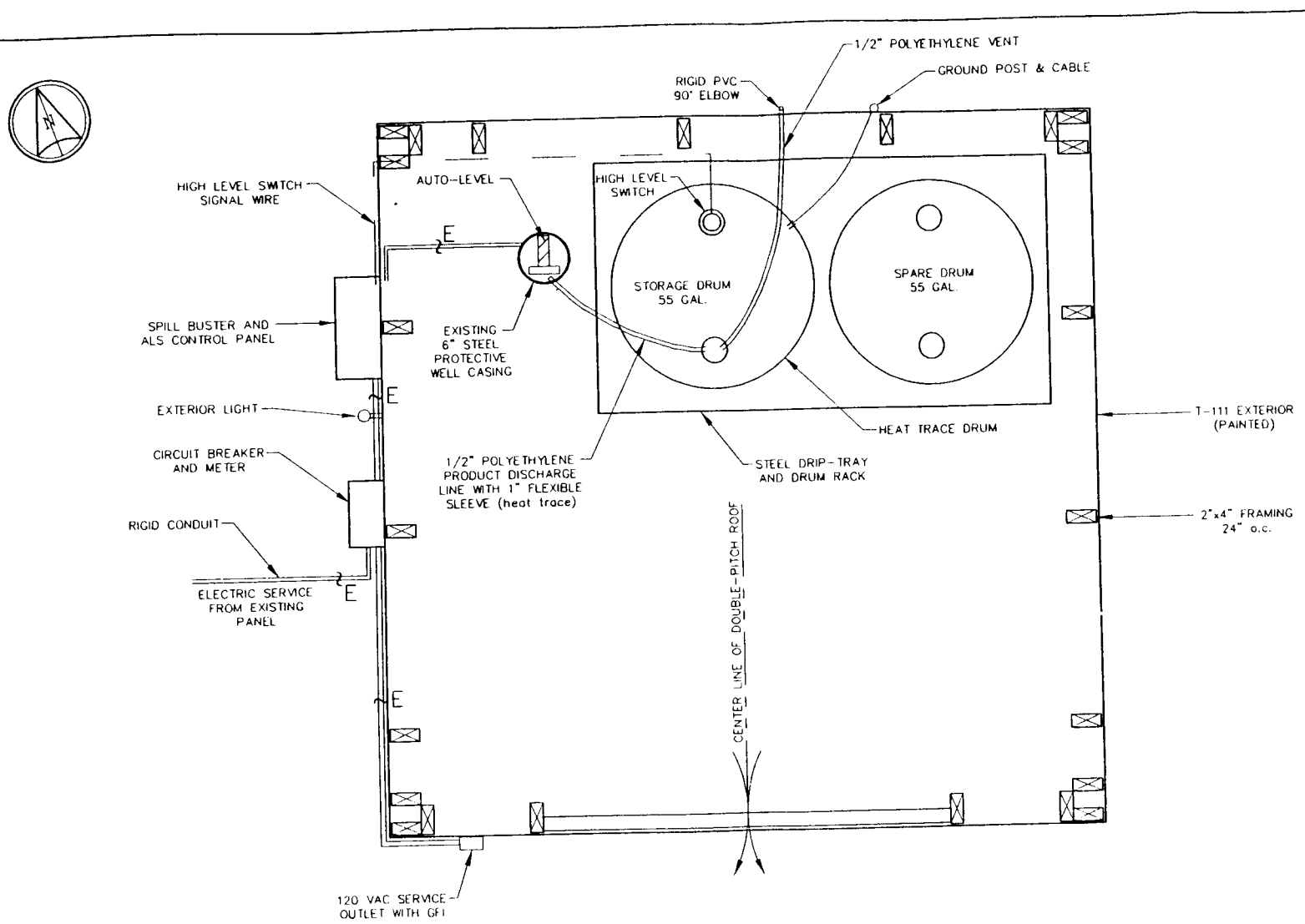
PIPING DETAIL

NOT TO SCALE

DUNN ENGINEERING COMPANY
DIVISION OF RUST ENVIRONMENT & INFRASTRUCTURE

PRODUCT RECOVERY SYSTEM AND SYSTEM DIAGRAM
MARTIN MARIETTA CORP.
FARRELL ROAD PLANT AOC #7
TOWN OF GEDDES NEW YORK

PROJECT No. 38564.207	DATE 1/23/95	DWG. No. 38564-01	SCALE 1"=20'	FIGURE No. 1



ENCLOSURE & SYSTEM – PLAN

SCALE: 1"=1'

DUNN ENGINEERING COMPANY
DIVISION OF RUST ENVIRONMENT & INFRASTRUCTURE

PRODUCT RECOVERY ENCLOSURE AND SYSTEM DIAGRAM
MARTIN MARIETTA CORP.
FARRELL ROAD PLANT AOC #7
TOWN OF GEDDES NEW YORK

PROJECT No. 38564.207	DATE 1/23/95	DWG No. 38564-02	SCALE 1" = 1'	FIGURE No. 2

Start-up

Following completion of the installation, Dunn would start-up the product recovery system, verify proper operating conditions, set-up the ALS, and remain at the site as required to confirm that the system is operating correctly.

Certification of Completion

At the completion of installation and start-up, Dunn would update the construction plan and prepare a brief letter report documenting and certifying that the installation was conducted in accordance with the IRM Workplan. The report would also include an O&M checklist, manufacturer literature and procedures, and a reporting log. The report and record drawing would be certified by a New York State Professional Engineer and will be submited to NYSDEC.

Operation and Maintenance

Following start-up, Dunn will monitor the system once per week for the first month and bi-weekly thereafter, and provide O&M required to keep the system operating in an effective manner. At each service, an inspection checklist will be completed. The results of the O&M will be provided in the monthly progress reports required as part of the IRM Consent Order.

Schedule

Installation can begin immediately upon approval of this plan. Installation of the system outlined above would require approximately 2 weeks. We propose to conduct the work between February 13 and February 24, 1995. MMC will schedule this work upon receipt of the Department's approval.

Please contact Pat Salvador (315) 456-3199 or me (315) 456-6976 if you have any questions or comments.

Sincerely,

Brian A. Kent, Mgr.,
Environment, Health & Safety

/cl
Enc.

pc: Henriette Hamel - NYSDOH
Director, Bureau of Environmental Exposure Investigation - NYSDEC
Ralph Manna - NYSDEC
Michael Lesser, NYSDEC
Virginia Robbins, Bond, Schoeneck & King
Alan Tavenner, Dunn Engineering Company

TABLE 1
MARTIN MARIETTA CORPORTATION
FARRELL ROAD PLANT - AOC #7
GROUNDWATER ELEVATION AND PRODUCT RECOVERY DATA
MONITORING WELL MW-2

Week Number	Date	Depth to Groundwater (ft)	Product Thickness (ft)	Product Recovered (liter)	Weekly Recovery (l)
1	7/8/94	NA	NA	0.80	0.80
2	7/12/94	NA	NA	0.10	
	7/14/94	NA	NA	0.00	0.10
3	7/22/94	NA	NA	0.10	0.10
4	7/28/94	NA	NA	0.05	0.05
5	8/8/94	14.67	0.01	0.05	0.05
6	8/23/94	14.81	0.00	0.15	0.15
7	9/9/94	14.97	0.00	0.85	0.85
8	9/27/94	15.57	0.46	2.30	2.30
9	10/4/94	15.72	0.18	2.00	2.00
10	10/11/94	15.70	0.47	2.00	2.00
11	10/18/94	15.81	0.54	2.00	
	10/19/94	15.36	0.01	2.85	
	10/21/94	15.28	0.01	1.40	6.25
12	10/24/94	NA	NA	1.10	
	10/26/94	15.42	0.01	1.15	
	10/28/94	15.44	0.02	0.75	3.00
13	10/31/94	NA	NA	1.80	
	11/2/94	15.54	0.13	1.00	
	11/4/94	15.85	0.56	0.20	3.00
14	11/7/94	15.95	0.68	1.80	
	11/9/94	15.95	0.71	0.40	
	11/11/94	15.88	0.60	4.00	6.20
15	11/14/94	15.99	0.75	4.00	
	11/15/94	15.99	0.72	1.00	
	11/17/94	15.98	0.70	2.00	7.00
16	11/21/94	16.00	0.72	3.00	3.00
17	11/28/94	16.10	0.83	2.80	
	11/30/94	16.10	0.83	0.40	
	12/2/94	16.09	0.83	0.30	3.50
18	12/5/94	16.05	0.80	1.30	
	12/7/94	16.08	0.88	0.50	
	12/8/94	15.60	0.33	3.00	
	12/9/94	15.48	0.25	3.50	8.30
19	12/12/94	15.53	0.35	3.00	
	12/14/94	15.53	0.35	3.00	
	12/16/94	15.48	0.35	0.80	6.80
20	12/19/94	15.52	0.40	0.60	
	12/23/94	15.55	0.45	3.00	3.60
21	12/27/94	15.58	0.47	0.50	
	12/30/94	15.57	0.60	0.10	0.60
22	1/4/95	15.52	0.40	0.60	
	1/6/95	15.96	0.77	0.00	0.60
23	1/9/95	16.07	0.83	1.80	
	1/11/95	16.08	0.83	2.00	
	1/13/95	16.10	0.83	2.00	5.80
			Total Product Recovered (liters)	**66.05**	

NA - Data not available.
Groundwater elevation is relative to an arbitrary datum (top of well casing).

The SpillBuster *Junior* is an economical electronically controlled product recovery system that can automatically recover product in 2" or larger wells. The *Junior* offers reliable and accurate sensing of the product/water interface to prevent water from being pumped into the product tank. When used with the Automatic Level Seek (A.L.S.) motorized reel unit the *Junior* can accurately track ground water fluctuations over a range greater than 10 feet with continuous product recovery.

SPILL BUSTER™ JUNIOR

The *Junior* system can also be utilized in multiple well sites with the addition of the *Junior* Multi-well Expansion Unit. With the Multi-well Expansion Unit up to 8 probe/pump units can be run from a single control box!

FEATURES:
- 115 VAC or 12 VDC operation for permanent or portable installation.
- Can pump product from depths of over 150 feet.
- Automatic product tank over-ride shutoff.
- Operates in 2" or larger well - no water discharge permitting required.
- Uses same proven technology as SpillBuster *Senior* Recovery System.
- 500 gallons per day product pump capacity.

ACCESSORIES: Automatic Level Seek - motorized water table tracking.
- Range of greater than 10 feet.
- Compact, explosion proof housing.
- Integrated well head clamp.
- 25 foot cable for 12 VDC operation.

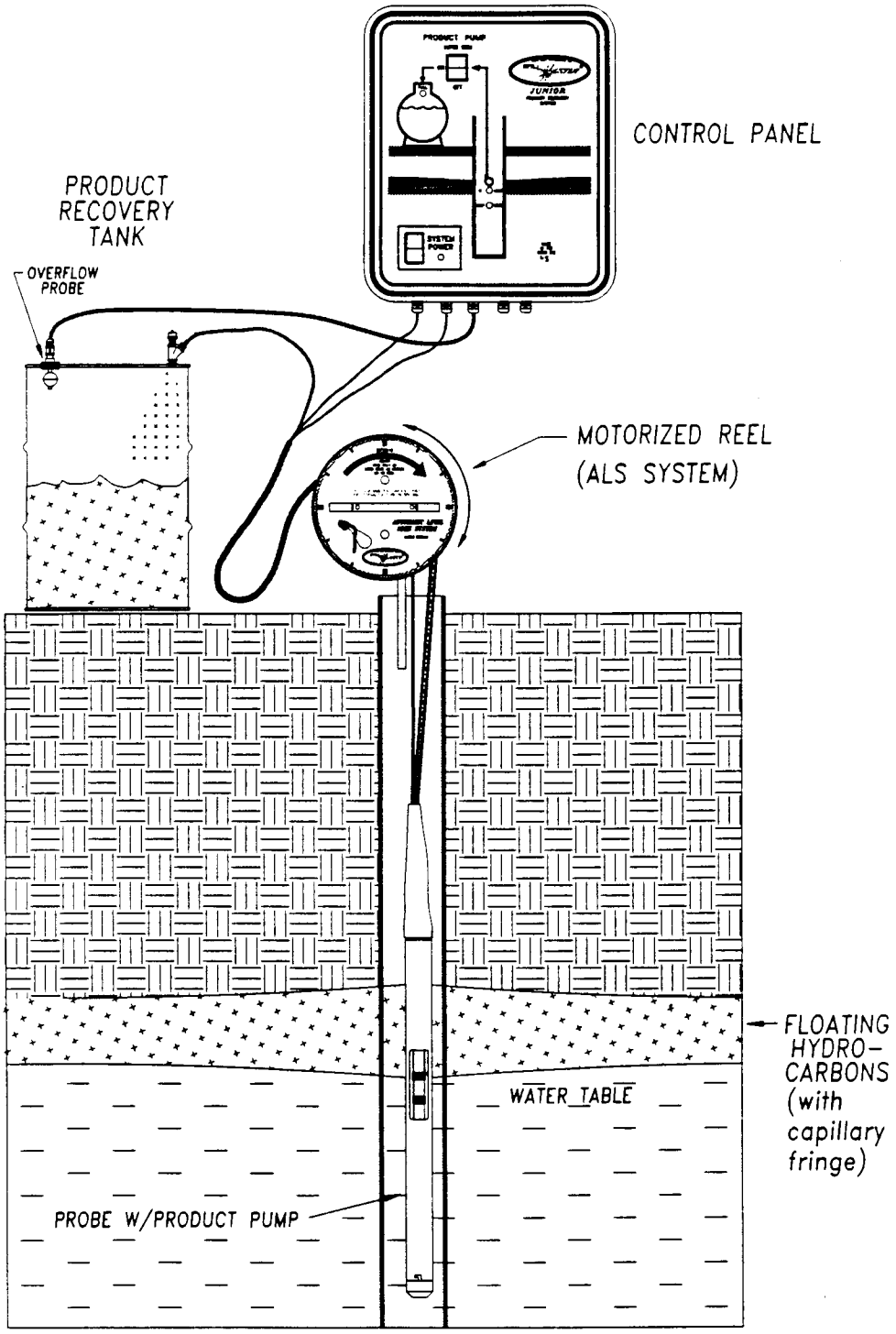
Multi-well Expansion Unit - operate multiple wells from one control box.
- Up to 8 probes time-shared from one control box.
- Each well & probe can be up to 500 feet from control box & product tank.

Immediate Response Box - portable rapid deployment system.
- Rugged plastic box housing a system ready to go!

CLEAN EARTH TECHNOLOGY, INC.
RR 1 Box 735 Long Point Road
North Ferrisburgh, Vermont 05473
(802)425-3710
FAX (802)425-2896

SPILLBUSTER *JUNIOR* PRODUCT ONLY SYSTEM

SHOWN WITH AUTOMATIC LEVEL SEEK



CLEAN EARTH TECHNOLOGY
RR1 BOX 735 LONG POINT ROAD
NORTH FERRISBURGH, VERMONT 05473
(802) 425-3710 FAX (802) 425-2896

1.0 Introduction

The Spillbuster Junior is an economical electronically controlled free product recovery system that can recover fluid products floating on the water table. The Spillbuster Junior is designed to operate as a product only system in a 2" or larger well. This frequently allows recovery to begin prior to permitting for larger wells and water discharge.

The Spillbuster Junior system is based upon patented state of the art sensors in a probe that sense the interface between water and product. A product pump is located in the probe that pumps continuously when the product intake is immersed in product.

Due to the highly accurate water/product interface sensing system the system offers water free recovery down to a product level of .5" above the interface. In addition, "Super Skim" operation provides accurate recovery down to .1" above the interface. The water/product interface location is detected by HYDRO SENSE ™ sensors. The sensors are made of polymer composite bands that sense variations in low frequency signal transmission upon contacting water.

System operation is completely automatic. If the water table height changes, the probe will continue to pump product as long as the probe inlet is immersed in product. If the water level rises to the product inlet or if the top of the product layer drops below the product inlet the pump will be shut off.

The basic Spillbuster Junior system is comprised of two major components: a control box, and a probe unit. The control box houses manual and automatic controls, logic circuits, and power supplies. The probe assembly is comprised of the HYDRO SENSE ™ water/product interface sensors, and an electric product pump. In addition to these two components a product tank overflow shutoff sensor and fitting are provided with the standard Junior system.

The product pump contained in the probe is a powerful unit that can pump up to 500 gallons per day in well depths of 100 feet or more. Reliability and life in severe environments is excellent. If replacement becomes necessary the procedure is simple and quick, requiring no tools.

Several options are available for the Spillbuster Junior system including the Automatic Level Seek system (A.L.S.), the Multi-Well System, and the Immediate Response Box.

The majority of systems in the field include the Automatic Level Seek (A.L.S.) system. The A.L.S. is a compact motor driven reel that automatically raises and lowers the probe in a 2" or larger well to track the water table. The A.L.S. system is attached to the top of the well and is housed in an explosion proof enclosure. The A.L.S. system is capable of tracking the water/product interface over a range greater than 10 feet up and down in the well.

The Multi-well System option provides an economical way to remove product from as many as eight wells using a single control box. Up to eight probes and A.L.S. units can be connected to a single system. The probes are operated on a time-shared cycle so that one well is operating at any given time. The period of operation for each probe is adjustable.

An Immediate Response box is also available that contains a complete recovery system in a rugged portable plastic box. The system contained in the box can be specified by the customer, and can be anything from a basic Junior system to a system with Automatic Level Seek or a battery for 12 VDC operation.

The Junior system can be operated from either 115 VAC or 12 VDC. For 12 VDC operation long cables with battery terminal clamps and photovoltaic (solar panel) recharge systems are available as options.

Schematics of "typical" system installations are shown on the next two pages. For a description of the system operation see Section 7.0 (System Operation).

The Spillbuster equipment is very versatile; we are capable of making modifications within a short time, or we may already have exactly what you need! For unusual site requirements or any other questions please contact the factory.

2.0 System Specifications

Power Requirements:

Control box: 115 VAC with ground (220 VAC standard option) 20 Amp service

Circuit Protection:

15 Amp main breaker on system power switch
7 Amp Slow-Blow fuse for product pump

Environmental Operating Limits:

Minimum Operating Temperature: -30 degrees F (ambient)
Maximum Operating Temperature: 150 degrees F (ambient)

Probe/Product Pump Specifications:

Probe Dimensions: 1 3/4" diameter X 24" long
Probe Weight: 2 1/2 pounds
Pump Performance: .3 GPM (500 gallons per day) - "type 1" viscosity - see below
100 ft. max. pumping head capacity
Probe/Product Pump Cable Length: 50 ft. standard (up to 500 ft optional)

Well Requirements:

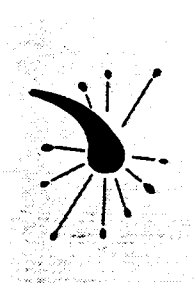
Well Diameter: 2 inch minimum for product recovery only
Well Depth For Product Only Pumping: Minimum of 2 feet of water below product level

Product Viscosity - Standard Product Pump:

"Type 1." Product (Viscosity of less than 10 Cp at 70 degrees f): gasoline
diesel fuel
#2 heating oil
JP-4
JP-5
paint thinners

Product Viscosity - High Viscosity Pump:

"Type 2." Product (Viscosity of less than 100 Cp at 70 degrees f): SAE 10 oil
Olive Oil
Polyurethane



Please call with your requirements for alternate product chemistrys and viscositys.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road, Albany, New York 12233

Langdon Marsh
Commissioner

MMC

FEB 13 1995

Environment Health & Safety

February 9, 1995

Mr. Brian A. Kent
Principal Engineer
Martin Marietta Corporation
P.O. Box 4840
Syracuse, New York 13221-4840

Dear Mr. Kent:

Re: GE Farrell Road Site, Geddes, Onondaga County, New York, Site No. 7-34-055, AOC #7

The New York State Department of Environmental Conservation (NYSDEC) has reviewed Martin Marietta Corporation's proposal to implement the next phase in the ongoing product recovery program in this area. We approve your proposal, and agree with your conclusion that groundwater depression would be counter-productive in this situation.

If you have any questions, please contact me at 518/457-4343.

Sincerely,

Robert W. Schick, P.E.
Section Chief, Remedial Section A
Bureau of Western Remedial Action
Division of Hazardous Waste Remediation

cc: L. Nyberg, Esq.
V. Robbins, Esq.
H. Hamel, DOH

To be POSTED in a Conspicuous Manner ON OUTSIDE OF BUILDING

THIS CERTIFIES THAT

Rust Environmental + Infra

has been granted a

PERMIT

To Erect Shed as per plan

at Syraco Farrell Rd

Peter Allen

CODE ENFORCEMENT OFFICER
Town of Geddes
1000 Woods Road
Solvay, New York 13209
(315) 468-2274

TOWN OF GEDDES
BLDG. CODE INSPECTOR

(This Permit Must Be Kept on the Premises With One Set of Approved Plans and Specifications until Full Completion of the Work Authorized)

NO PLUMBING, DRAINAGE or ELECTRICAL WORK in this Building to be covered or concealed without permission of the Code Inspector as evidence by his official stamp in this space.

Plumbing

Date Issued 1/25/95

Permit No. 5740

Electrical

BUILDING DEPARTMENT • TOWN OF GEDDES • Phone 468-2527

P.03

315 4537321

FARRELL.RD.

THE NEW YORK BOARD OF FIRE UNDERWRITERS

PAGE 1

8033406

BUREAU OF ELECTRICITY
202 ARTERIAL ROAD, SYRACUSE, NEW YORK 13206

Date FEBRUARY 28,1995 *Application No. on file* 08463195/95 H 734692

THIS CERTIFIES THAT

only the electrical equipment as described below and introduced by the applicant named on the above application number in the premises of

MARTIN MARIETTA, FARRELL RD./MARTIN MARIETTA, IN GEDDES, N.Y.

in the following location: ☐ *Basement* ☐ *1st Fl.* ☒ *2nd Fl.* COMM *Section* *Block* *Lot*

was examined on FEBRUARY 23,1995 *and found to be in compliance with the National Electrical Code.*

FIXTURE OUTLETS	RECEPTACLES	SWITCHES	FIXTURES			RANGES		COOKING DECKS		OVENS		DISH WASHERS		EXHAUST FANS	
			INCANDESCENT	FLUORESCENT	OTHER	AMT.	K.W.	AMT.	K.W.	AMT.	K.W.	AMT.	K.W.	AMT.	H.P.
					2										

DRYERS		FURNACE MOTORS				FUTURE APPLIANCE FEEDERS			SPECIAL REC'PT.		TIME CLOCKS		BELL TRANS.	UNIT HEATERS		MULTI-OUTLET SYSTEMS NO. OF FEET	DIMMERS	
AMT.	K.W.	OIL	H.P.	GAS	H.P.	AMT.	NO.	A.W.G.	AMT.	AMP.	AMT.	AMPS.		AMT.	H.P.		AMT.	WATTS

SERVICE DISCONNECT			NO. OF METER EQUIP.	SERVICE									
AMT.	AMP	TYPE		1 Ø 2W	1 Ø 3W	3 Ø 3W	3 Ø 4W	NO. OF CC. COND. PER Ø	A.W.G. OF CC. COND	NO. OF HI-LEG	A.W.G. OF HI-LEG	NO. OF NEUTRALS	A.W.G. OF NEUTRAL

OTHER APPARATUS:

PHOTO EYE-1
PANELBOARDS:1-4 CIR. 60
G.F.C.I.-1

THOMAS M. PATTERSON
6266 KIRKVILLE RD. N.
KIRKVILLE, NY. 13082

[redacted]

GENERAL MANAGER

Per 37

This certificate must not be altered in any manner; return to the office of the Board if incorrect. Inspectors may be identified by their credentials.

Building Department
TOWN OF GEDDES

1000 Woods Rd. Phone 468-2527 Solvay, N. Y.

Building Permit Receipt

No. 5740 Date January 25 1985

Permission is hereby granted to:

RUST ENVIRONMENT & INFRA.
12 METRO PARK RD
ALBANY NY 12205

to Erect shed as per plan

at premises located at
SYRACO Farrell Rd

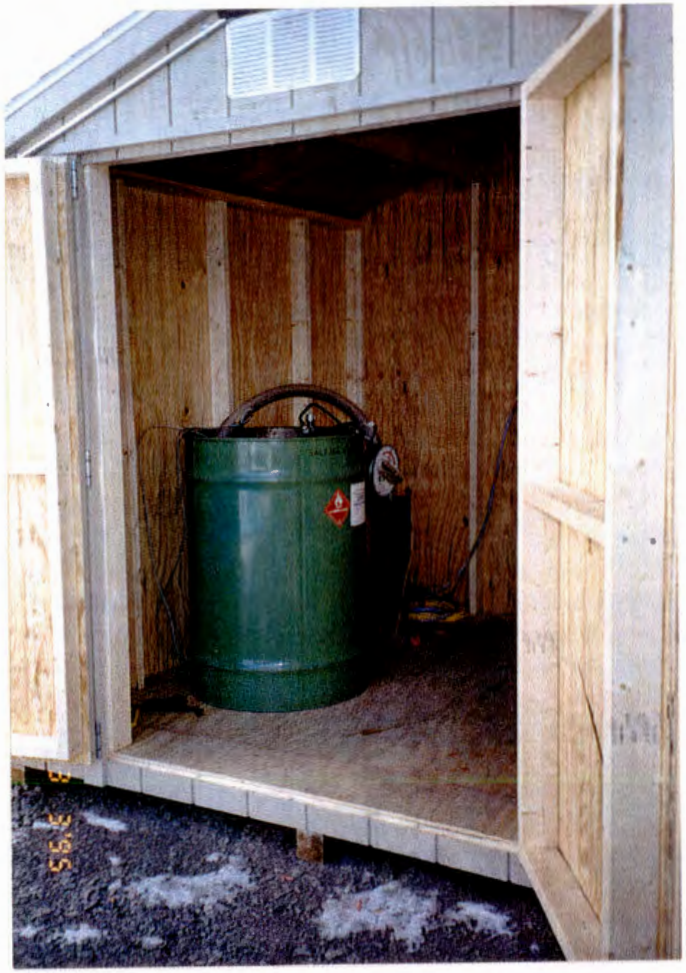
pursuant to application dated 1/25 1985, and plans and specifications approved by the Superintendent of Buildings.

Fee $ 10.00

Rec't # 3723

Est. $ 4000

Peter Allyn
Superintendent of Buildings



1)Building showing product storage drum and ALS on well head.

2) Product storage drum and ALS reel affixed to well head.

3)Building showing control panels.

APPENDIX C

Example Inspection Checklist and Product Recovery Log

Martin Marietta: Farrell Road Site AOC#7
Product Recovery System Inspection Checklist
Town of Geddes, New York

This summary inspection checklist is to be completed during each site inspection.
Note all items which require repair or maintenance.
Use the reverse of this page to note any additional comments.

Name of Inspector(s):_____

Date of Inspection:_____

Arrival Time:_____ Departure Time:_____

Weather conditions:_____

Inspection Items:	**OK:**	**Needs Attention:**
Enclosure condition:	_____	_____
Lights:	_____	_____
Product Recovery Pump:	_____	_____
ALS unit:	_____	_____
Control Panel:	_____	_____
Storage Drum and overpack:	_____	_____
Piping and containment sleeve:	_____	_____
Indication of spills or leaks:	_____	_____

Waste Inventory:

Product Level in Drum	_____ inches
Number of Drums	_____
Days in storage (oldest Drum)	_____ days

Spill Buster settings:

Cycle time	_____ hours
Probe raise time	_____ seconds
Product per cycle (if available)	_____ liters

Spill Buster Pump:	**OK:**	**Needs Attention:**
Pull Rope on Reel (not overlapping)	_____	_____
Pump Cable (over reel w/ adequate slack)	_____	_____
Control Box (low limit on/high limit off)	_____	_____
Super Skim Pump Check	_____	_____

Martin Marietta: Farrell Road Site AOC#7
Product Recovery System Inspection Checklist
Town of Geddes, New York

Well Data:

Depth to Product	_____ feet
Depth to Water	_____ feet
Product Thickness	_____ feet

(NOTE: Collect well data at least monthly.)

Additional Notes:

Sheet No. _____

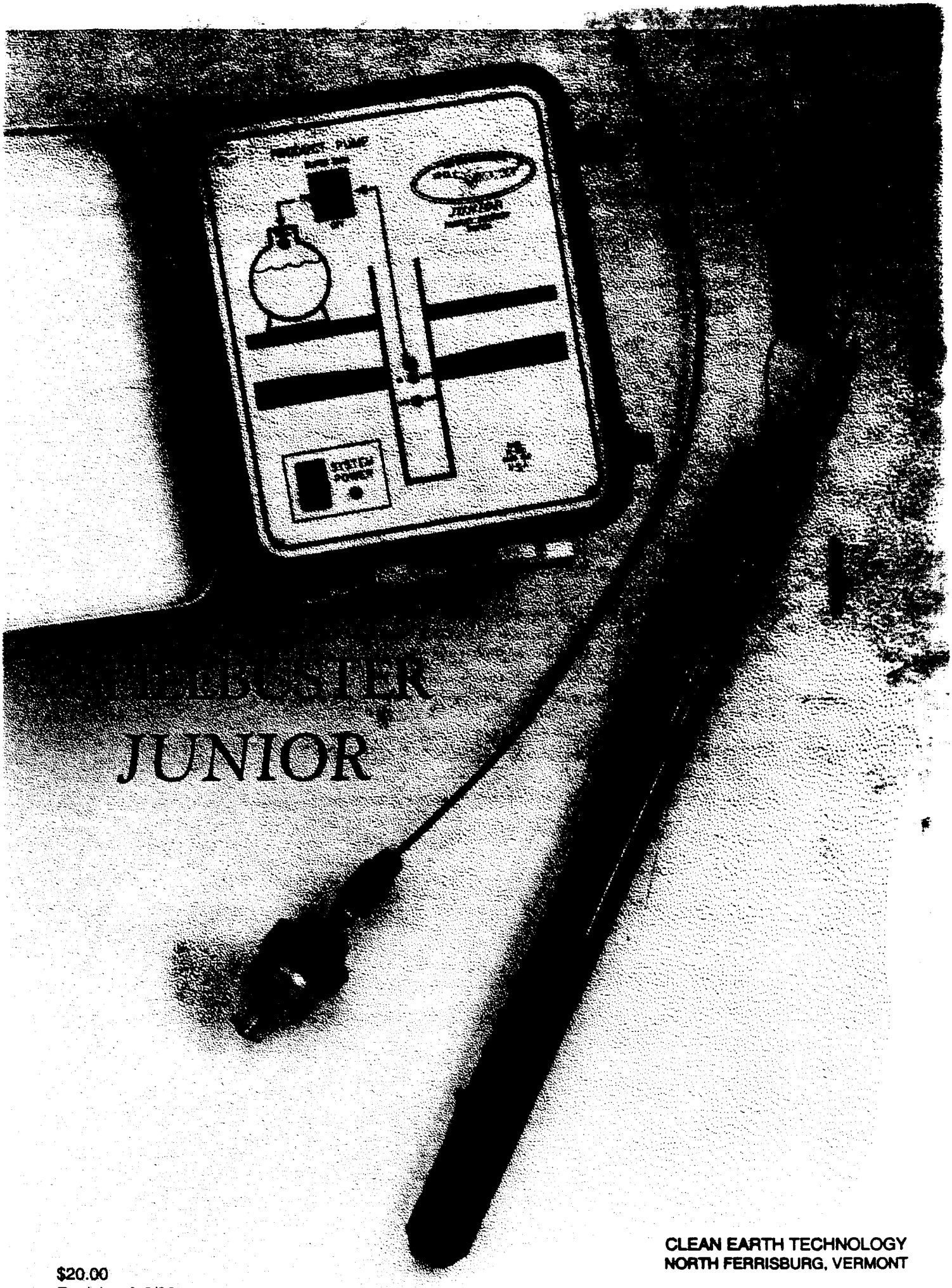
PRODUCT RECOVERY LOG

Farrell Road Site AOC #7

Date	Time	Product Level in Drum (inch)	Volume (gal) Recovered	Inspector	Notes

APPENDIX D

SpillBuster Jr. Equipment Manual



JUNIOR

CLEAN EARTH TECHNOLOGY
NORTH FERRISBURG, VERMONT

$20.00
Revision A 8/93

SpillBuster Junior Limited Warranty

All references to the Customer herein shall mean the Purchaser or the Lessee as applicable. CLEAN EARTH TECHNOLOGY, INC. (Clean Earth) warrants the SpillBuster Junior Remediation System (SpillBuster) to be free of substantial defects in material and workmanship for one year from date of shipment. Clean Earth's sole responsibility under this warranty shall be to either repair or replace, at its option, any component which fails during the applicable warranty period because of defect in workmanship or material. No other liabilities shall be assumed by the manufacturer or its agents, nor are they expressed or implied.

Clean Earth will, upon receipt of warranty item shipped freight prepaid, repair and return the item, freight prepaid, within 1 to 2 weeks.

This warranty is contingent upon proper use of the SpillBuster by the Customer in accordance with Clean Earth's published specifications. This warranty shall not be valid if the alleged defect is the result of abuse, misuse, accident, alteration, neglect, or unauthorized repair. Any repair shall be deemed unauthorized unless it is made by Clean Earth, or with the written consent of Clean Earth. This warranty is the sole warranty made by Clean Earth to the Customer and is in lieu of all other warranties or obligations, express or implied.

System upgrades will be made available to customers as they are completed. Clean Earth Technology is not obligated to provide those upgrades without cost.

WARNING: Logic board dip switch settings other than those shown herein are not approved by Clean Earth Technology Inc. and may cause spillage of product. Please consult the factory for alternate settings.

WARNING: In the event that equipment is returned to the factory for any reason a complete decontamination must be done before shipment. Shipping hazardous materials improperly may be a federal offence.

Clean Earth Technology
Long Point Road
RR 1 Box 735
North Ferrisburgh, Vermont 05473-9711
802/425-3710
FAX 802/425-2896

Table of Contents

1.0 Introduction

The Spillbuster Junior is an economical electronically controlled free product recovery system that can recover fluid products floating on the water table. The Spillbuster Junior is designed to operate as a product only system in a 2" or larger well. This frequently allows recovery to begin prior to permitting for larger wells and water discharge.

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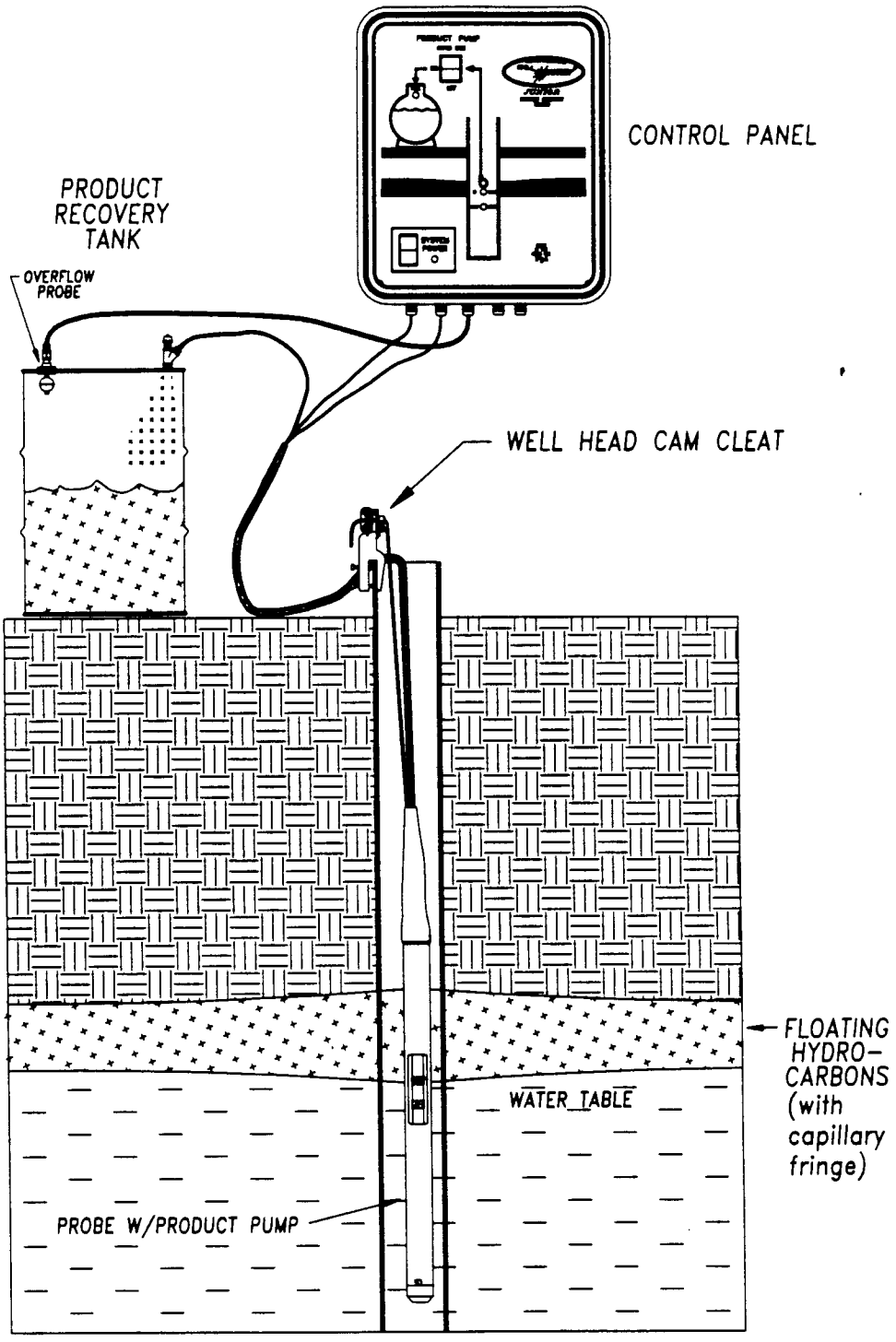
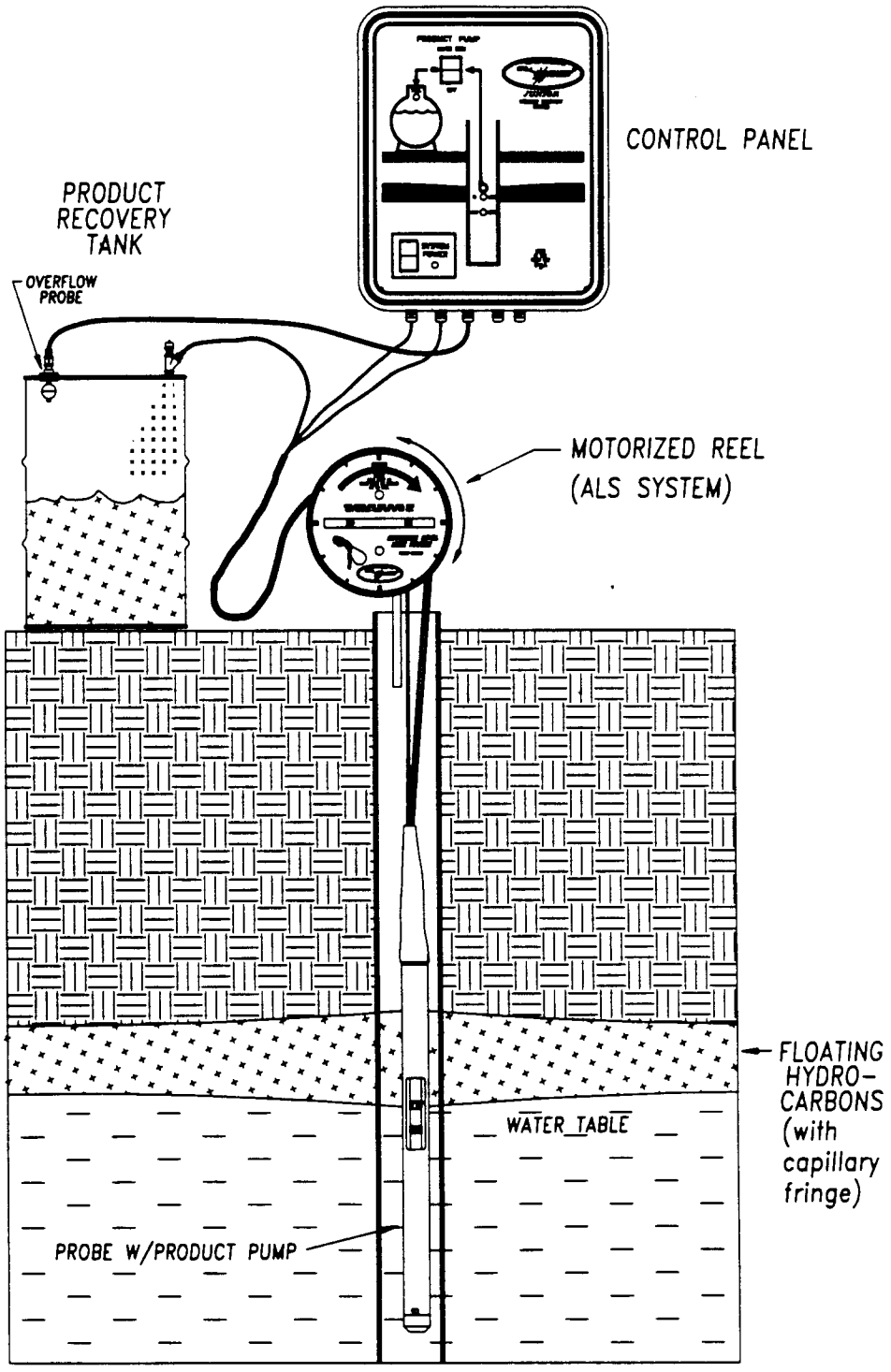
Introduction -Junior System Schematic



The basic Junior Spillbuster System set up with a well head clamp and cam cleat to position the probe in the well.

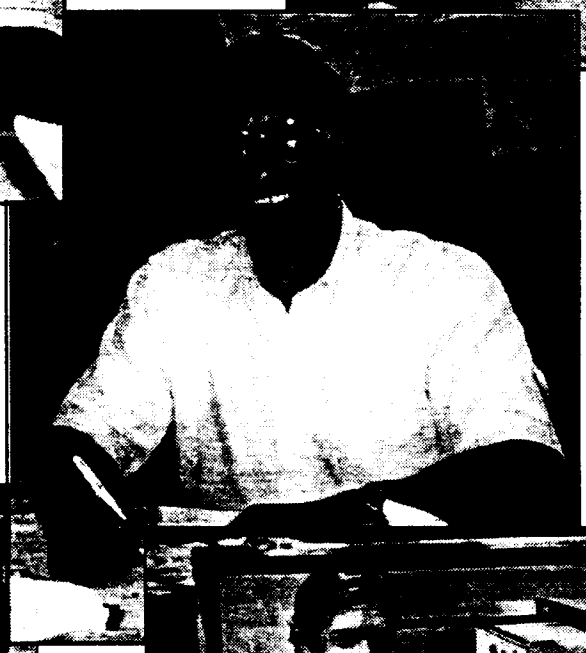
Introduction - Junior System with ALS Schematic



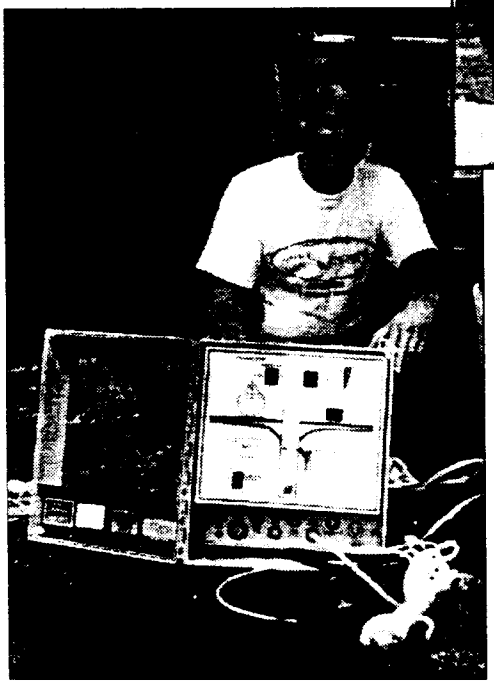
A Junior Spillbuster System set up with an Automatic Level Seek motor and reel. The ALS system is raises and lowers the probe in the well to track the water table. The ALS will track fluctuations of ten feet or more.

Dave Bowles

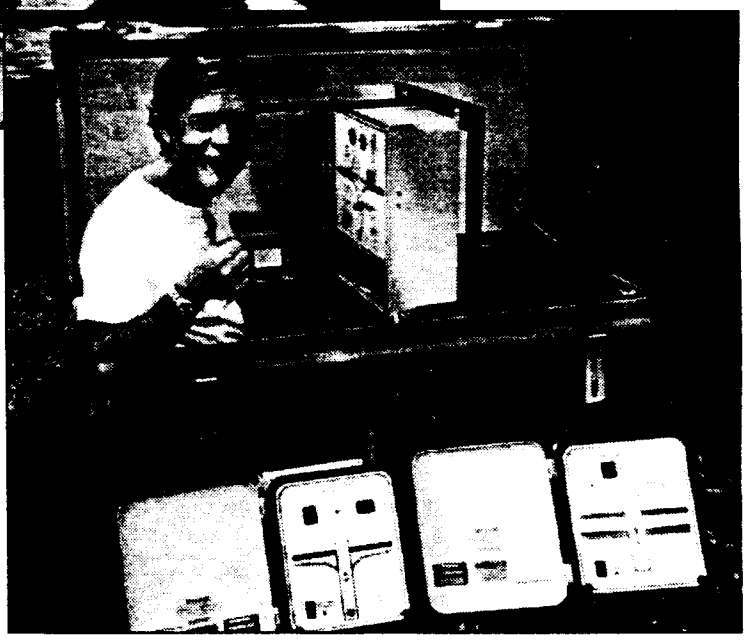
Dave Lamphere



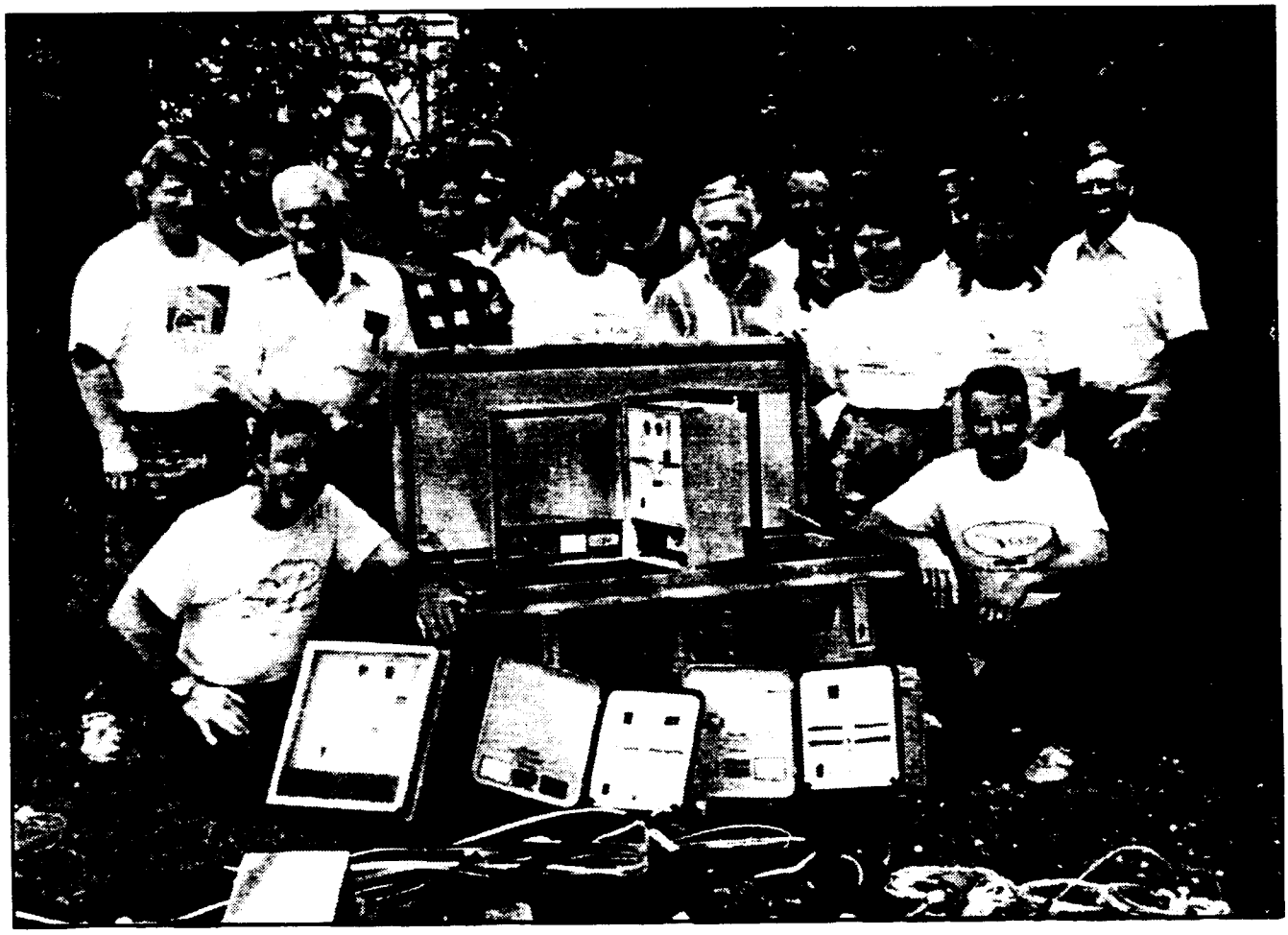
Tony Caruso



Tom Bouffard



Dave "Harry" Harrison
(No, we can't send a technician in every box!)



The Clean Earth Team

2.0 System Specifications

Power Requirements:

Control box: 115 VAC with ground (220 VAC standard option) 20 Amp service

Circuit Protection:

15 Amp main breaker on system power switch
7 Amp Slow-Blow fuse for product pump

Environmental Operating Limits:

Minimum Operating Temperature: -30 degrees F (ambient)
Maximum Operating Temperature: 150 degrees F (ambient)

Probe/Product Pump Specifications:

Probe Dimensions: 1 3/4" diameter X 24" long
Probe Weight: 2 1/2 pounds
Pump Performance: .3 GPM (500 gallons per day) - "type 1" viscosity - see below
100 ft. max. pumping head capacity
Probe/Product Pump Cable Length: 50 ft. standard (up to 500 ft optional)

Well Requirements:

Well Diameter: 2 inch minimum for product recovery only
Well Depth For Product Only Pumping: Minimum of 2 feet of water below product level

Product Viscosity - Standard Product Pump:

"Type 1." Product (Viscosity of less than 10 Cp at 70 degrees f): gasoline
diesel fuel
#2 heating oil
JP-4
JP-5
paint thinners

Product Viscosity - High Viscosity Pump:

"Type 2." Product (Viscosity of less than 100 Cp at 70 degrees f): SAE 10 oil
Olive Oil
Polyurethane

Please call with your requirements for alternate product chemistrys and viscositys.

3.0 Equipment List

STANDARD EQUIPMENT:

NEMA 4 weatherproof main control panel

Product tank level sensor w/25 foot signal cable

Product pump/probe w/50 foot probe cabling & pull rope

100 foot product discharge line

25 foot probe power cable extension

Product tank discharge bung

Well head cam cleat and bracket

STANDARD OPTIONS:

Automatic Level Seek (ALS) System (for product only system)

Multi-well System (operates up to eight wells)

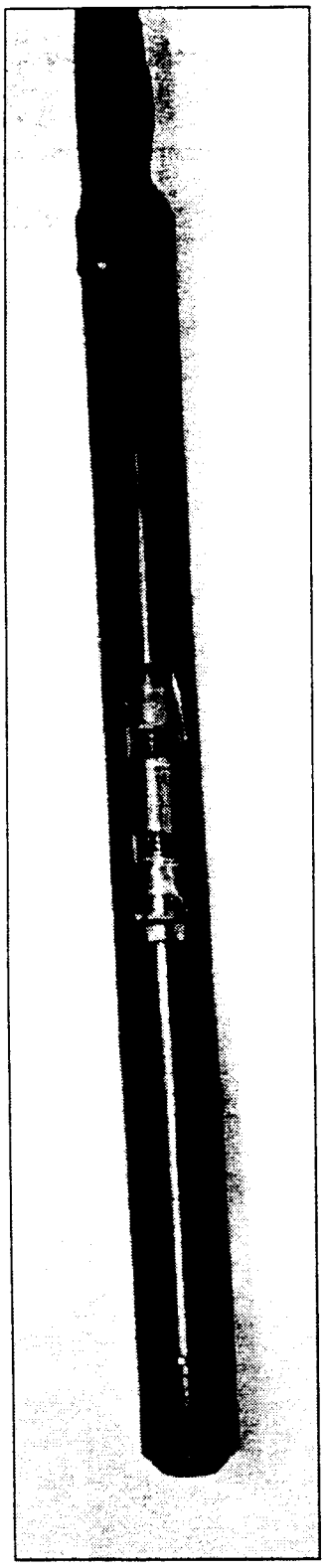
Immediate Response box (portable recovery system)

12 VDC battery cables (25')

Batteries with Solar Charger

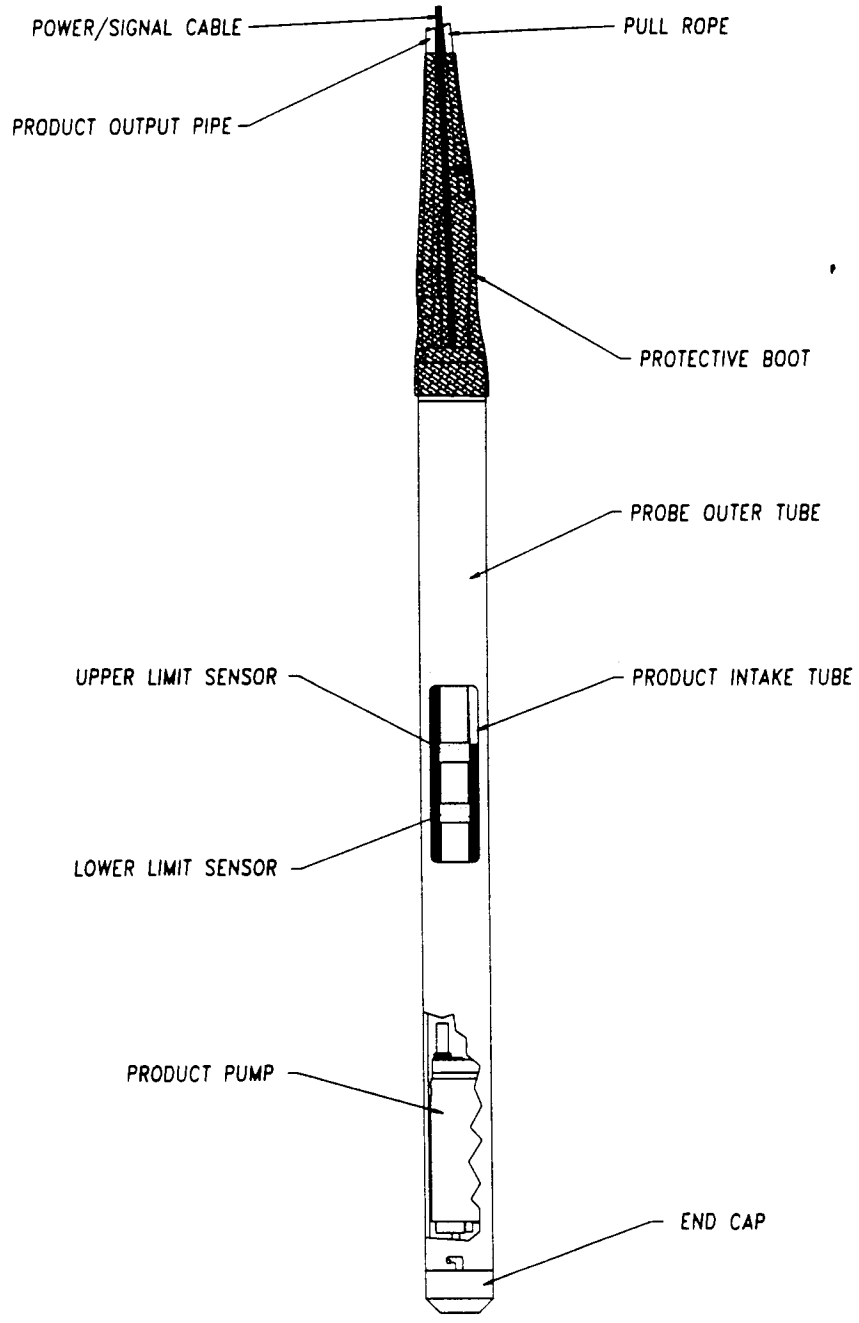
Extension cables - Product pump/probe to control panel available in 25, 50, 75, and 100 foot lengths (non-standard lengths also available).

4.0 System Components



Probe/Product Pump

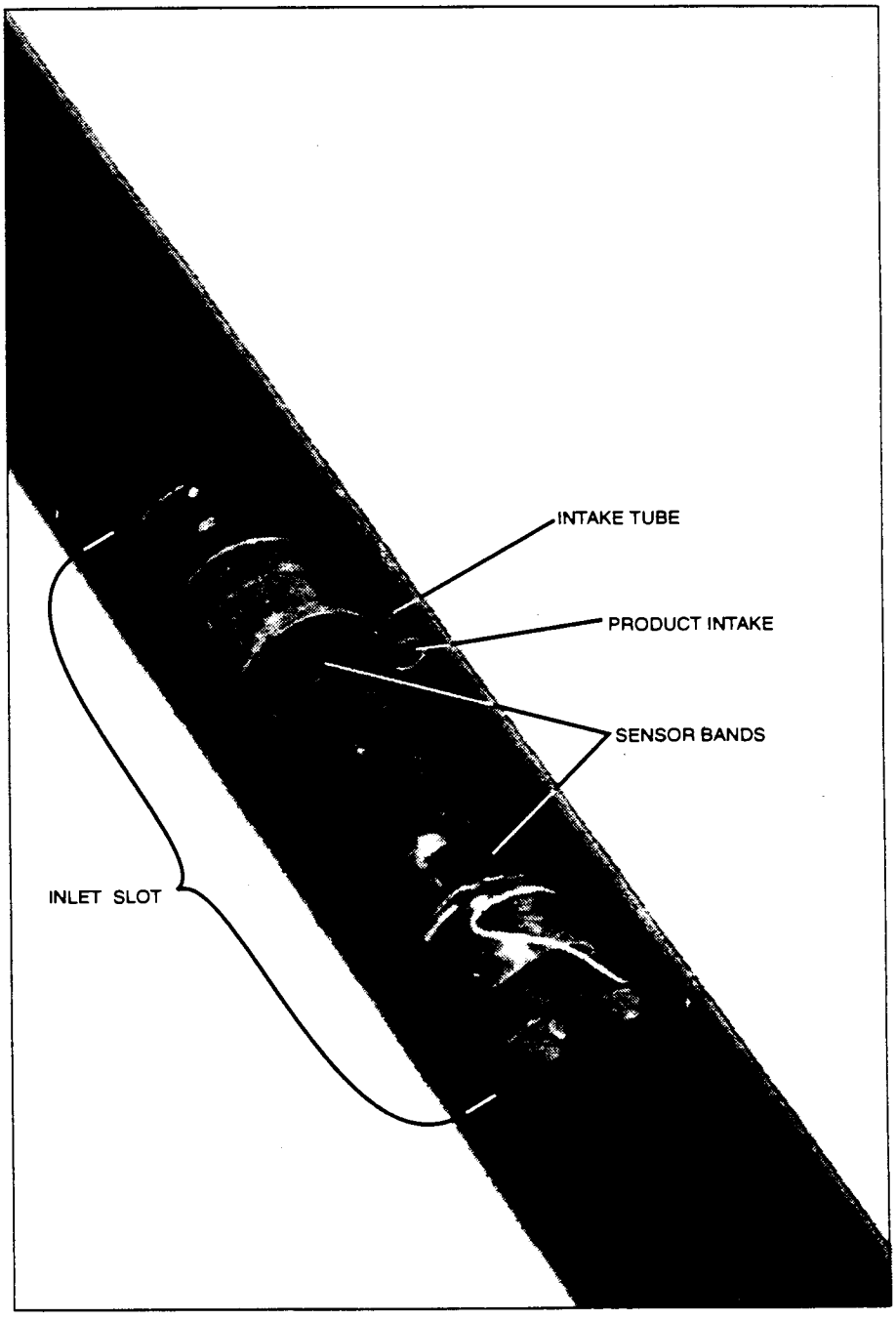
The probe/product pump contains circuits for sensing the product/water interface as well as housing the product pump. Sensors insure that water will never be pumped into the product tank. The probe/product pump assembly is constructed of corrosion and chemical resistant metals and plastics. The probe is shown in a photo at the left and below in a cutaway view.

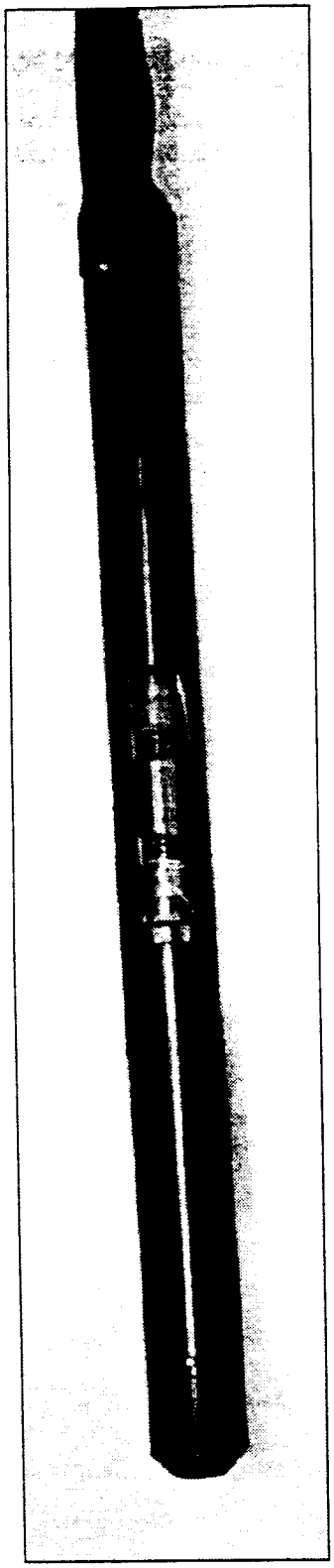


Inlet Slots

The probe inlet slots in the middle of the probe body allow water and product to enter into the interior of the probe. Care must be taken when cleaning the inlet slots to avoid damaging the black sensor bands and their attaching wires. Use of sharp tools such as screwdrivers, knives, etc. to clean the probe inlet slots should be strictly avoided. Proper cleaning of the inlet slots and sensor bands is described in Section 8 - Service and Maintenance.

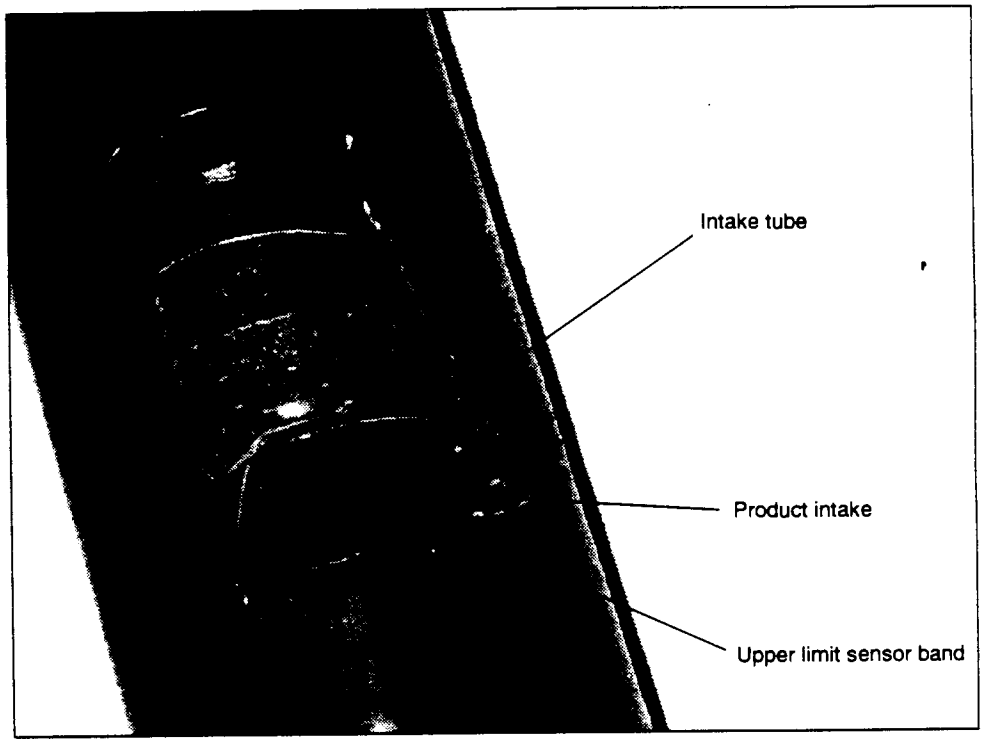
There are two inlet slots in the middle of the probe on opposite sides. The slots are approximately 5" tall and 1.2" wide. The slots allow the product to flow into the product inlet and around the sensor bands.





Inlet Tube

The pump inlet tube is located about midway up the probe, just above the high limit sensor. Product is drawn up into the intake tube and is directed to the pump in the bottom of the probe. The product inlet is shown below.

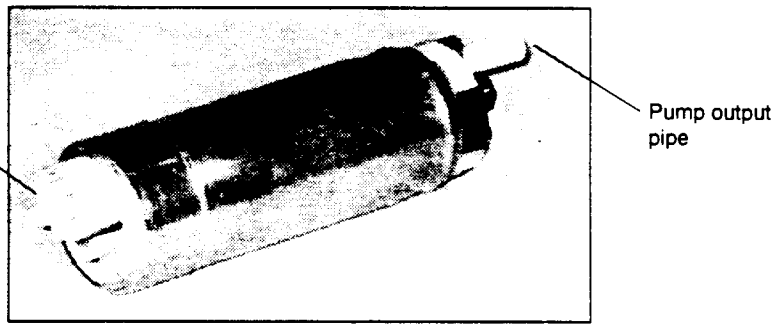


Sensors

There are two sensor bands; one lower band and one upper band. The sensors use a low frequency signal to sense the product/water interface. The sensors operate on the phenomena that signal transmission varies significantly due to the transmission characteristics of the fluid surrounding the antenna. The variation in signal transmission is used to determine the interface location to an accuracy of +/- .1" relative to the product inlet. The sensors are constructed of "state of the art" polymer materials for corrosion resistance and long life.

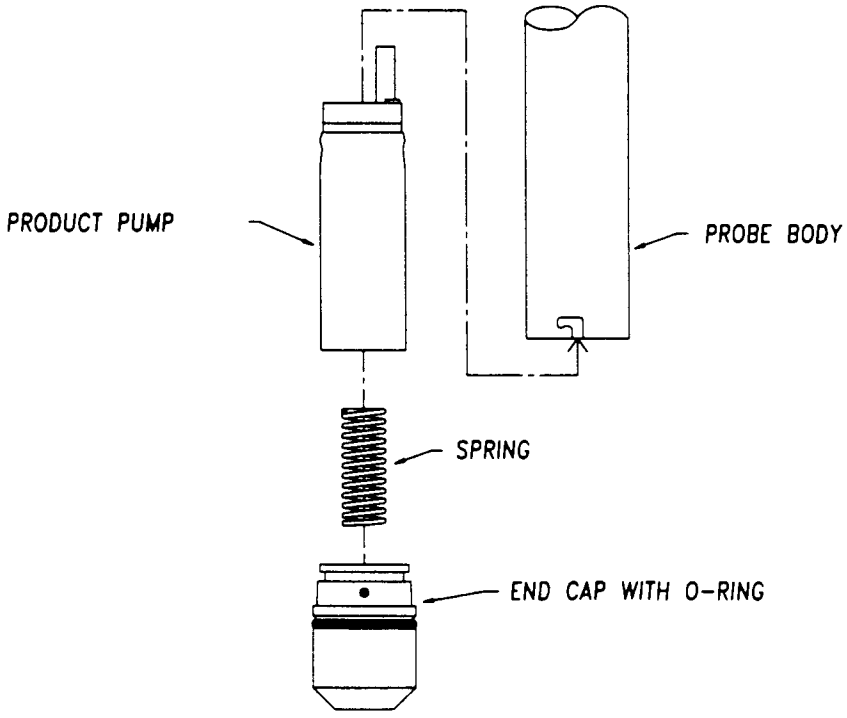
Product Pump

The product pump is a very rugged and chemical resistant unit capable of pumping 500 gallons per day, and will provide a 150 foot head. In addition, it can withstand a certain amount of small solids such as dirt or sand passing though it. A modified version is available that can pump higher viscosity fluids (up to 100 centipoise) such as polyurethane varnish, SAE 10 oil, and olive oil.

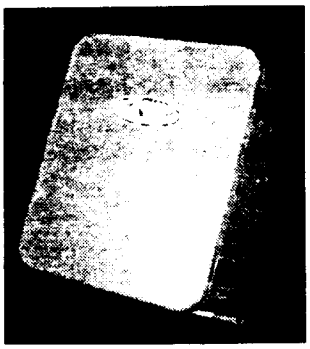


Standard product pump

The product pump is easily accessable and is located in the bottom of the probe. The pump is spring loaded into the probe body by the pump cap (end cap) and is held in place by the pump cap and spring. Pump removal is described in detail in Section 8 - Maintenance and Service..



Product pump assembly



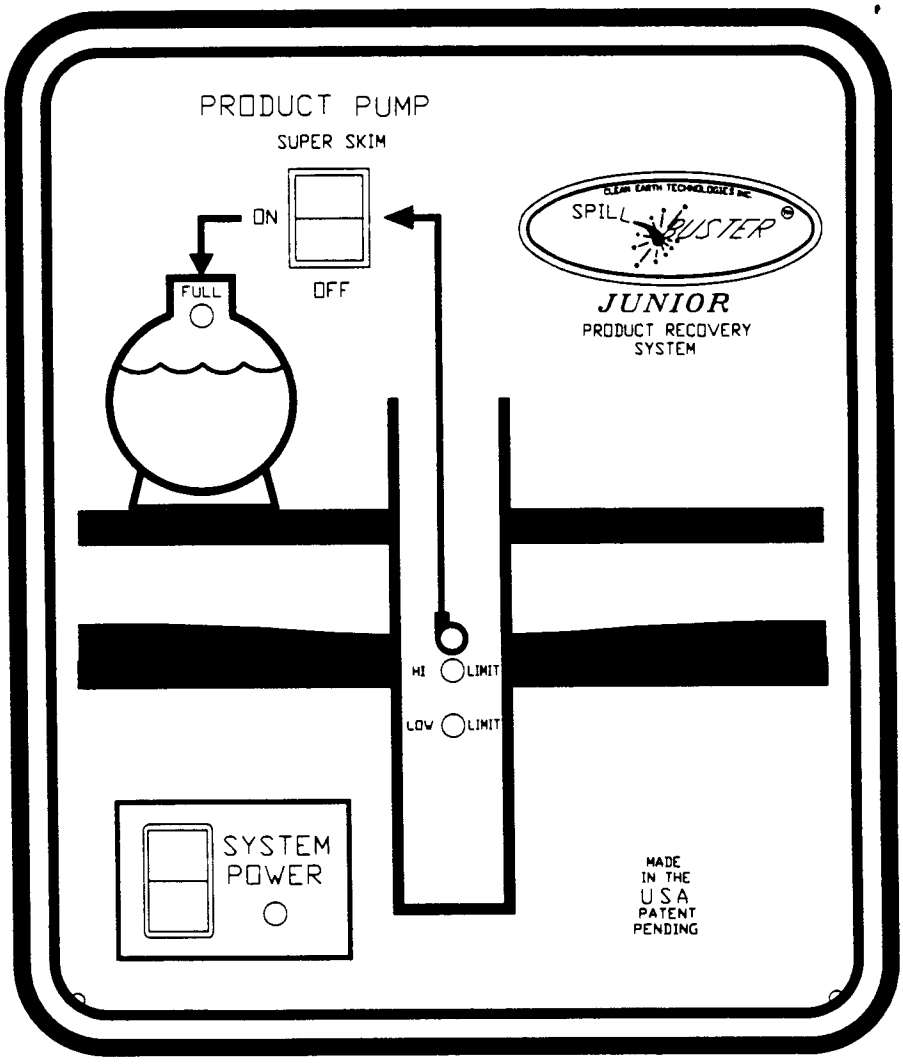
Spillbuster Junior Control Box

Control Box

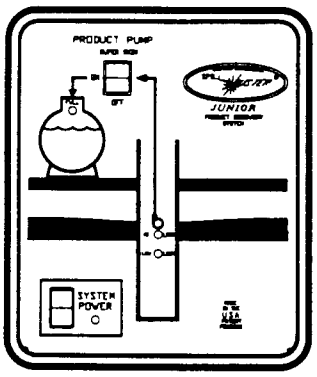
The control box is a NEMA 4 weatherproof metal box containing the logic circuits and controls for the Spillbuster Junior system. The control box door should be kept latched at all times when not in use, and excessive moisture (e.g. rain) should be not be allowed to enter the box. Although there are no open contacts this is not an explosion-proof enclosure; locate the control box in a non-hazardous location!

Control Panel

The control panel is accessible by opening the front cover of the control box. The control panel contains the system power switch and product pump switch. In addition, LED (light emitting diode) indicators display product tank level, water level, and product pump status. The control panel is shown below.



The Control Panel, inside the cover of the Control Box.

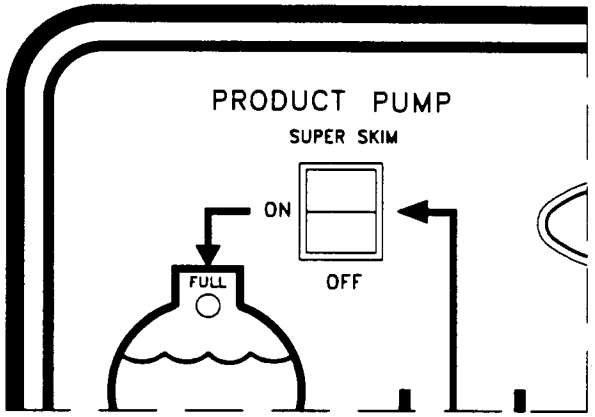


An enlarged view of the Super Skim switch on the control panel is shown at the right.

Product Pump/Super Skim Switch

The three position product pump/super skim switch is shown below. The first (lower) position of the switch is product pump OFF.

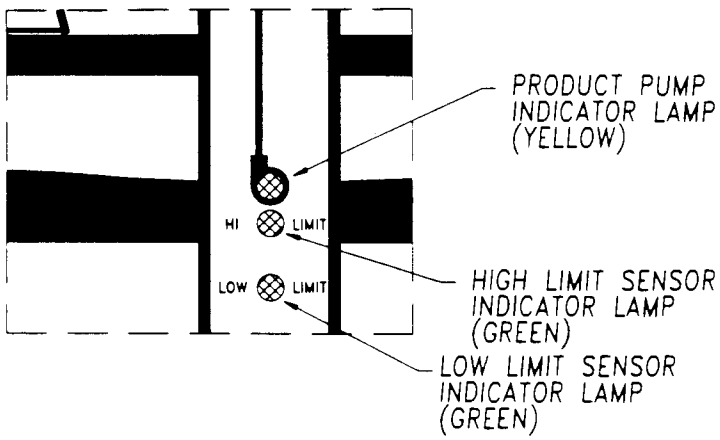
The middle position is product pump ON. Once the switch is turned on the system logic automatically turns the product pump on and off as required.



The yellow product pump indicator light in the center of the control panel (shown below) indicates when the pump is actually operating. It does not indicate whether or not the switch is ON. In the ON position the product pump operates automatically. In normal operation the product pump indicator light will turn off and on as the product pump cycles.

The third (upper) switch position turns on the Super Skim mode of operation. The Super Skim switch position is spring loaded. When the switch is momentarily pressed the Super Skim function is activated and will run its course. Super Skim is operated on a timer that is preset at the factory for 30 seconds. The timer can be set for a different duration if desired by modifying dip switch settings on the logic board inside the control box. For further information on dip switches see the section entitled Dip Switch Settings. Once the timer shuts Super Skim off, the system reverts to normal operation (product pump ON). The Super Skim mode can be cancelled by pushing the switch into the OFF position.

An enlarged view of the probe indicator lamps is shown at the right.



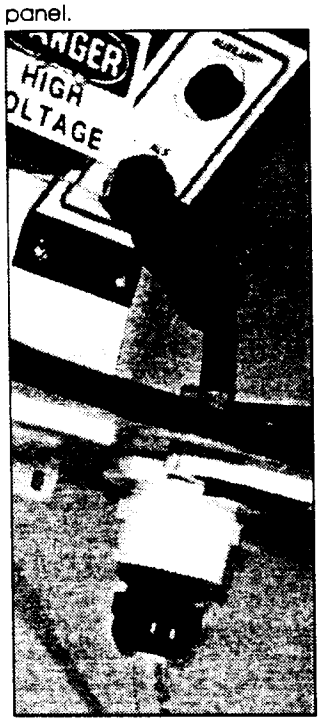
Logic Board

The logic board is located on the rear side of the control panel. The control panel is hinged on the top edge. The control panel can be opened to access the logic board by removing the two screws at the lower corners of the control panel (newer models have two pull knobs instead of two screws). The bottom of the control panel will then swing out and up to expose the board. The removal and installation of the board is detailed in Section 8 - Service and Maintenance.

The control box with the front panel opened up to access the logic board.

Printed circuit board inside the control box

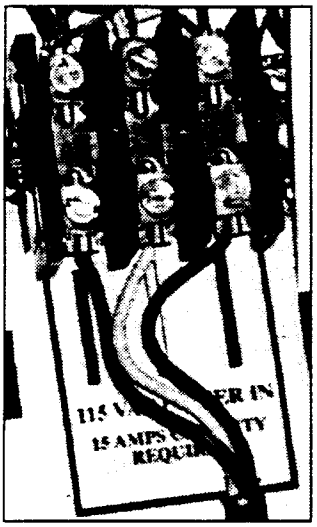
ALS cable passing through the bottom of the control box and attaching to the connector panel.



Control Box Cable Connections

Input/output cables for the system feed through the bottom of the control box and connect on the I/O connector panel inside the box. These cables include the probe product pump power, probe signal cable, product tank sensor, and A.L.S.

The proper connections are shown in the control box via color coding overlays surrounding the connectors. Cables have corresponding color bands. Connectors are unique for each cable, thus it is not physically possible to make the wrong connection on the I/O panel. Cables are provided from the factory with controlbox feedthroughs and connectors already installed on the cables.



115 Volt Terminal Block shown with the protective cover removed.

Control Box 115 Volt Terminal Block

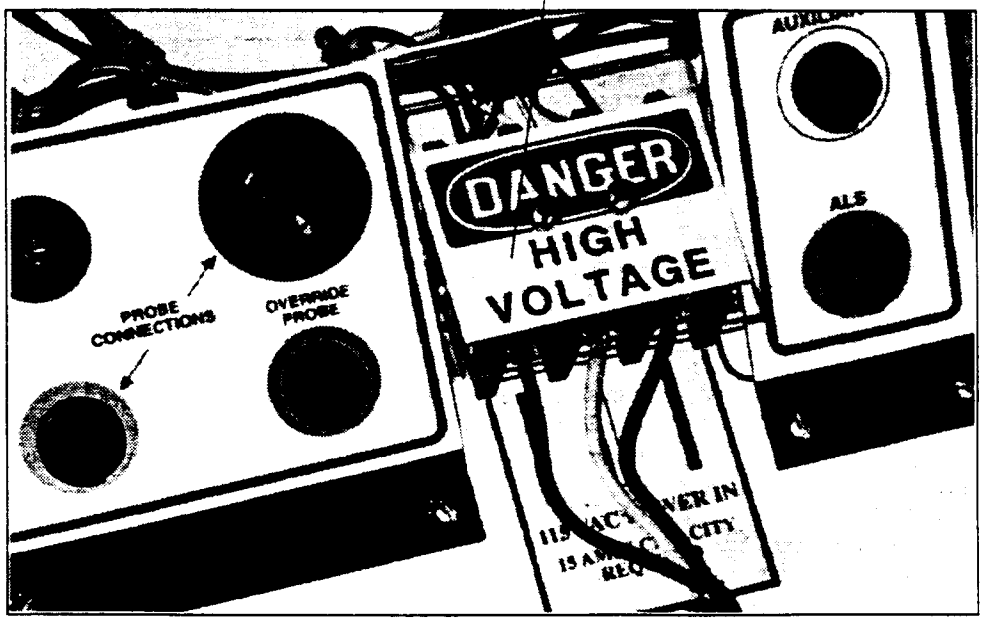
WARNING!

All 115 volt wiring must be done by a qualified electrician. Disconnect 115 volt power at its source prior to opening the control panel or accessing the terminal block or connector panel. Electrical shock may result in serious injury or death.

115 VAC wiring is connected in the control box on the 115 volt terminal block. The terminal block is accessed by opening the front panel and removing the protective cover.

The 115 volt cable is fed through a cable feedthrough at the bottom of the control box and connected to the terminal block as shown on the overlay directly below the terminal block. The overlay is color coded to assist in making the correct connections. Always replace the protective cover after service.

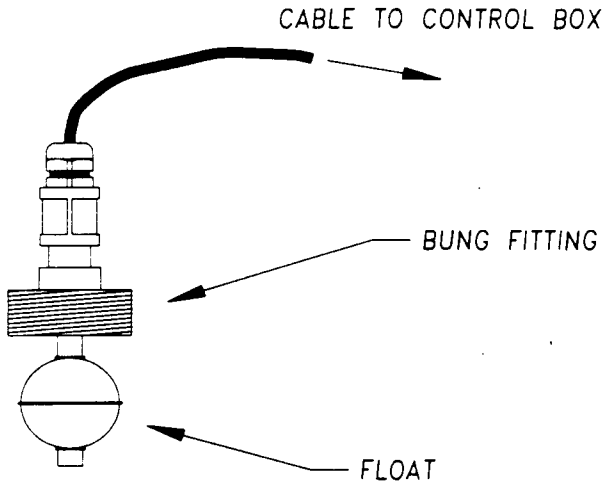
115 Volt Terminal Block with the protective cover attached.

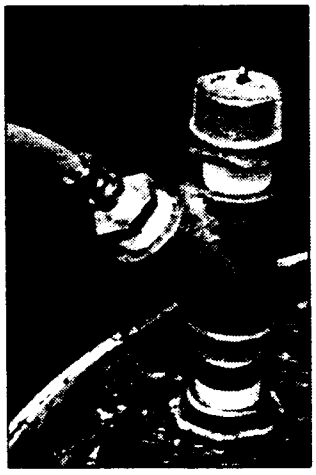


Product tank probe installed in a standard 2" NPT bung shuts the system off when the tank is full.

Product Tank Probe

The product tank probe has a float sensor that actuates when the tank is full. When the product tank is full the product pump is automatically turned off. The product tank probe installs in a standard 2" NPT bung hole.

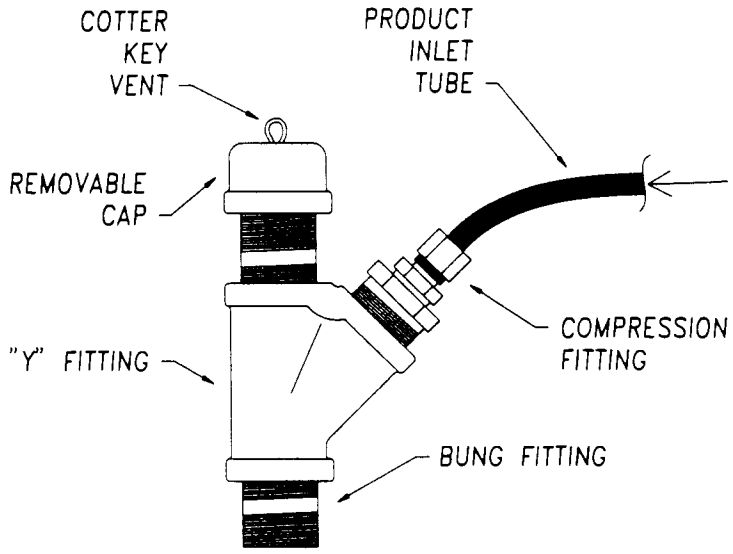




Product tank inlet fitting vents the tank and provides an inlet for product pumped out of the well by the probe. The cap can be removed to test the level with a dip stick.

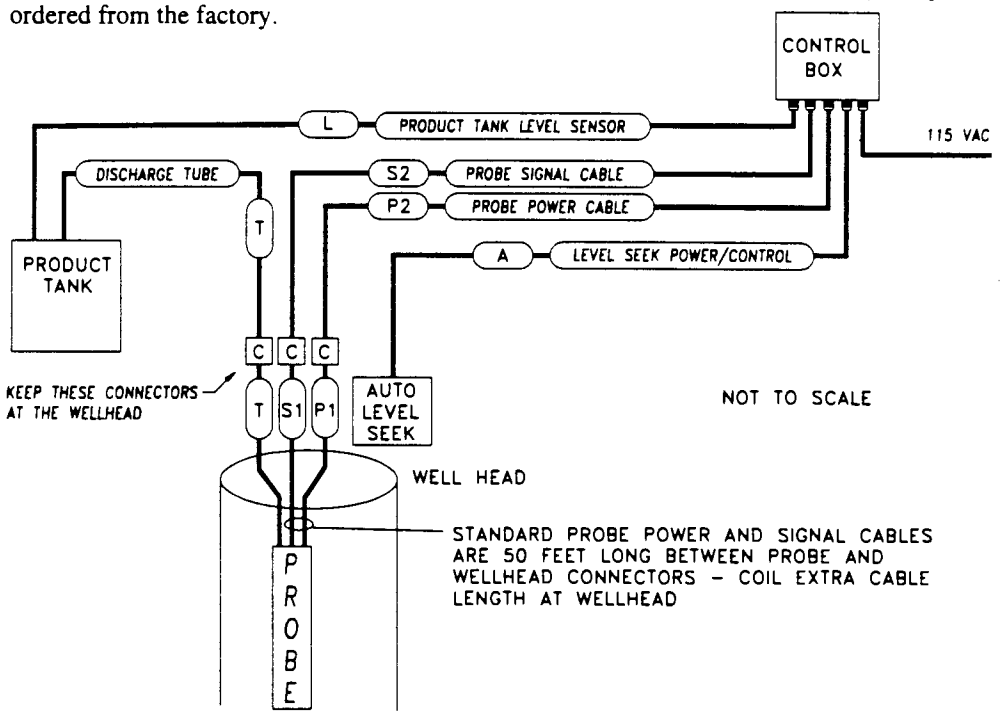
Product Tank Inlet Fitting

The product tank inlet fitting screws into the small bung on the product tank. The inlet fitting contains a vent in the cap as shown in Figure 9. The design allows the use of a dipstick without removing the Inlet Fitting by unscrewing the vented cap on the top. The product tube (coming from the Probe) attaches to the inlet fitting with a compression fitting which is supplied.



Cables

The standard Spillbuster system is supplied with cables as shown in the following schematic. As shown in the table accompanying the schematic some optional extension lengths are available as off the shelf parts. Any cable extensions other than those shown may be special ordered from the factory.



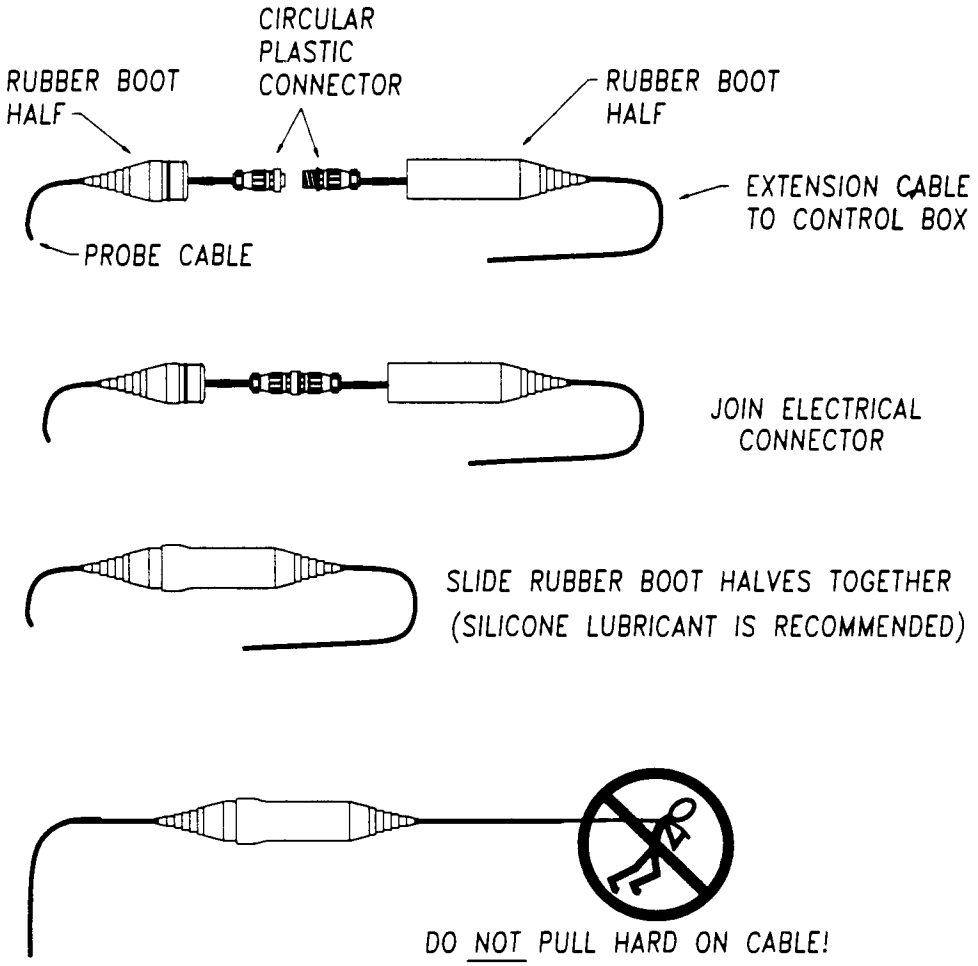
Tag	Descnption	Standard Lengths	Standard Options	Optional Lengths
P1	Power Cable (Probe to Connector at Wellhead)	50'	75', 100', 125'	up to 150' max. - **
P2	Power Cable (Wellhead Connector to Control Box)	25'	50', 75', 100'	**
S1	Signal Cable (Probe to Connector at Wellhead)	50'	75', 100', 125'	up to 150' max. - **
S2	Signal Cable (Wellhead Connector to Control Box)	25'	50', 75', 100'	*
L	Product Tank Level Sensor Cable	25'	50', 75', 100'	*
T	Product Delivery (discharge) Tube (shipped with 100' of extra tubing in addition to the standard 50')	50'	100' lengths	
A	Automatic Level Seek Cable	50'	up to 250'	
C	Cable Connectors w/Rubber Boots			

* - Custom lengths can be made for any cable

** - Longer lengths on the probe power cable require heavier gauge wire to handle current

Cable Connector And Rubber Boot Assembly

The power and signal cables coming from the probe are 50 feet long. An extension cable must be used to connect the probe cables to the control box. 25 foot extension cables are supplied as standard equipment for this purpose. The cabling is designed to place the connection between probe cables and the extension cables at the well head for easy probe removal. The connections between the probe cables and the probe extension cables are made with electrical connectors with rubber sealing boots over them as shown below.

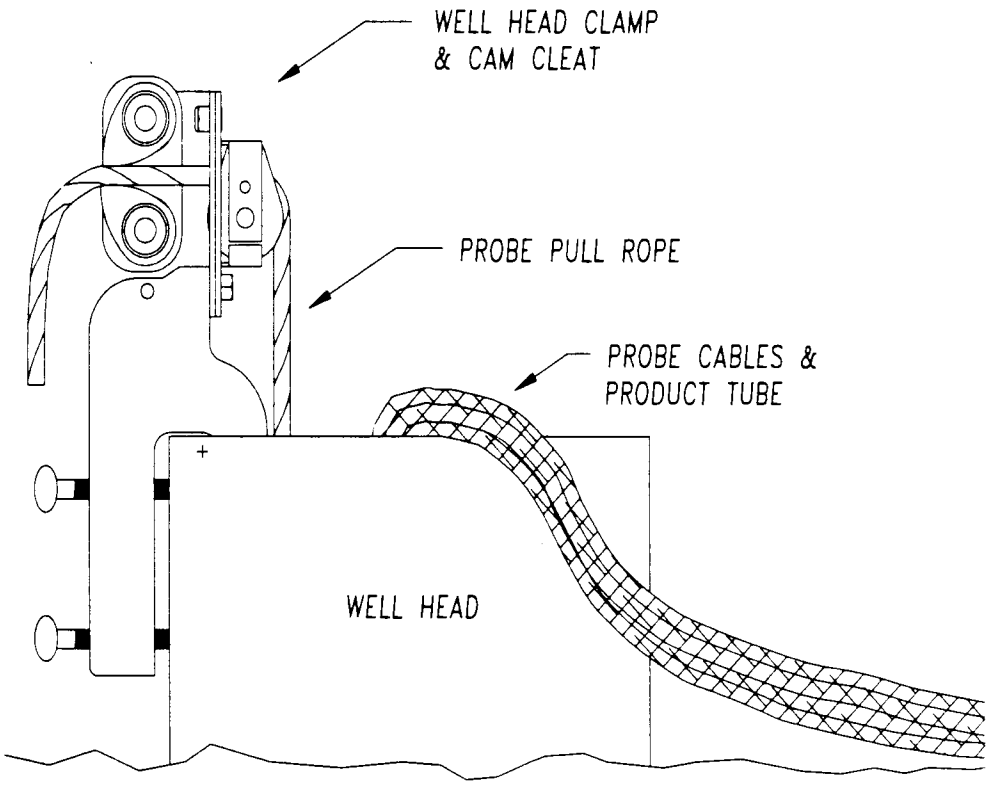


Avoid pulling on the cable or damage may result to the cable or connector! *Do not* attempt to pull the rubber boot assembly through a conduit. The rubber boot should be kept at the well head. Any excess probe cable can be coiled and kept at the well head. Alternate cable lengths are readily available for deeper wells and control box placement further than 25 feet from the well head. The maximum allowable total cable length from the probe to the control box is 1000 feet. Long cables require larger gauge wire for the product pump. Contact the factory for information and availability.

Well Head Clamp And Cam Cleat

The well head clamp and cam cleat can be used to fix the location of the probe in the well when the Auto Level Seek reel unit is not installed. The clamp is attached to the well head using two thumb screws as shown below. The clamp is not necessary when the A.L.S. is installed.

Drawing of a well head clamp holding a probe by cleating off the probe pull rope at a fixed depth in the well.

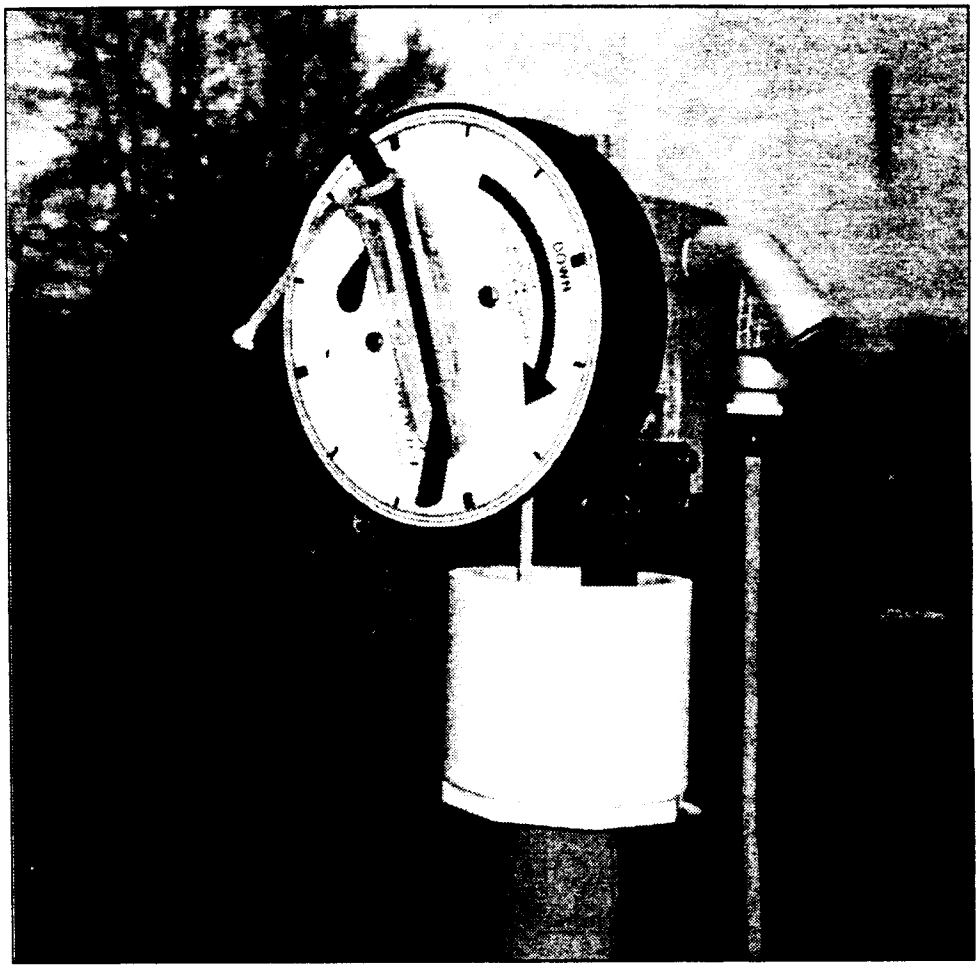


5.0 Options

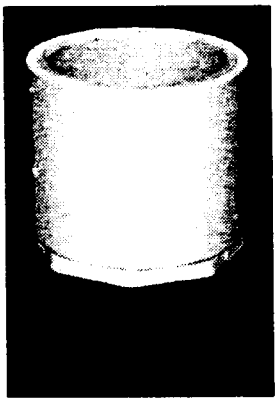
Automatic Level Seek System

The Automatic Level Seek (A.L.S.) system is available as an option to provide probe tracking of the water/product interface in a 2" or larger well. The A.L.S. system is for use in a product only recovery set-up; it cannot be used simultaneously with a SpillBuster depression system. The system consists of a motor and reel assembly attached to the wellhead that automatically raises and lowers the standard SpillBuster system probe as the water table moves.

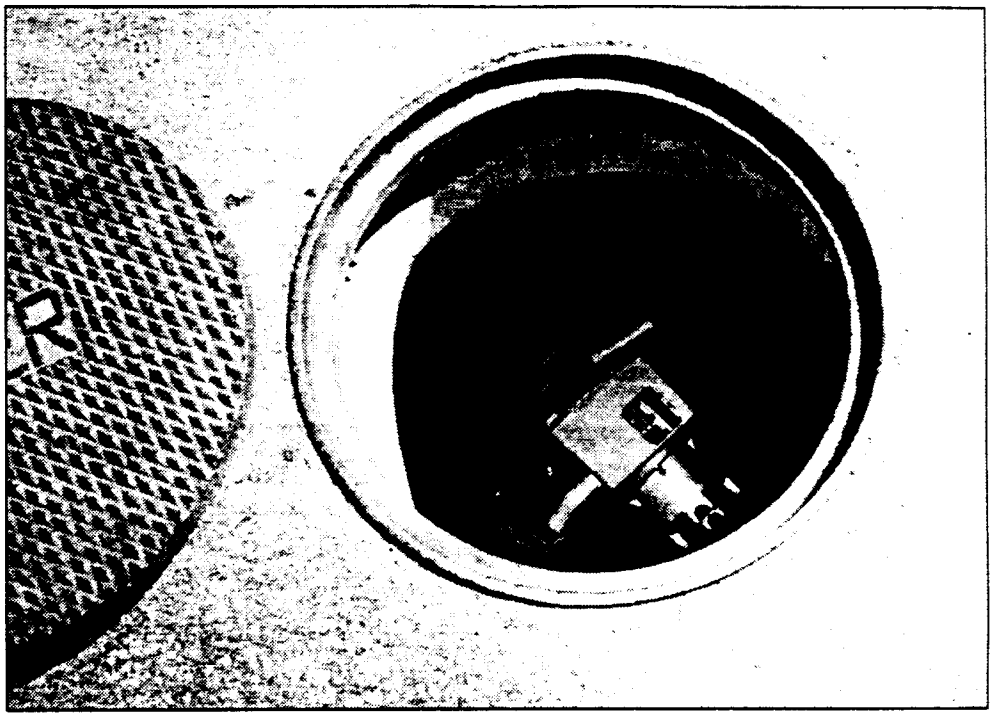
The A.L.S. system plugs into a connector that is provided on both the SpillBuster Senior and Junior control box I/O panels.



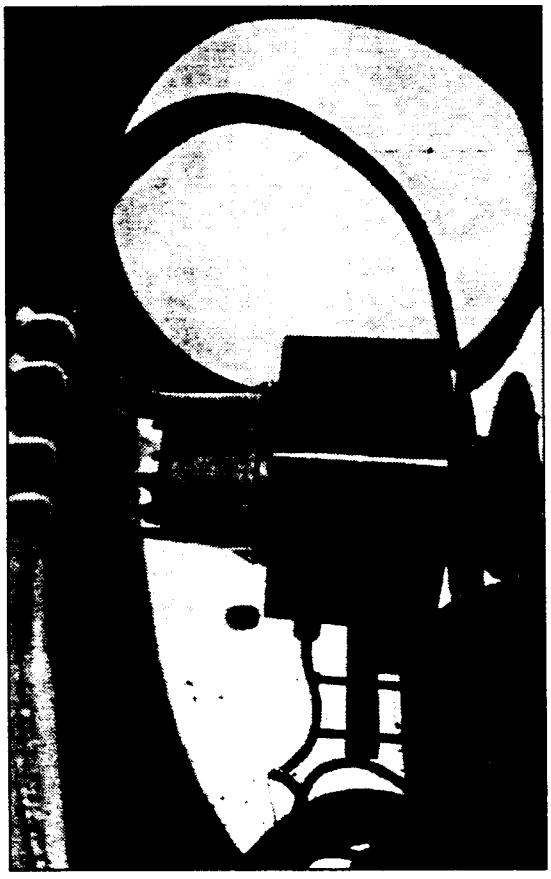
Automatic Level Seek system installed on a 2" PVC wellhead.



A PVC re-inforcement is shipped with every unit destined for a 2" PVC well application.



These photos show an ALS installation in a vault. This is an excellent choice for many urban or high traffic areas where safety or security are major concerns. The controls are located in a nearby shed or building.



Looking up from the floor of the vault through the manhole cover opening.

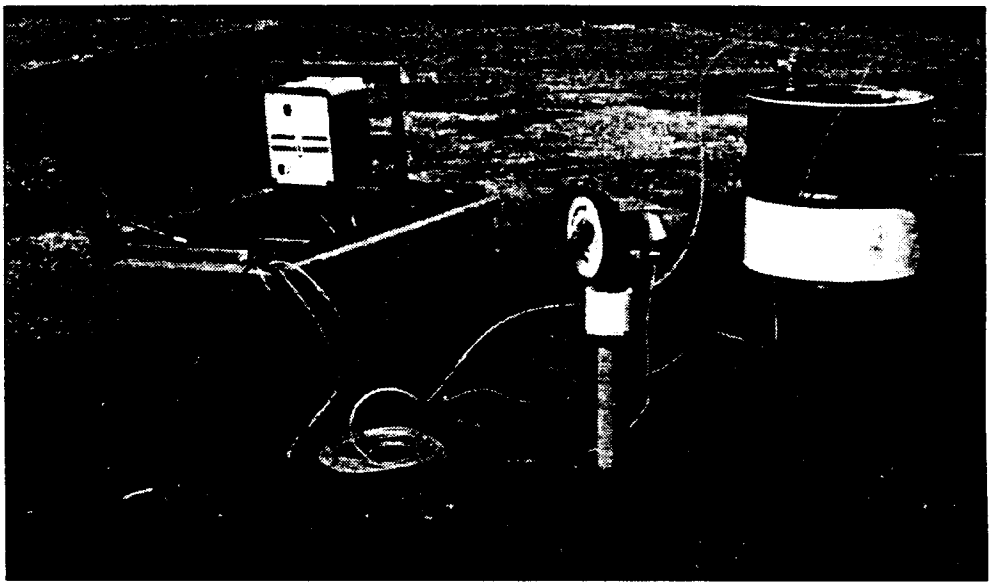
Immediate Response Box

The Immediate Response Box (I.R. Box) is a rugged plastic box that contains a complete SpillBuster Junior (or Senior) system including a control box, a probe, and a product tank sensor. The I.R. Box provides an extremely portable system to start removal of product in a 2" or larger well with minimal equipment set-up. Since the I. R. Box contains a standard control box it can be used with any other SpillBuster options including the Automatic Level Seek system (shown below).

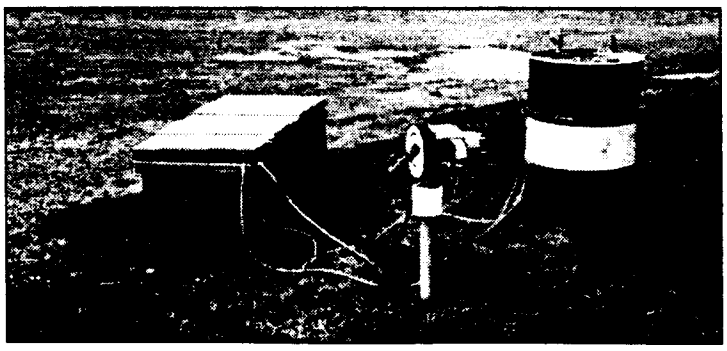
WARNING!

Control box must be located more than 25 feet from any hazardous area. This includes explosive atmospheres or vapors.

Immediate Response Box delivered to site.



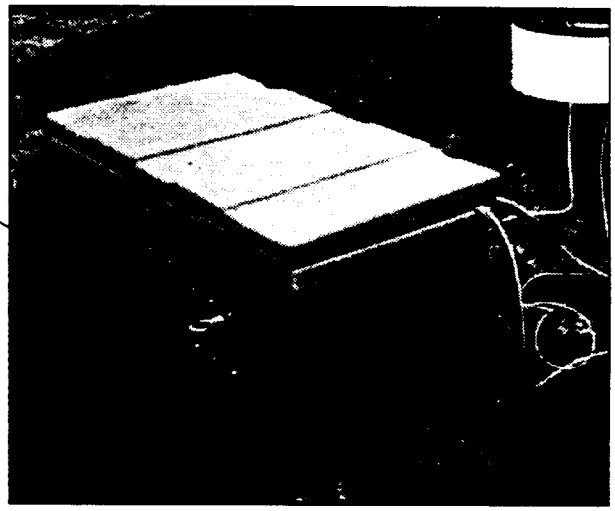
Junior system with ALS set-up on well-head.



Site up and running. Up to 500 gallons per day of product can be pumped with one system.

The I.R. Box can easily be carried in a small pick-up truck or van. The basic set-up involves swinging the control box up into position on an integral bracket, installing the product tank inlet and overflow sensor, and setting the probe at the correct height in the well. A large forged shackle is attached on the rear of the box for security.

The system is powered by 115V from an extension cord (see Section 6 - Installation for extension sizing). In addition, cables can be provided to operate the system from a 12 volt battery such as a vehicle battery.



Photovoltaic Charging System

For sites with no utility connection available batteries with a photovoltaic (solar) recharging system can be supplied. This can be integrated with an Immediate Response box if desired. Sizing the charging system can depend upon the amount of product present at the site to determine the duty cycle or percentage of time the system will run. Please contact Clean Earth Technology for a quote (802/425-3710 8 am - 5 pm E.S.T).

Cable Extensions

Alternate cable lengths are readily available for deeper wells and control box placement further than 25 feet from the well head. Off the shelf cable extensions are shown in the table in Figure 25. The maximum allowable total cable length from the probe to the control box is 1000 feet. Please contact the factory regarding site requirements for non-standard cable runs.

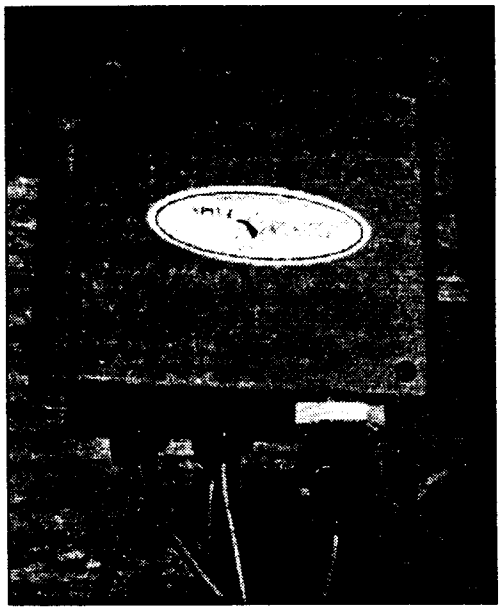
Other Options

There are several other options available including the following items:

220 volt to 110 volt conversion box.

Product tank sensor cable splitter box.

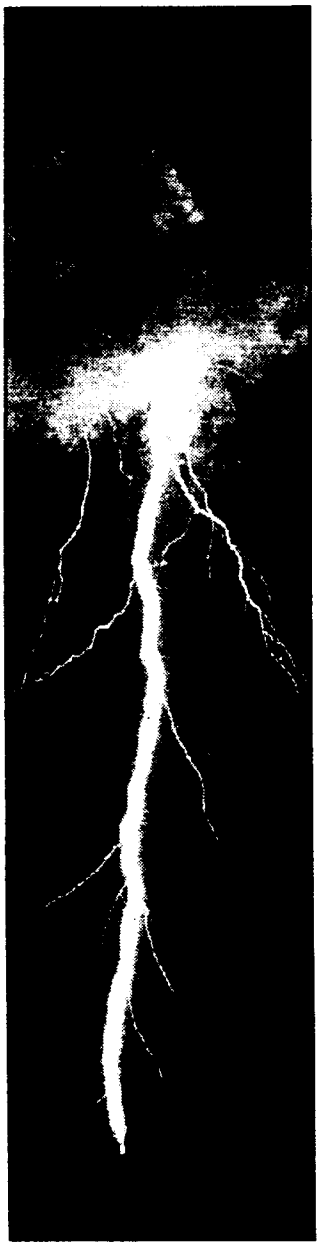
12 Volt battery operation cables.



Please contact the factory for requirements or ideas not shown in this manual. Often custom parts can be developed and manufactured in a short time and at a reasonable cost.

6.0 Installation

System Grounding



A proper ground is not an option!

WARNING!
PRIOR TO OPERATION THE SYSTEM MUST BE GROUNDED!

The interface sensors operate by the shielding effect of ground water normally present. The control box senses this shielding effect and therefore must also be referenced to ground. Grounding procedures are described in the following sections for four installations:

1. **Standard utility connection.**
2. **Remote power installations (with a portable generator).**
3. **Bench testing where the test water is in a non-conductive vessel or is otherwise not connected to earth ground.**
4. **12 VDC battery operation.**

A missing ground connection is indicated when the LOW LIMIT light stays off yet the probe is immersed in water.

Grounding A Utility Connection

When connecting to a utility power source the green grounding wire must be connected to the proper power input terminal in the control box. This connection is marked on the overlay below the power input terminal block. A three prong plug with a three lead cable must be used for system power; typically a black "hot" lead, a white "neutral" lead, and a green grounding lead.

Grounding A Portable Generator

A three lead cable must be run from the generator to the control box; typically a black "hot" lead, a white "neutral" lead, and a green grounding lead. In addition, the generator must be bonded to an earth ground. Recommendations are as follows.

- The metal casing of a driven well can be used as a ground, otherwise use a "made electrode" which can be a driven rod or pipe.

- Drive the rod or pipe at least 3 feet into undisturbed soil.

- Use galvanized pipe at least 3/4" trade size or a 5/8" Copperweld type rod.

- If copper rod is used a copper cable clamp must be used as well.

- Use a No. 12 or larger copper ground wire tied to ground lug of generator. Clean up any corrosion on the lug!

Grounding For Lab Or Bench Testing

In operation in a lab or on the bench where the test water is in a non-conductive vessel or is otherwise not connected to earth ground the water must be grounded. This can be accomplished by submerging at least 6 inches of 1/2" copper pipe in the water and attaching the other end to earth ground or to the green grounding terminal in the control box. The copper pipe should be soldered to the ground wire to preclude a poor contact due to oxides. Use of copper pipe is recommended to provide adequate surface area in the water.

Grounding For Battery Operation

Junior systems operated from a battery must have the negative terminal of the battery grounded directly to a pipe or rod driven into the ground. Do not operate the Junior system from a vehicle or equipment that has a positive ground.

It is absolutely necessary to ground <u>every</u> battery operated system!

Some examples of battery locations requiring a ground rod and cable for operation are:

- a vehicle battery.

- a battery inside an Immediate Response Box (whether on the ground, in a truck, etc.)

- a battery in a pick-up truck rear box.

- a battery with a photovoltaic (solar cell) charger

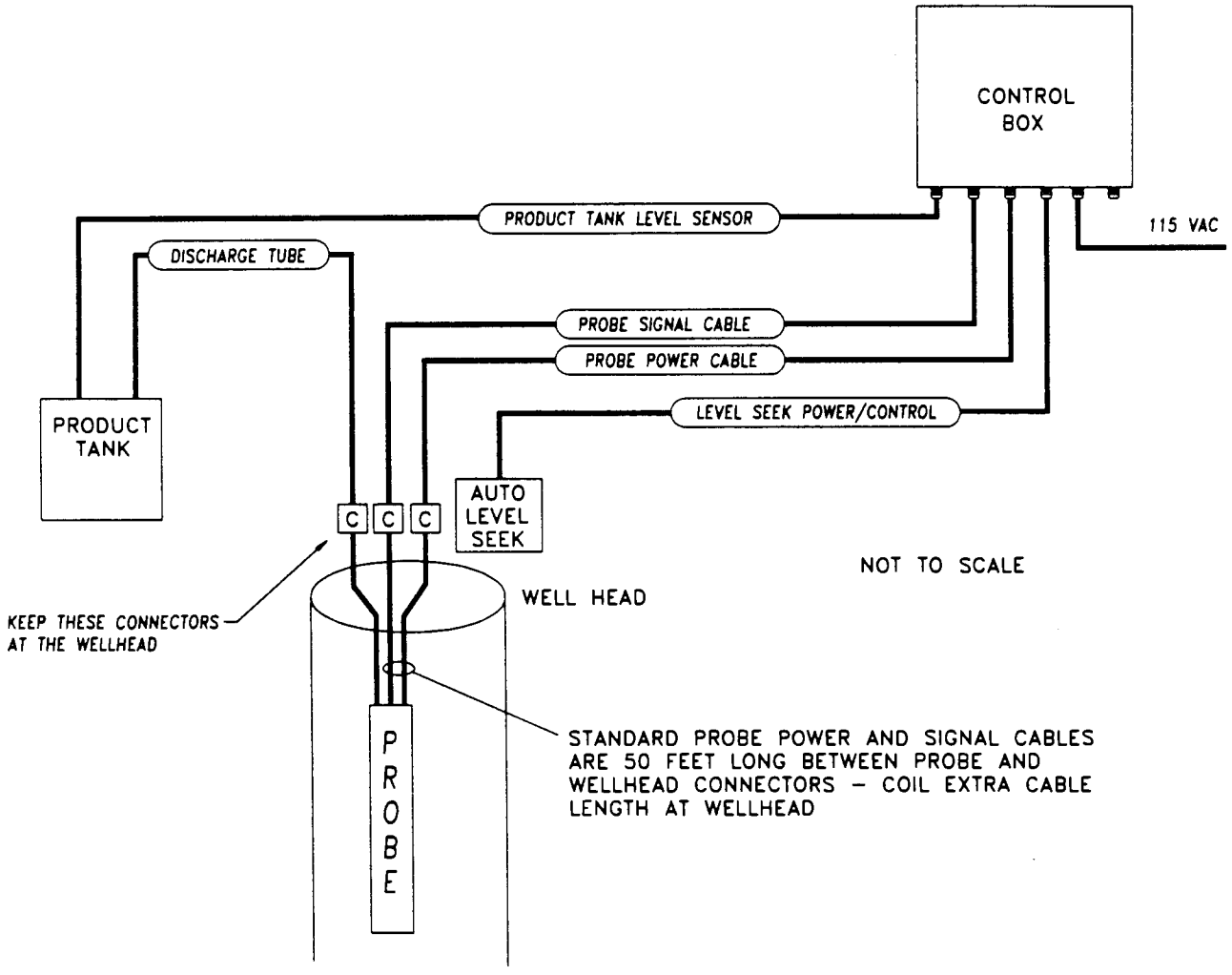
Junior System Installation

Control Box Installation

Mount the Control Box in a suitable location (minimum of 25 feet from any hazardous area). Typical installations are in sheds, vaults, on the side of a building, or on a utility type pedestal mount. If the control box door is latched and the cable feedthroughs are correctly installed, the unit is weatherproof.

Installing the System Cables

The cabling coming out of the well is designed to provide connectors at the well head so that the probe can be removed without having to remove the cables all the way to the control box. Excess cable from the probe should be coiled at the wellhead to enable the connectors to stay at the wellhead as depicted below.



6.0 Installation - Cables - Pulling Cables Through Conduit

All of the cables are available in custom lengths as well as standard "off the shelf" lengths. If PVC conduit pipe is run between the control box and the well head the minimum recommended diameter is 4" pipe. This will help prevent any damage to system cabling caused by forcing cable connections through a smaller diameter pipe.

The wrong way to pull the cables through a pipe!

The right way to do it!

Use large pipe. Tape the pull rope in place on the cable to prevent it from sliding up to the connector. Tape the connectors to prevent contamination. Distribute the connectors over a few feet; don't bunch them in one place.

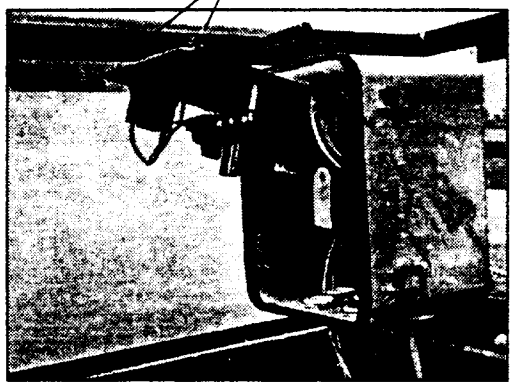
6.0 Installation - Cable Connections at the Control Box

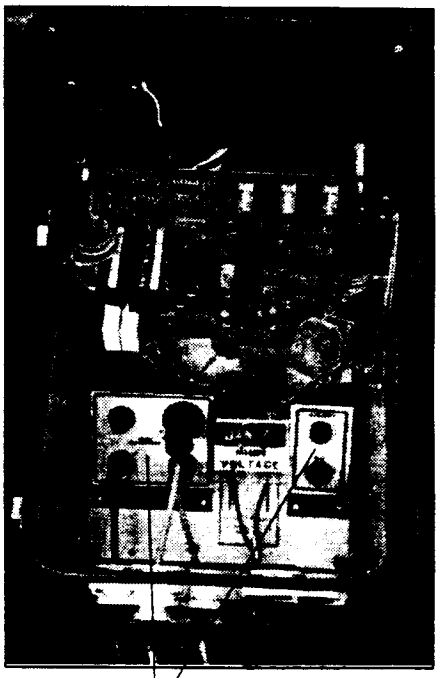
WARNING!
Control box must be located more than 25 feet from any hazardous area. This includes explosive atmospheres or vapors.

WARNING!
All 115 volt wiring must be done by a qualified electrician. Disconnect 115 volt power at its source prior to opening the control panel or accessing the terminal block or connector panel. Electrical shock may result in serious injury or death.

At the control box all cables enter through feed-through holes in the bottom of the box and plug onto connections inside the box on the connector panel.

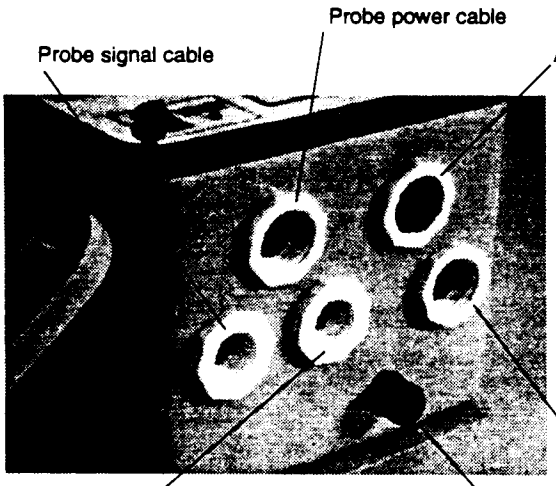
The connector panel is located inside the control box. Access is provided by lifting the bottom edge of the control panel as shown to the right.





This photo below shows a properly installed cable, sealed as it passes through the bottom of the control box.

The cables for the probe, product tank overflow sensor, and Auto Level Seek are all color coded with color bands to corresponding colored labels on the connector panel. In addition, each cable has a unique connector that only fits onto the proper location on the connector panel.

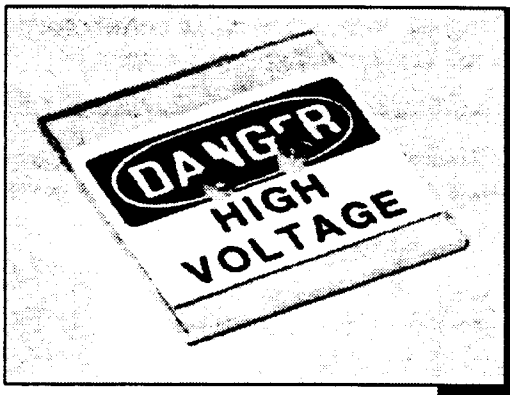


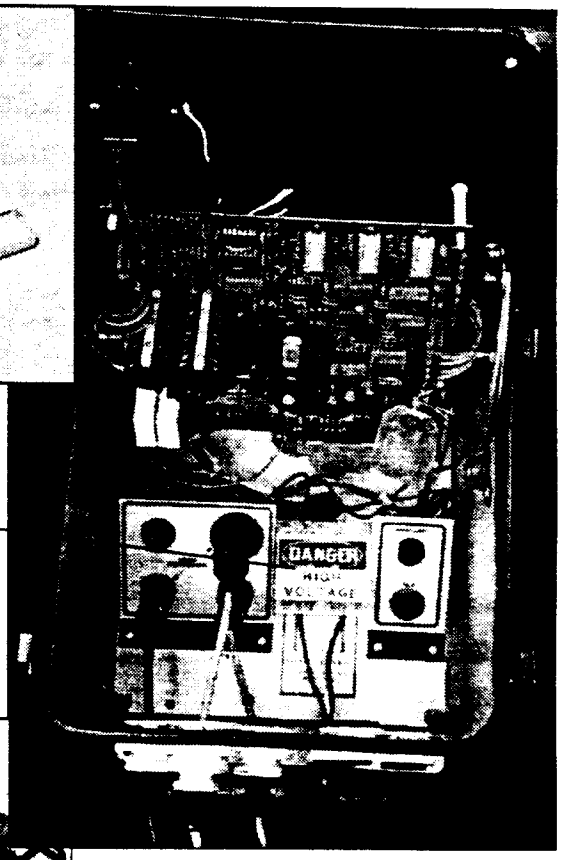
The cables have pre-installed fittings on them that screw into corresponding fittings on the bottom of the control box as shown at the left. There are several different sizes of fittings. To seal the box and align the cables with their connection in the box this pattern must be used.

6.0 Installation - 115 volt wiring

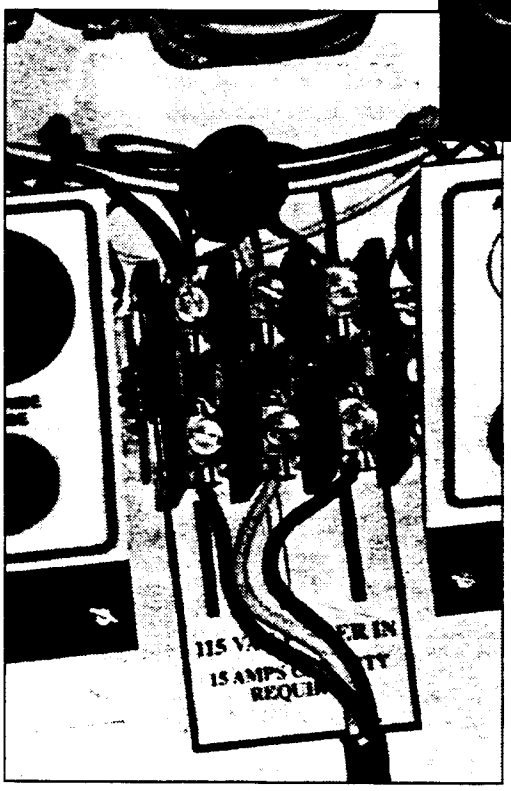
Install hardwiring to the Control Box. Any power cables going in or out of the Control Box must be have a round profile (not Romex) to seal at the Control Box feed through. The incoming power cable must be able to handle a minimum of 15 Amps.

Remove the Protective Cover to access the 115 volt terminal block. **All 115 volt wiring must be done by a qualified electrician. Electrical shock may result in serious injury or death.**





Terminal block with the protective cover in place



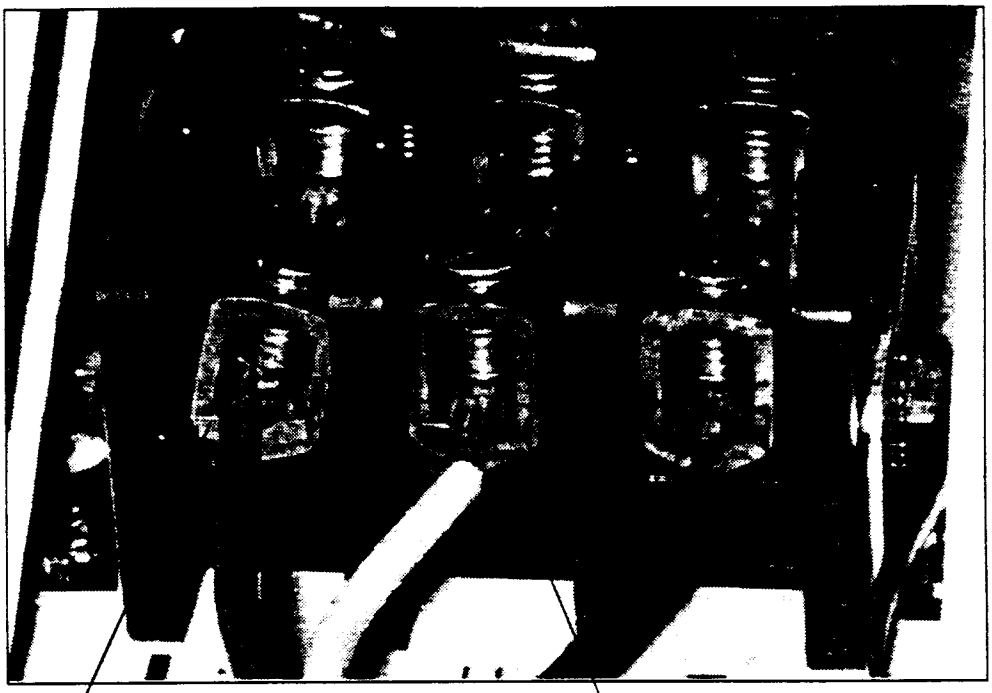
The terminal block shown with the cover removed and the 115 volt source cable connected.

WARNING!

All 115 volt wiring must be done by a qualified electrician. Disconnect 115 volt power at its source prior to removing the terminal block protective cover or connecting/ disconnecting any wires at the terminal block. Electrical shock may result in serious injury or death.

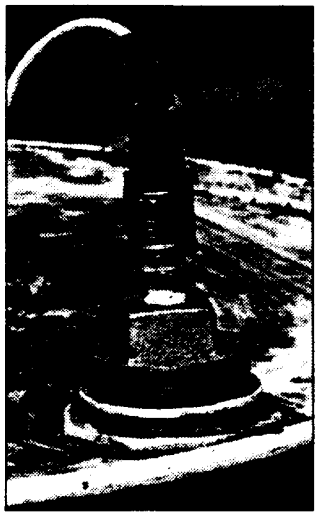
6.0 Installation - 115 volt wiring

Installing the 115 volt cable in the terminal block. The cable must be installed correctly as shown.



This view looking at the side of the terminal block shows the correct location to insert the 115 volt wire.

Always replace the protective cover on the terminal block after installation or prior to providing power to the system.



Above - The product tank sensor is shown installed in a barrel.

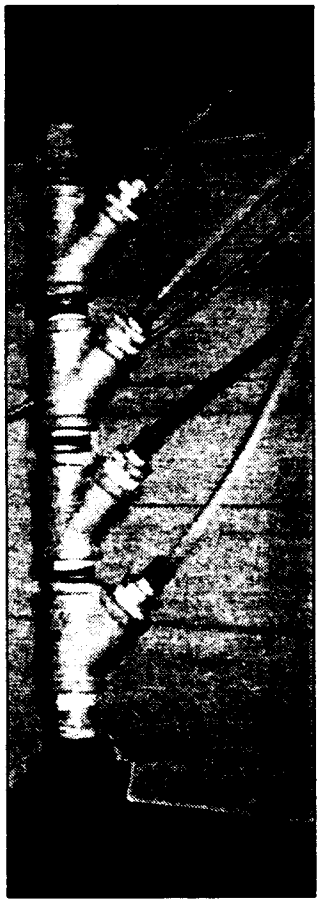
Product Tank Overflow Sensor

Install the product tank overflow sensor in the product tank and plug the cable into the control box. The fitting screws into a standard 2" bung threaded hole.

Other options are available such as a "splitter" to allow use of multiple recovery systems using one product tank. Please call the factory with your requirements.

Note

The product tank overflow probe must be connected to the control box prior to system operation. There is an electrical interlock to prevent the product pump from turning on without having the product tank probe connected.



Four systems into one (large) product tank.

Product Tank Inlet Fitting

The product tank inlet fitting screws into a standard small bung fitting. Connect the product tube coming from the probe to the inlet fitting using the compression fitting supplied on the fitting assembly. The product tank can be checked manually for level by unscrewing the cap from the the top of the fitting and inserting a dipstick into the product tank. The cap also contains a small vent. In the case of multiple recovery systems using one product tank the fittings can be stacked as shown at the left.

Remove this cap to use a dip stick to check the tank level.

Auto Level Seek Motor & Reel Installation

The A.L.S. system is turned on and off simultaneously with the product pump switch on the control panel. When the product pump switch is in the ON position, the A.L.S. system will automatically track the water table.

The A.L.S. reel contains a factory preset slip clutch that is designed to prevent damage from occurring to the probe or A.L.S. parts if the probe or cable should hang-up or become stuck.

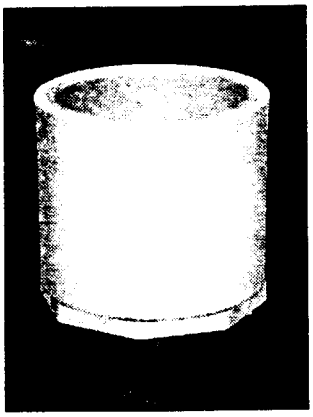
If the probe or cabling should become stuck, even for a period of days or weeks, free the stuck parts, and the system should continue to operate without any further maintenance.

On a 2" PVC well head install the reinforced well head adapter (included with A.L.S.). Use PVC adhesive and slide the adapter fully onto the well head. The well head adapter provides a re-inforced area to clamp the ALS unit to and also locates the ALS reel directly over the well for proper operation. If you have a 2" PVC well head and did not receive an adapter please contact the factory.

The well head adapter is not necessary for larger wells. For small (2" to 4") steel well heads please consult with the factory for an adapter to locate the ALS reel over the well.

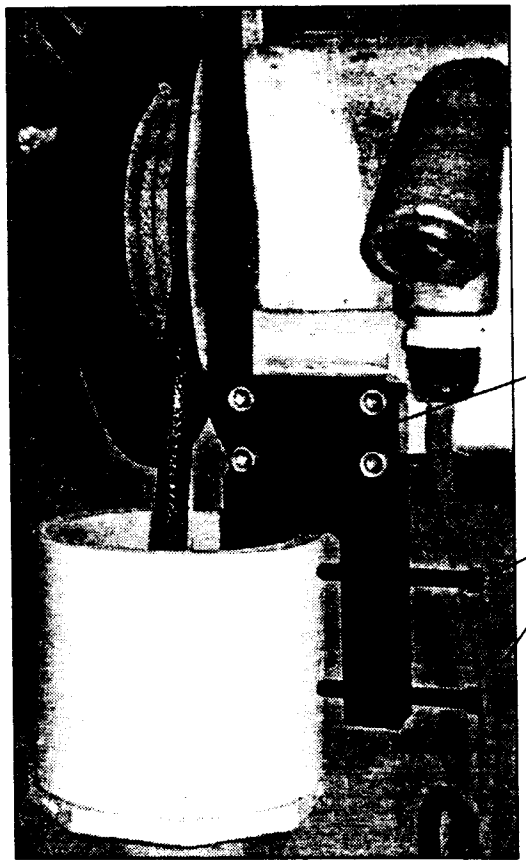
After the well head adapter is installed on the well, place the ALS unit onto the adapter as shown in the accompanying pictures. The ALS is clamped onto the adapter with a pair of set screws as shown below. The set screws should be made snug; do not damage the well head, screws, or clamp by over-tightening.

Before installing the pull rope on the reel or putting the probe in the well test the probe pump and power as described in the following section entitled "Product Pump/Power Test".



Well head adapter for re-inforcing the top of a 2" PVC well.

An ALS unit installed on a 2" PVC well with a well head adapter.



Dip Switch Settings

On the printed circuit board inside the control box there are three dip switches with eight individual switches each. The dip switches are used to configure the system for specific site requirements, for example, to increase the system "cycle" time or to turn off the audio tones.

The dip switch settings are fully described in Section 7 - System Operation. Section 7 should be thoroughly reviewed prior to starting product recovery.

The standard factory dip switch settings are shown in Appendix A.

Do not modify the standard dip switch settings without contacting the factory first or there is a danger that product could be spilled, that water may get pumped into the product tank, or that your warranty may be invalidated.

Product Pump/Power Test

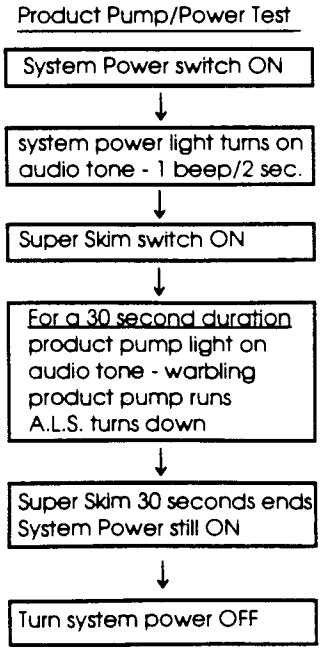
When all cabling and system components are connected, the system ground is installed, and power is supplied to the system, it is preferable to test the product pump for operation prior to putting the probe in the well. It is convenient to have two people for this operation; one to hold the probe or listen down the well, and one to operate the control box.

Turn the system power switch ON. The system power indicator light on the control panel will turn on, and the audio tone in the control box will begin to beep at 1 beep every 2 seconds.

Press and release the three position product pump switch to the upper spring loaded "SUPER SKIM" position (past the center "ON" position). The yellow product pump light on the control panel should turn on and the audio tone in the control box should produce a warbling tone while the pump is ON.

Simultaneously, the product pump (in the probe) should audibly start and operate for approximately 20-30 seconds and then stop. Along with the audible motor sound whether in or out of the well, starting the pump usually causes the entire probe to visibly jerk from the pump torque reaction if the probe is hand held or is sitting upon the ground.

In addition, at the same time, the A.L.S. reel should turn in the down direction for approximately 20-30 seconds and stop. The probe is now ready to install in the well.



Installing Probe In Well & Depth Setting

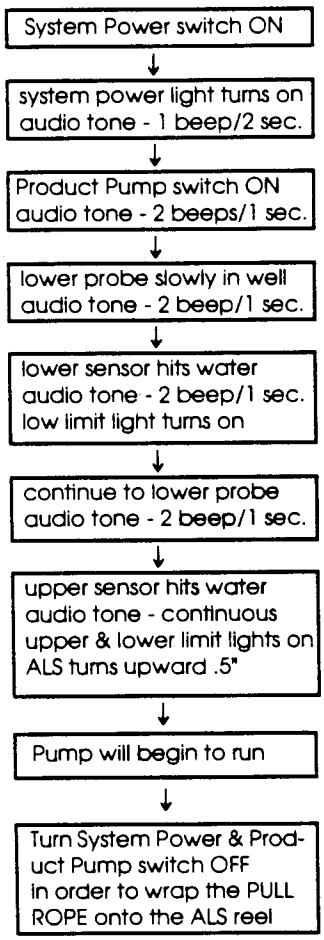
Turn the system power switch ON. The system power indicator light will turn on, and the audio tone will begin to beep at 1 beep every 2 seconds.

Put the three position product pump switch in the center ON position (not the Super Skim position). The product pump indicator light will still be off. With the pump switch ON the product pump circuit is powered, but the pump will not run until after the probe sensors are submerged in water. The product pump light only turns on when the product pump is actually running.

Slowly lower the Probe into the well. When the low limit sensor in the probe reaches the product/water interface the low limit indicator light on the control panel will turn on and the audio tone will beep at 2 beeps per second. The Probe should be lowered slowly until the high limit light turns on and the audio tone is continuous. Stop lowering. The high limit light and continuous tone indicate that the water/product interface is located just below the product intake at the high limit on the probe. The pull rope can now be wrapped onto the A.L.S. reel as detailed in the following section.

It is preferable to switch the system power OFF at this point.

Probe depth setting



Place four wraps of the pull rope around the reel. The rope wraps in the direction shown above. The black mesh cable does NOT wrap around the reel.

Installing Pull Rope on the ALS Reel

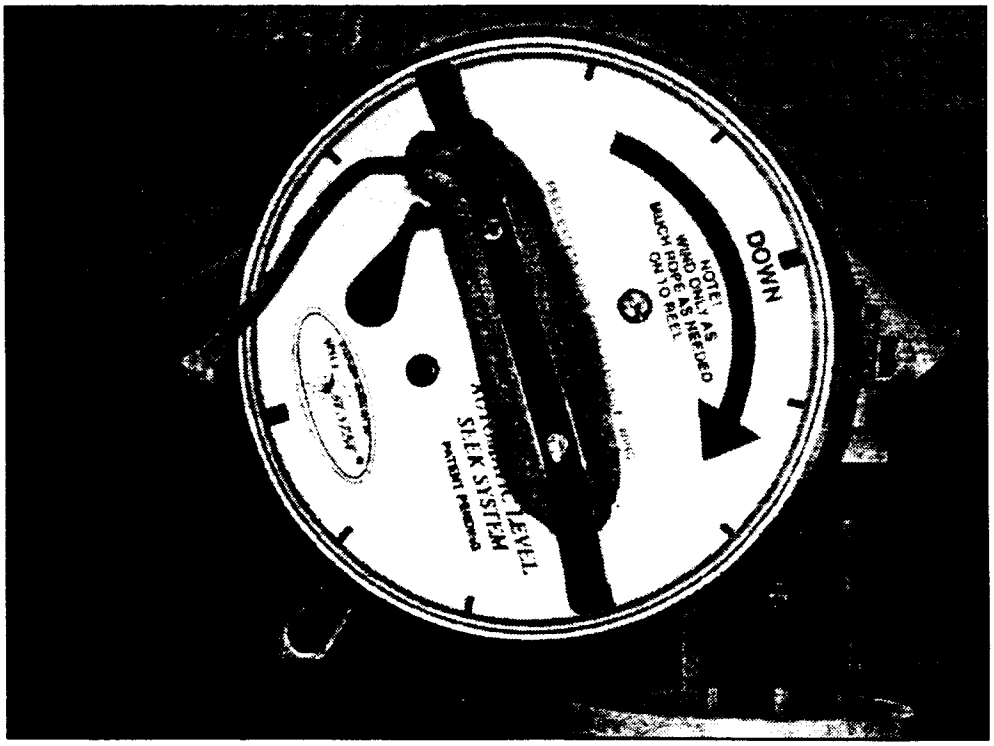
After the high limit sensor contacts water as described in the previous section it is preferable to have the System Power switched OFF until the pull rope and probe cable are installed. Pull the probe back up a couple of inches and wrap the pull rope around the A.L.S. reel. For best results the recommended number of wraps is 3 or 4, depending on specific site requirements. The reel is 4" in diameter, thus each wrap on the reel will wind up about 12" of pull rope. If the water table may drop more than 4 feet more rope will need to be wound on the reel. Pass the end of the pull rope through the hole in the side of the reel, pull the excess rope through the hole, and pull the rope into the slot adjoining the hole to lock off the rope as shown below.

Feed excess rope through this hole.

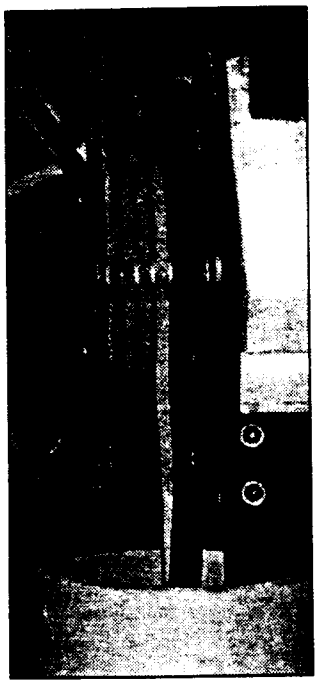
After the excess rope is pulled through the hole, slide the rope up into this slot to lock it off.

Wrap the remainder of the pull rope (now sticking out the side of the reel) around the cleat provided on the side of the reel as shown below. Try to wrap neatly and tightly and tie off the rope so that long loose ends or loops don't get caught during normal A.L.S. operation.

The black mesh encased cable does <u>not</u> get wrapped around the reel!



Wrap excess rope neatly onto the cleat on the side of the reel and tie it off.

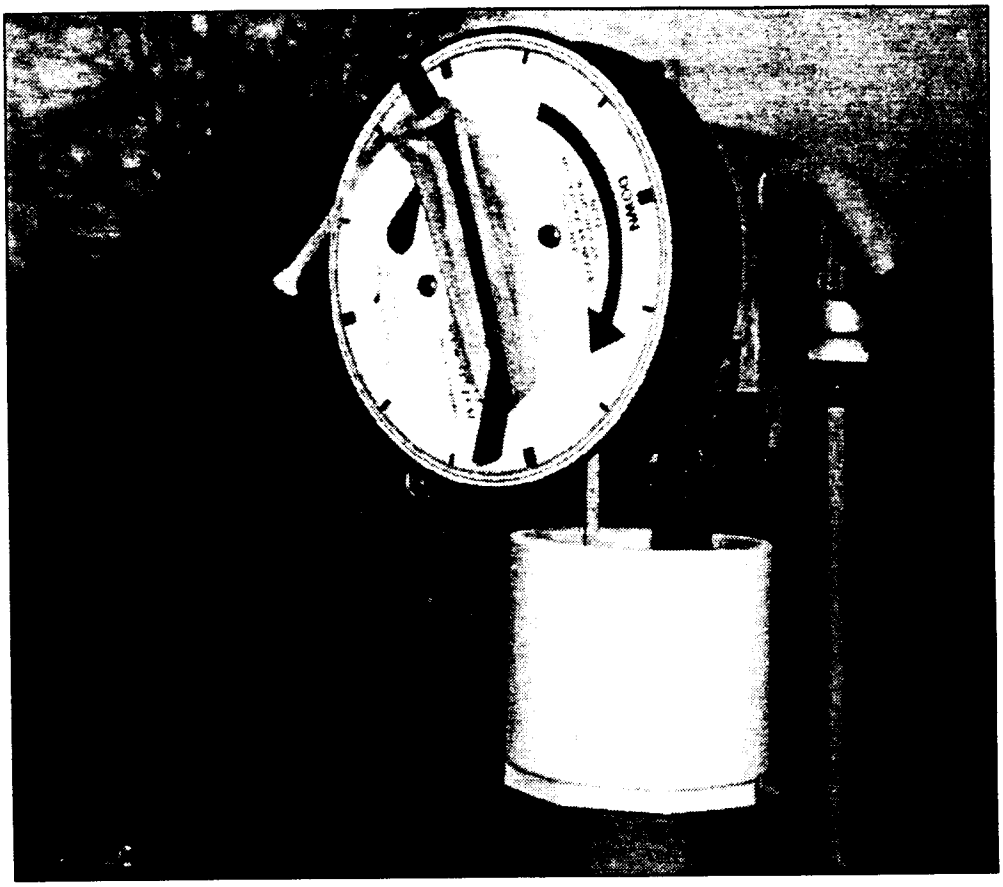


The black mesh cable lays over the reel; it does NOT wrap around the reel!

Reserve several feet of black mesh cable behind the ALS unit in a clear area. The cable behind the ALS must able to move freely to allow proper operation.

Installing the Probe Discharge Tube & Cables

The black mesh cable attached to the probe contains the product discharge tube and the probe power and signal cables and is covered with a black plastic protective mesh. After the probe pull rope is installed on the A.L.S. reel, the mesh cable is laid over the reel. ***The mesh cable is never wrapped around the reel, it simply lays over the top of the reel as shown below.***



Allow several feet of mesh cable to lay on the ground behind the ALS unit. The cable must be free of obstructions and laid out in a way to allow it to slide over the reel as the probe moves up and down in the well. A typical installation has one large loop of cable laid out on the ground or in a vault. Contact the factory with installation questions.

ORIGINAL DIP SWITCH SETTINGS FROM FACTORY

	S1	S2	S3
1	OFF	ON	OFF
2		ON	OFF
3		ON	OFF
4		OFF	OFF
5		ON	OFF
6		ON	OFF
7		ON	OFF
8		OFF	OFF

7.0 System Operation

Audio Tones & Indicator Lamps

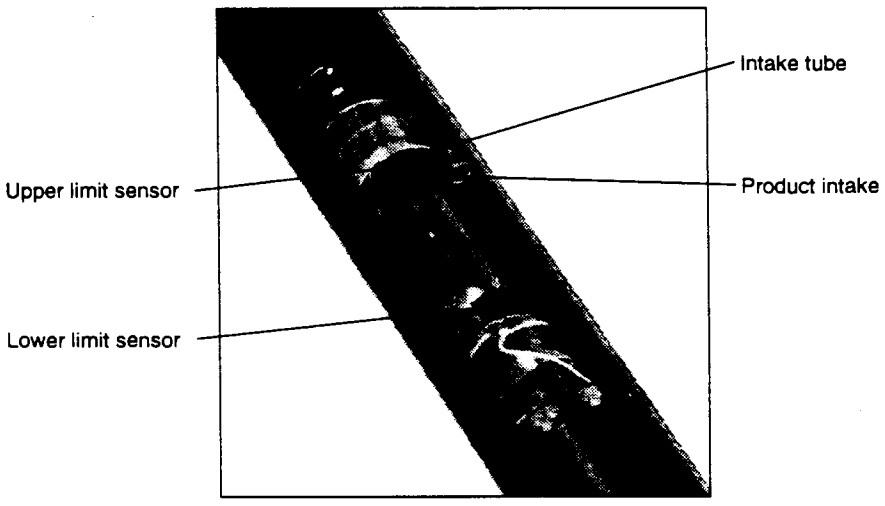
Turn system power switch on the control panel to on. The yellow system power indicator light should illuminate.

The system cycles at power up (see cycle operation schematic on the next page). For 10 minutes after power is turned on audio tones and indicator lamps on the control panel indicate what is happening in the well:

Switch Status	Probe Height in Well	Probe Sensor Status	Audio Signal	Panel Lamps
System Power ON Product Pump OFF	above water in well	probe dry, pump OFF	1 beep/2 seconds	system power lamp ON product pump lamp OFF
System Power ON Product Pump ON	lowering in well	probe dry, pump OFF	1 beep/2 seconds	system power lamp ON product pump lamp OFF
System Power ON Product Pump ON	lowering in well	low limit sensor is wet	2 beeps/second	system power lamp ON product pump lamp OFF low limit lamp ON
System Power ON Product Pump ON	stop lowering	low limit sensor is wet high limit sensor is wet	continuous tone	system power lamp ON product pump lamp OFF low limit lamp ON high limit lamp ON
System Power ON Product Pump ON	raise .5" & stop	low limit sensor is wet high limit sensor is dry	warbling tone	system power lamp ON low limit lamp ON product pump lamp ON (product pump running)

The audio tones operate for 10 minutes after the system power is turned on. The tones can be set to operate continuously or can be turned off by altering dip switch settings on the logic board.

Center section of probe showing the intake and upper and lower sensor bands.



System Cycle (With Auto Level Seek)

The system normally operates in a cycling mode. A Junior system equipped with A.L.S. begins a cycle with the probe being lowered in the well. The probe is lowered by the A.L.S. motor for a specific period of time called the "Probe Lower Time", which is factory preset to 1 minute, or until the upper limit sensor on the probe contacts water. In one minute of operation the probe travels down in the well about 1 to 2 feet.

If the upper limit sensor does not contact water the system waits for a System Cycle Delay period. The System Cycle Delay is preset for 20 minutes.

After the 20 minute System Cycle Delay ends the probe lowers again for 1 minute or until the probe hits water. This cycle continues until the upper limit sensor does contact water.

Once the upper limit contacts water, the probe is raised for another specified period of time called the "Probe Raise Time". The Probe Raise Time is preset for 1 second. This brings the probe back up about .5" to locate the intake just above the water/product interface.

At the end of the Probe Raise Time the product pump turns on. If the pump is pumping product it will run continuously until there is no more product or until the upper limit sensor contacts water.

If the product pump begins to pump air, it will "Time Out" and turn off after 5 seconds. Once the pump shuts off the system will wait for a specified delay period that is factory preset to 20 minutes.

After the delay the A.L.S. will once again begin to lower the probe for 1 minute or until the upper limit sensor contacts water. This cycle will continue until the system power switch is turned off.

Normally when the product is pumped out of the well the water level rises. This is due to the fluid in the ground maintaining its static head. As an example, if there is a site with 6 inches of product floating on the water table and the product is removed, the water will fill in much of that 6" of height to maintain the static head in the area of the well.

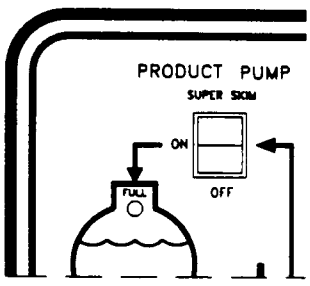
The water level rising affects the system in the following way: As the probe pumps product out of the well the water level will rise and will contact the upper limit sensor. This initiates another raise and pump cycle which bypasses the 20 minute System Cycle Delay. This may happen repeatedly, until the product in the well is mostly pumped off.

Once the product level in the well is reduced the system will begin to cycle every 20 minutes.

Note that whenever the upper limit sensor is in the water the A.L.S. should be raising the probe (unless the product pump switch is turned off).

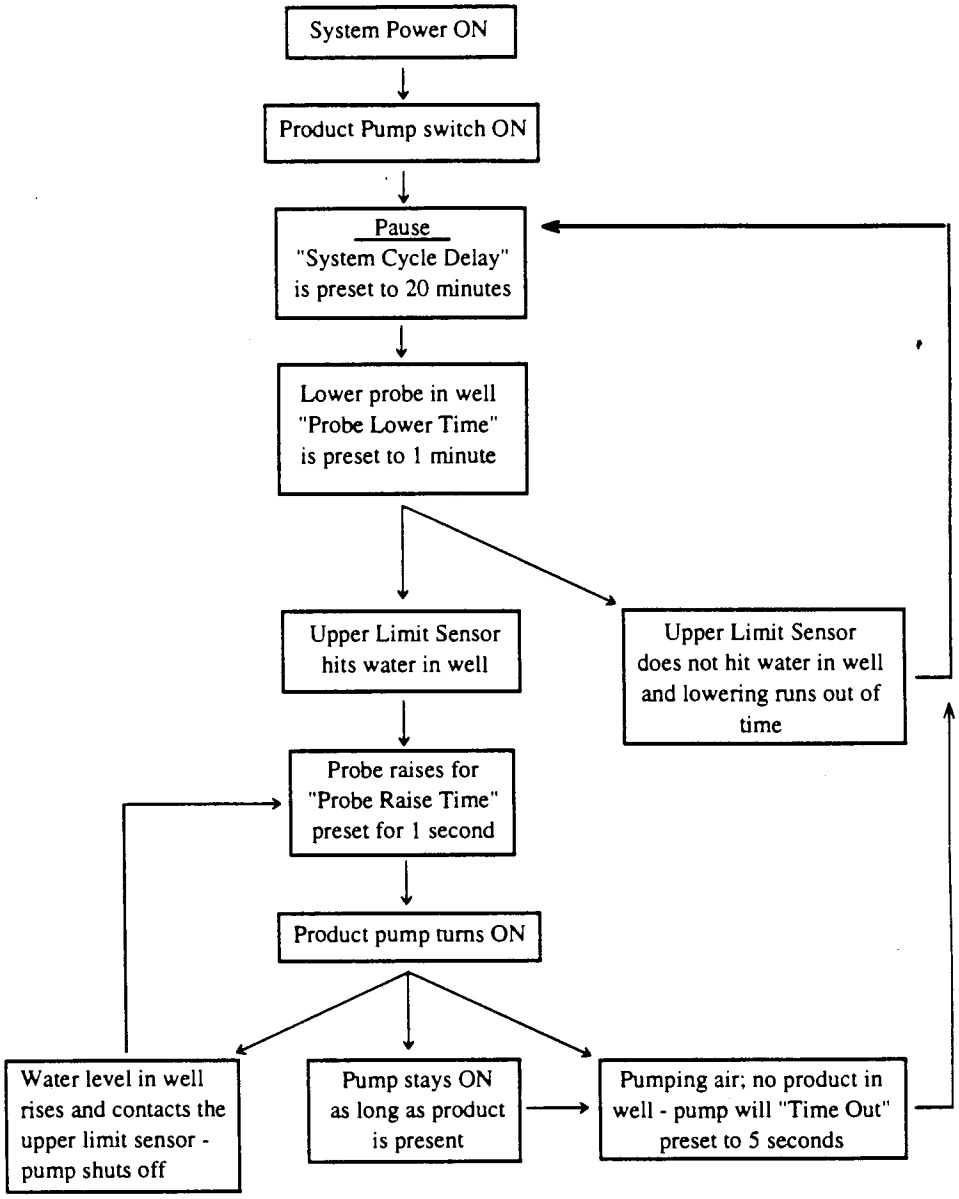
All cycle timing periods such as the Probe Lower Time, the System Cycle Delay, the Probe Raise Time, and the Time Out are adjustable via several standard logic board dip switch settings. Consult the factory prior to modifying the standard settings.

If the product FULL indicator light is on or if the product tank sensor is not connected to the control box the product pump will not run.



7.0 System Operation - Explanation of Cycle Times

This schematic shows the system cycle operation with the Auto Level Seek unit installed. Note that if the upper limit sensor on the probe does not hit water the system will cycle repeatedly and the A.L.S. will continue to unreel the probe until water is found. *If the probe never contacts water it will eventually wind the pull rope backwards and pull the probe up.* The probe will jam at the wellhead and the ALS & pump will continue to cycle every 20 minutes.



System Cycle Operation (No A.L.S.)

The system normally operates in a cycling mode. When the system power is turned ON and the Super Skim switch is activated the product pump turns on. If the pump is pumping product it will run continuously until there is no more product or until the upper limit sensor contacts water. If the product pump begins to pump air, it will "Time Out" and turn off after approximately 5 seconds. Once the pump shuts off, the system will wait for a "System Cycle Delay" time that is factory preset to 20 minutes. After the delay the pump will begin operating again. This cycle will continue until the system power switch is turned off.

Operation without an A.L.S. is recommended only when a technician is manually raising and lowering the probe to "bail out" a well. Automatic operation at fixed level in the well is not usually practical due to fluctuations in the water table caused by product removal or natural causes.

Product Pump "Time Out"

The system monitors product pump current draw to determine if the pump is pumping product or air. If the pump is pumping air, the current to the pump will be low. When the system senses low pump current continuously for approximately 5 seconds the pump is turned off and the System Cycle Delay period begins (preset to 20 minutes).

The product pump low current sensing period can be set at 5 seconds or 10 seconds with dip switch S3-4. The S3-4 switch is factory preset to the ON position (5 seconds).

"System Cycle Delay" Time

The System Cycle Delay Time is the time that the system waits after either; 1.) the probe is lowered and the upper limit sensor on the probe does not hit water, or 2.) the pump shuts off because it is pumping air.

The System Cycle Delay time can be lengthened to allow a well to recharge if the product refill rate is slow.

In a new installation the delay time can be reduced in order to get the site up and operating without having to wait for long cycle times while the probe locates the water/product interface.

The System Cycle Delay time is preset to 20 minutes, but can be varied from 10 seconds to 85.3 hours (3.5 days) using dip switch S2. This procedure is described in the following paragraph entitled "Dip Switch S2".

Probe Lower Time

The Probe Lower Time is the duration of time that the probe automatically lowers in the well after the System Cycle Delay (20 minutes). The Probe Lower Time takes place immediately if the Super Skim mode is initiated. Lower time is preset to 1 minute, but this can be cut short if the upper limit sensor on the probecontacts water.

Probe Raise Time

The Probe Raise Time lasts approximately 1 second and is intended to raise the probe up in the well approximately 1/2" after the upper sensor band contacts water. This is done to locate the product intake in the correct spot just above the water/product interface. This setting is adjustable depending upon how much product is in the well and where the intake must be located in the product. To skim the product off to within about .25" leave the setting in the preset 1 second position.

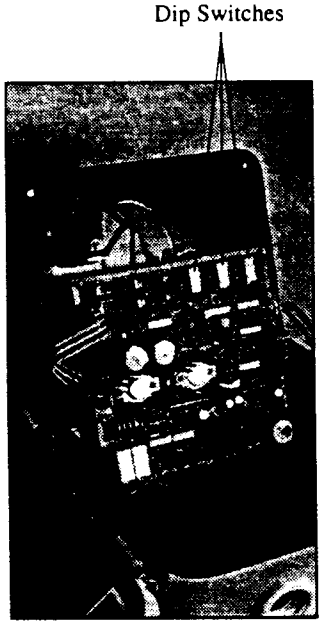
Adjustments to the raise time are made by changing dip switch S2 as described in the paragraph entitled "Dip Switch S2".

Dip Switch Settings

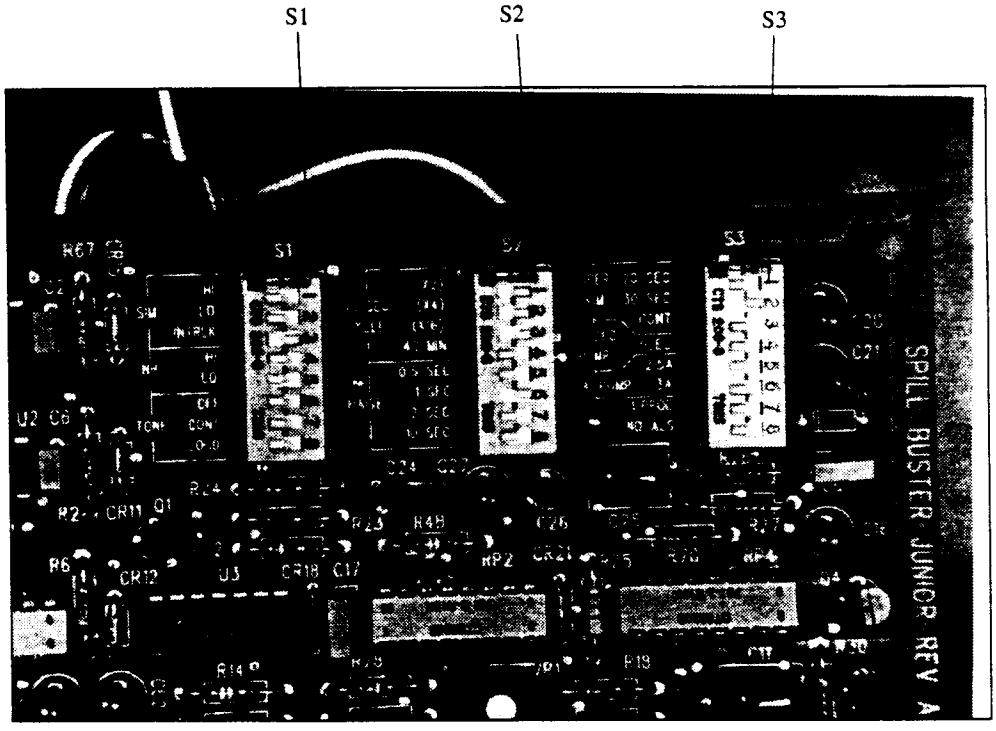
The dip switches come from the factory preset to a standard setting which will operate in most sites as is. Certain other options are available by using the dip switches which may increase the rate of product recovery depending upon the specific site. Standard dip switch settings are shown in Appendix A.

The location of the dip switches is along the top edge of the power supply board as shown at the left and below. Dip switches are labelled S1, S2, and S3 starting on the left (facing the board) with board upright. On each dip switch, for example on S1, the individual switches are labelled 1 through 8 from top to bottom.

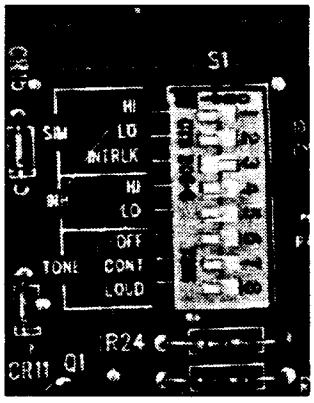
There are additional labels printed on the PC board next to each dip switch that describe the function of each individual switch.



The location of the three dip switches on the printed circuit board inside the control box. The printed circuit board is found on the back side of the control panel. The control panel hinges near the top edge and opens by pulling up and out on the two knobs on the bottom edge of the panel.



Dip Switch S1 Functions



Dip switch S1

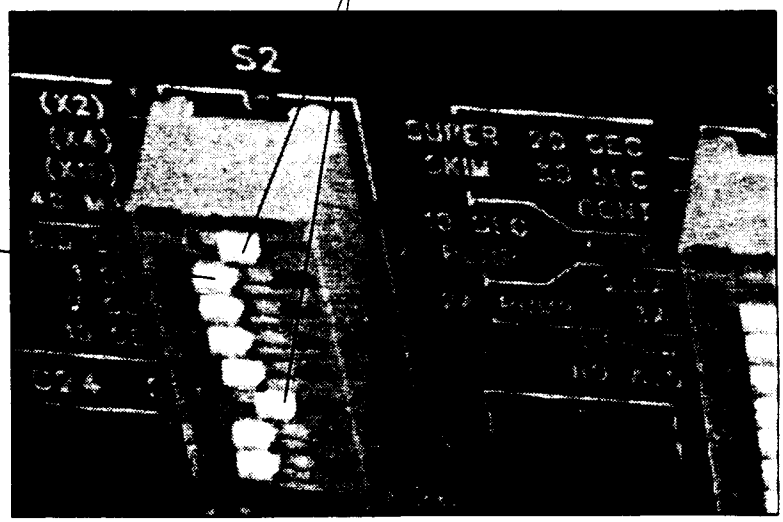
Dip switch S1 switches 1 though 5 control simulation and test settings for the system. These are for troubleshooting and testing the system by factory authorized personnel only.

The first two switches S1-1 and S1-2 simulate ON conditions for the high and low limit switches and S1-3 simulates the product tank probe being plugged in, but not ON.

In other words, S1-3 over-rides the product probe interlock to allow system operation without the product over-ride probe being plugged in.

The switches S1-4 and S1-5 inhibit the operation of the high and low limit sensors. In other words, they disconnect the hi and lo limit sensors at the logic board for troubleshooting purposes.

Switches S1 - 6, 7, and 8 are used for modifying the audio tones. Switch S1-6 will turn the audio off completely. Switch S1-7 over-rides the 10 minute timer for the audio tones. If S1-7 is in the ON position the audio tones will operate as long as the system is powered. Switch S1-8 increases the volume of the audio tones when it is ON.

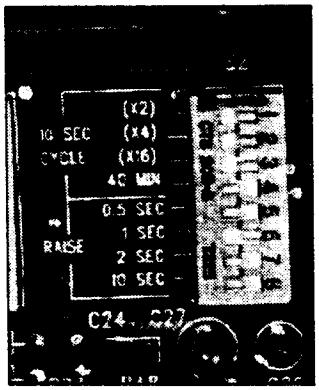


Photograph showing On and OFF positions for dip switches (dip switch S2).

Dip Switch S2 Functions

Dip switch S2 controls the system cycle time and the Automatic Level Seek raise time. Cycle times from 10 seconds up to 3.5 days are set as follows:

Dip Switches ON	Multiplier	System Cycle Time	Probe Lower Time
none	-	10 seconds	5 seconds
S2-1	(X2)	20 seconds	10 seconds
S2-2	(X4)	40 seconds	20 seconds
S2-1, S2-2	(X2, X4)	80 seconds	40 seconds
S2-3	(X16)	160 seconds	1 minute
S2-1, S2-3	(X2), (X16)	5.3 minutes	1 minute
S2-2, S2-3	(X4), (X16)	10.7 minutes	1 minute
S2-1, S2-2, S2-3	(X2), (X4), (X16)	21.3 minutes	1 minute
S2-4	40 minutes	40 minutes	1 minute
S2-1, S2-4	(X2), 40 minutes	80 minutes	1 minute
S2-2, S2-4	(X4), 40 minutes	160 minutes (2.7 hrs)	1 minute
S2-3, S2-4	(X16), 40 minutes	10.7 hours	1 minute
S2-1, S2-2, S2-3, S2-4	(X2), (X4), (X16), 40 min.	85.3 hrs (3.5 days)	1 minute



Dip switch S2

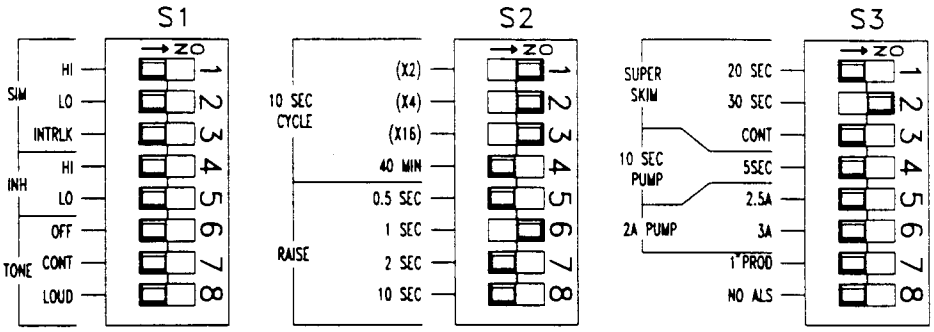
Switches S2-1 through S2-4 set the system cycle time. If all four of these switches are off the system cycle time is 10 seconds. The switches are multipliers of the basic 10 second cycle time, for example, if S2-1 is ON the system cycle time will be 10 seconds (X 2) or 20 seconds. If S2-1 and S2-2 are ON the cycle time is 10 seconds (X 2) (X 4) or 80 seconds. When switch S2-4 is turned on the multiplier becomes 40 minutes instead of 10 seconds. For example, if S2-1 and S2-4 are on that is (X2) 40 minutes or 80 minutes.

Switches S2-1 through S2-4 also control the probe lower time as described in the System Operation section and shown in the table below.

Switches S2-5 through S2-8 control the duration of the raise time for the Auto Level Seek system. The raise time is the period of time that the A.L.S. lifts the probe after the high limit sensor on the probe touches water. Raise times are adjustable from .5 seconds to 10 seconds as noted on the pc board next to the dip switch. Longer raise times will lift the probe up higher above the water table. The raise time dip switches are additive, that is, if all four are ON the raise time will be 13.5 seconds. A long raise time might be used in a well with a layer of bacterial growth or an emulsion at the water/product interface. A short raise time skims product off to less than .5", but may cause the pump/high limit to cycle rapidly due to ripples on the water contacting the upper limit sensor just below the product intake.

Raise times have a tolerance of plus or minus 30%.

Drawing of the dip switches along with the text printed on the pc board adjacent to the switches.



Dip Switch S3 Functions

Dip switch S3 controls the Super Skim feature operation duration, the product pump duration, the product pump current cut-out, a system function switch, and a "NO ALS" switch for operation without A.L.S.

Switches S3-1 and S3-2 control the length of time that the Super Skim feature operates. When S3-1and S3-2 are OFF Super Skim operates for 10 seconds. When S3-1 is ON Super Skim operates for 20 seconds, and when S3-2 is ON operation is for 30 seconds. The super skim timing switches are additive; if S3-1 and S3-2 are ON the operation time will be approximately 1 minute.

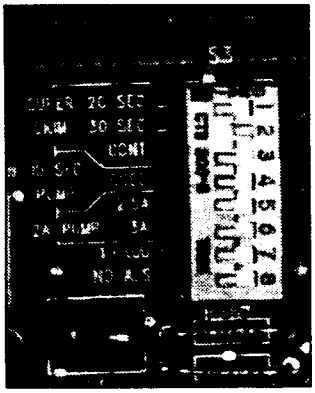
Switch S3-3 is not functional and must be in the OFF position.

Switch S3-4 adjusts the time-out duration on the product pump. When the product pump turns on in normal system operation, the product pump current is monitored. If the current is too low (pumping air, not product), the product pump will turn off after 10 seconds if S3-4 is OFF, and after 5 seconds if S3-4 is ON. If the product pump current is high enough the product pump will not time out, but will run continuously.

Switches S3-5 and S3-6 change the product pump low current threshold. If product pump current drops below the Low Current Threshold the pump is pumping air and it will time out If the pump is drawing more current than the LowCurrent Threshold the pump will run continuously.

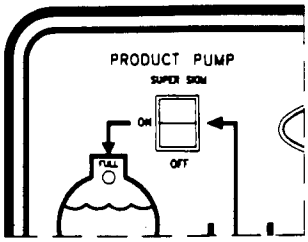
Dip switch S3-7 causes the system to operate off the low limit rather than the high limit sensor. This has the effect of putting the product intake about 2" higher than normal above the water level. This might be used in an emulsified well or in case the high limit sensor fails to operate.

Dip switch S3-8 is for sites where there is no A.L.S. unit installed. Having S3-8 ON starts the pump on every cycle without depending on a high limit contact with water. This might be used in a shallow well with no water and with the A.L.S. disconnected



Dip switch S3

Super Skim



The Product Pump switch on the control panel. The Super Skim position is spring loaded.

The Super Skim function is activated by pressing the product pump button at the top of the control panel. The Super Skim actuation is spring loaded; pressing it once and releasing it starts Super Skim. Super Skim is on an adjustable timer which is preset at the factory for 30 seconds. Super Skim over-rides the system cycle and immediately starts the probe lowering in the well for the period of time set on the timer. If the upper limit sensor contacts water, the probe raises for a short duration to locate the product intake just above the water level.

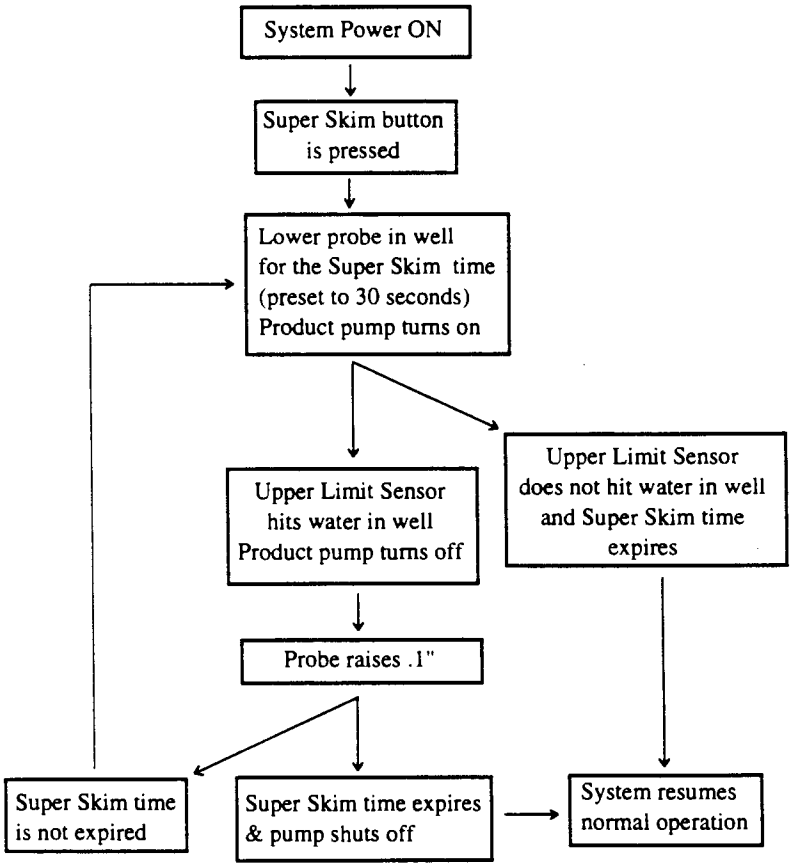
This is similar to the normal system cycle with the following differences.

1.) The probe immediately lowers, it does not wait for the normal System Cycle Time.

2.) The product pump runs for the entire 30 second duration whether there is product or not.

3.) The probe raise time after the upper limit sensor hits water is shorter, bringing the probe up about .1" above the water level instead of the normal .5".

During the 30 second Super Skim time period, if the probe upper limit sensor encounters water, the probe may continually "bounce" off the water surface and raise .1", pump and lower at the same time, raise .1", again contact water, and so on. After the 30 second timer shuts off, the system resumes normal operation.



Schematic of the system operation showing the action of the Super Skim function.

7.0 System Operation

8.0 Troubleshooting

Fault 1.) Rope wound backwards on the A.L.S. reel

High limit is not sensing water due to:

a.) Not enough water in the well - there must be at least 20" of water in the well below the product
b.) System or water is not grounded page 27
c.) Pull rope is overlapped on itself & wound up backwards page 38
Check for enough (or any) water in the well
Is the product tube/cable assembly preventing the probe from lowering to the water? page 38
d.) Bad probe, probe electrical cable, or cable connector - use product pump/power test page 38
e.) Fouled sensors page 66

Fault 2.) Pump won't run in a system test or Quick Check (see the next page for Quick Check)

a.) Fuse blown page 64
b.) Product tank light on - is the product tank full?
c.) Product tank sensor not connected to control box page 34
d.) Bad product pump page 55
e.) Bad probe, probe cable, or cable connector- use product pump/power test page 38

Fault 3.) Probe lowers deep into well and High Limit light doesn't come on

Same as Fault 1.) above

Fault 4.) Pump runs but no product is pumped

a.) Less than 1" of product in the well
b.) Clogged pump intake tube - clean intake/sensor bands page 66
c.) Probe Raise Time delay is set for too long - review System Operation section page 41
d.) S3-7 turned on by mistake - see Dip Switch S3 Functions page 48
e.) Clogged or frozen discharge line - thaw the lines

Spillbuster Pump Maintenance Checklist

1.) Check that the pull rope is on the reel correctly; if not, twist the reel backwards to drop the probe into the well and then twist the reel forward to reel the pull rope up correctly. Make sure that the rope is not overlapping on the reel.

2.) Check that the pump cable is over the reel with adequate slack. Make sure the cable is not catching on anything.

3.) Wipe off any water present on the top of the control box. Open the box cover. Check that the low limit light is ON and the high limit light is OFF. If not, rotate the A.L.S. reel by hand to obtain.

4.) Press the Super Skim switch to check pump operation. After pressing the switch, the panel lights should alternate pump/high/pump/high for 30 seconds. You may see fluid or bubble movement in the product tube. Listen down the well for the pump hum during the 30 second Super Skim operation. If the pump does not appear to working pull the probe out of the well and press the Super Skim switch while holding the probe. You should hear and feel the pump running. If not, try replacing the fuse behing the control panel (see Service Operations - Changing Product Pump Fuse on page 64).

If this does not work, the product pump is probably broken. Replace the pump with a spare pump (if provided). If there is no spare pump or if this does not work, call Clean Earth for assistance at 802/425-3710.

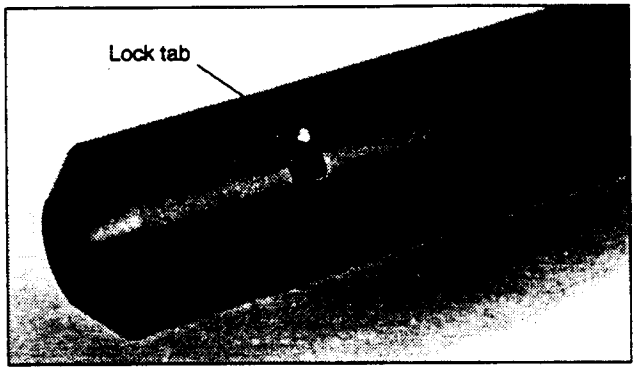
9.0 Service Operations

Product Pump Removal & Installation

Warning!

Prior to removing the pump cap prepare for 1/2 pint of product to be released from the pump cavity.

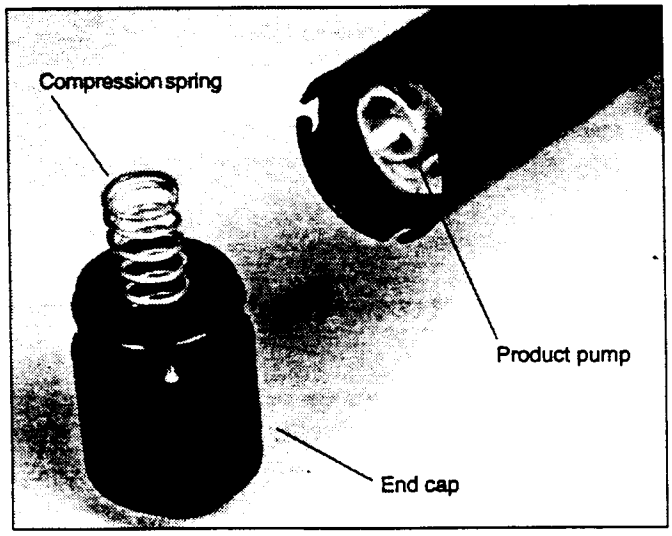
The product pump is located in the bottom end of the probe and is retained by the end cap. To remove the pump, hold the end of the probe over a container and grasp the metal probe body in one hand and the probe end cap with the other hand. Twist the end cap clockwise about 5 degrees to disengage the end cap lock tabs. Firmly pull the end cap straight off the bottom of the probe.



Bottom end of the probe showing one of three lock tabs. The lock tabs are released by turning the end cap clockwise 5 degrees.

Warning!

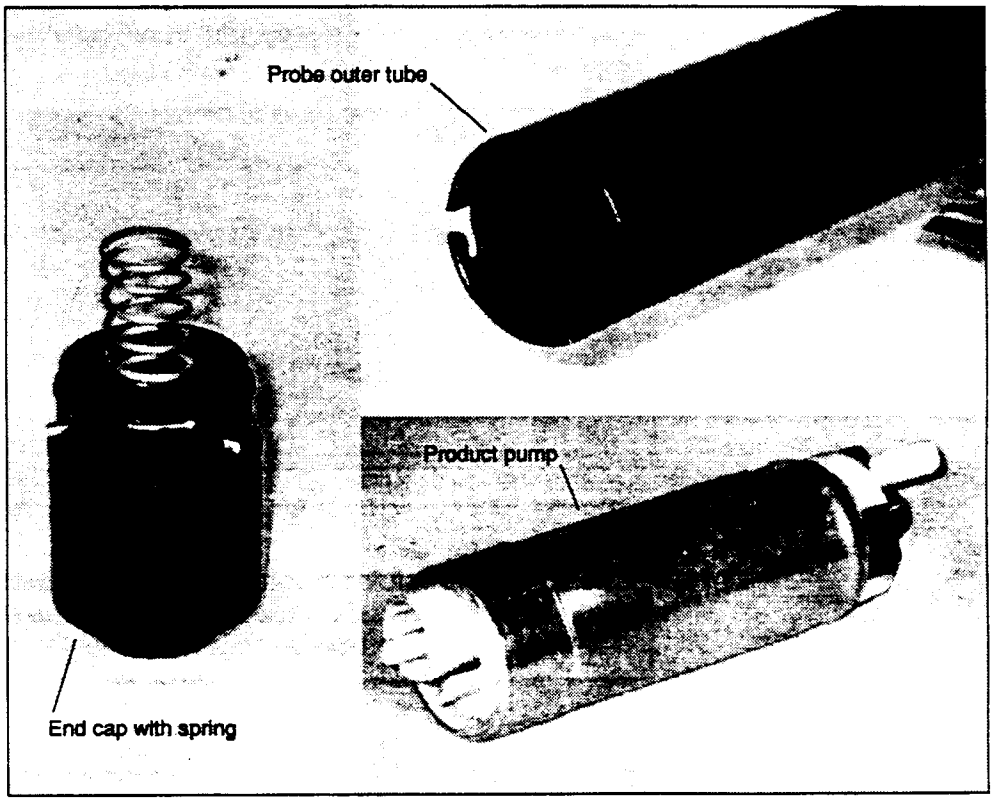
The end cap contains a compression spring that may cause the end cap to fly off unexpectedly once the lock tabs are disengaged. Always point the bottom of the probe down when removing the end cap.



Bottom of the probe with the end cap removed. The intake end of the product pump can be seen inside the probe body.

The product pump will usually not slide out on its own because the output pipe of the pump is inserted into a seal at the top end of the pump. Remove the pump either by grabbing the pump with a pair of pliers or by jerking or "snapping" the probe upward while your other hand is placed in position at the end of the probe to catch the pump as it falls out. Do not allow the pump to drop and impact any hard surface or damage may occur.

Product pump removed from the probe.



Installation of the pump is the reverse of removal with the following exception: rotate the pump so that the output pipe on the pump will align with the seal contained inside the pump cavity.

Note

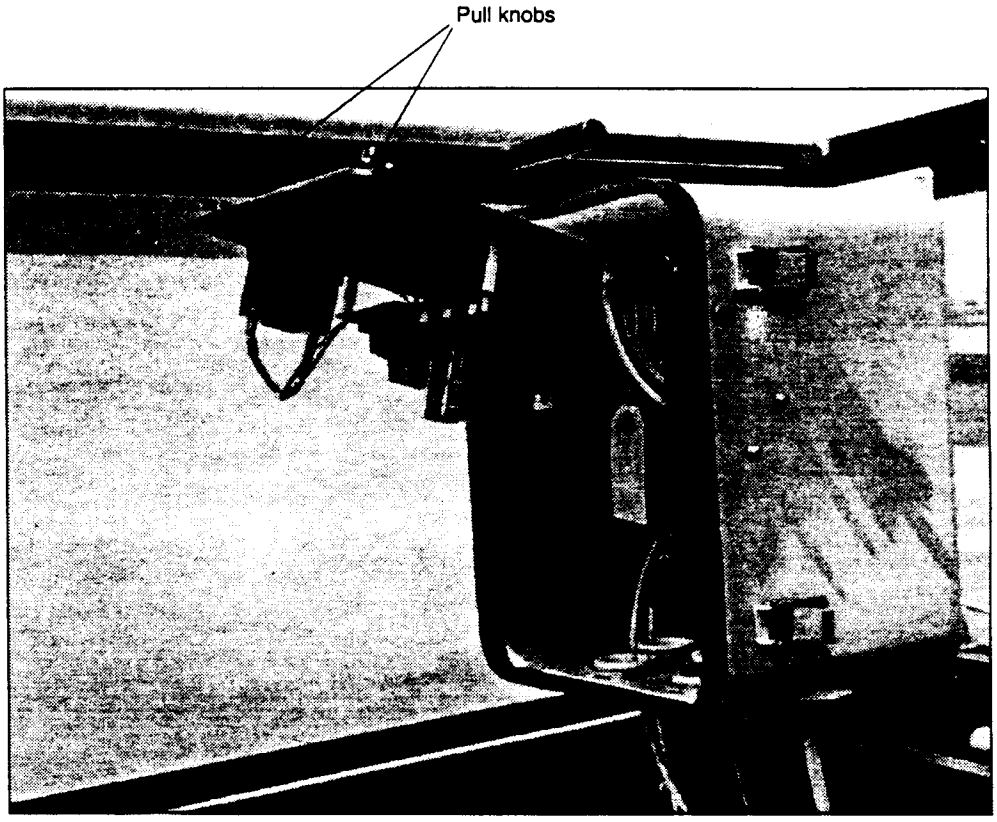
If the end cap cannot be inserted far enough to engage the lock tabs make sure the pump is aligned properly in its cavity.

Printed Circuit Board (PCB)

The printed circuit card (logic card) in located inside the control box. To access the PCB open the latched cover of the control box, grab the knobs at the bottom of the control panel, and pull the bottom of the control panel up and out as shown.

WARNING!

Always switch the System Power switch to the off position prior to opening the control panel!



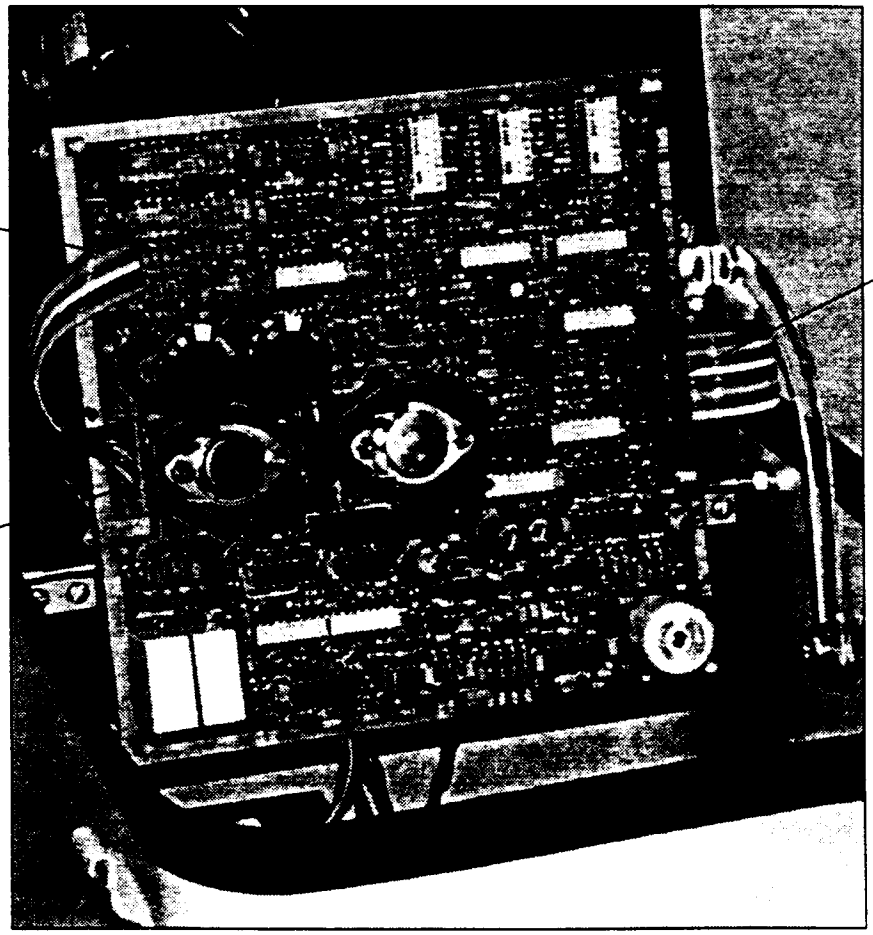
The control box showing the control panel opened up. The PCB is attached to the back of the control panel.

Printed Circuit Board Removal And Installation

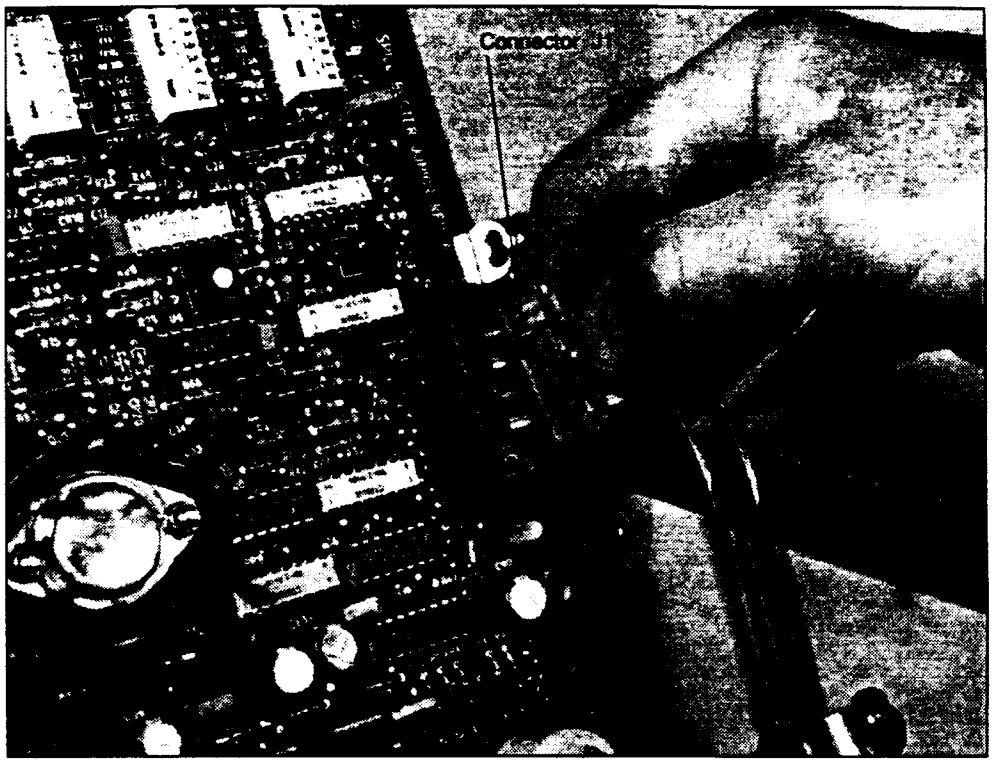
To remove the printed circuit card open the control panel per Section 7.2 above. The PCB is held in place by six nylon posts with catches on them. Prior to disengaging the posts three electrical connectors must be unplugged from the board.

WARNING!

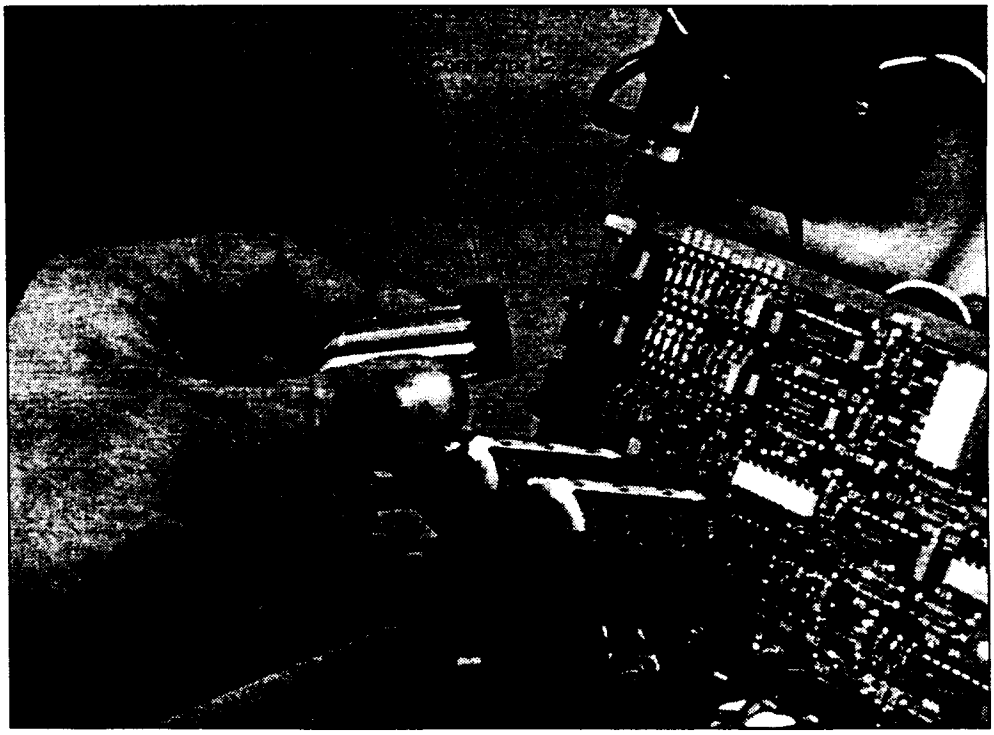
Always switch the System Power switch to the off position prior to opening the control panel!



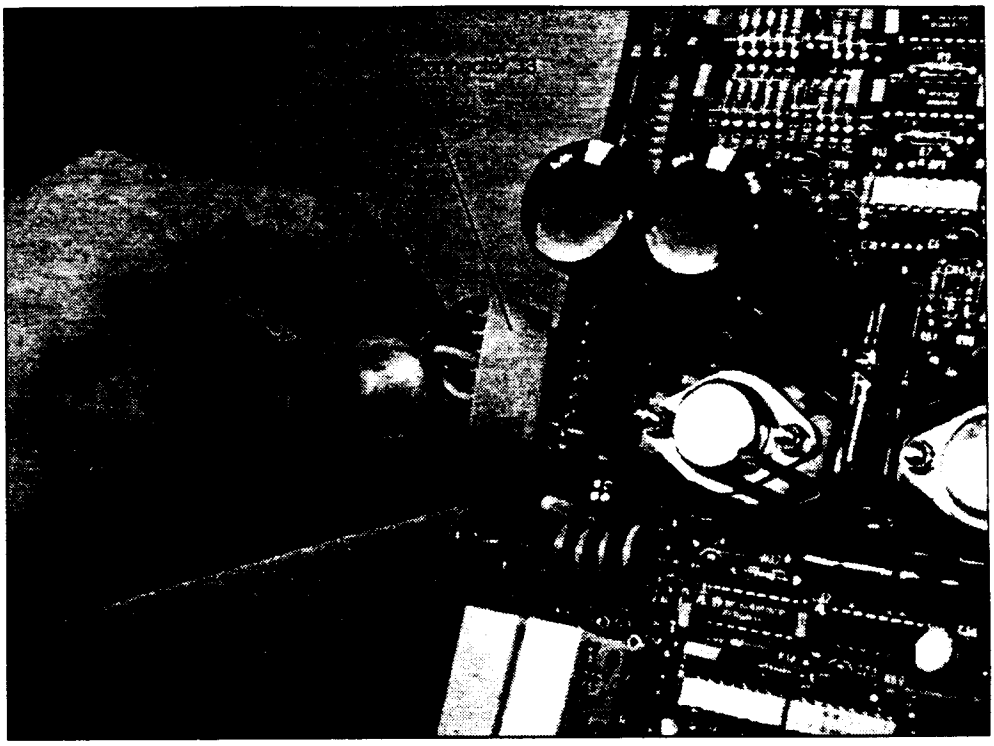
Remove connector J1 from the right side of the board. to prevent damage to the connector make sure the connector evenly; don't pull one end off first.



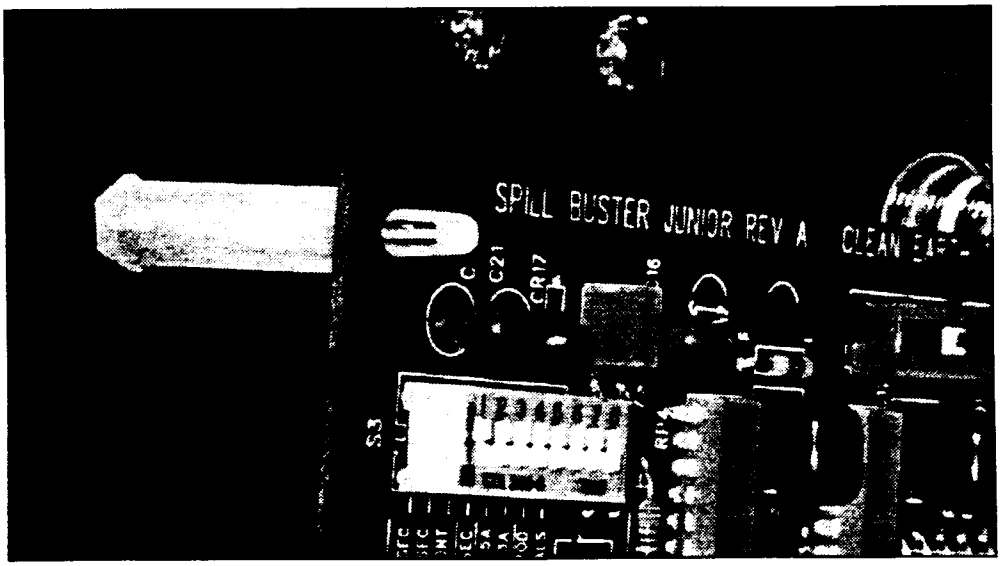
Remove connector J2 from the left side of the board.



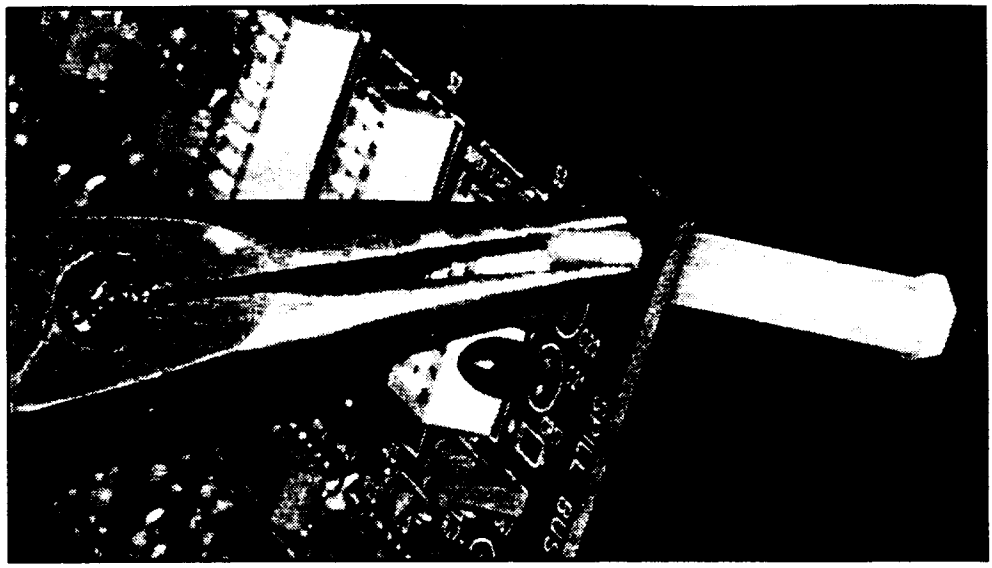
Remove connector J3 from the left side of the board.



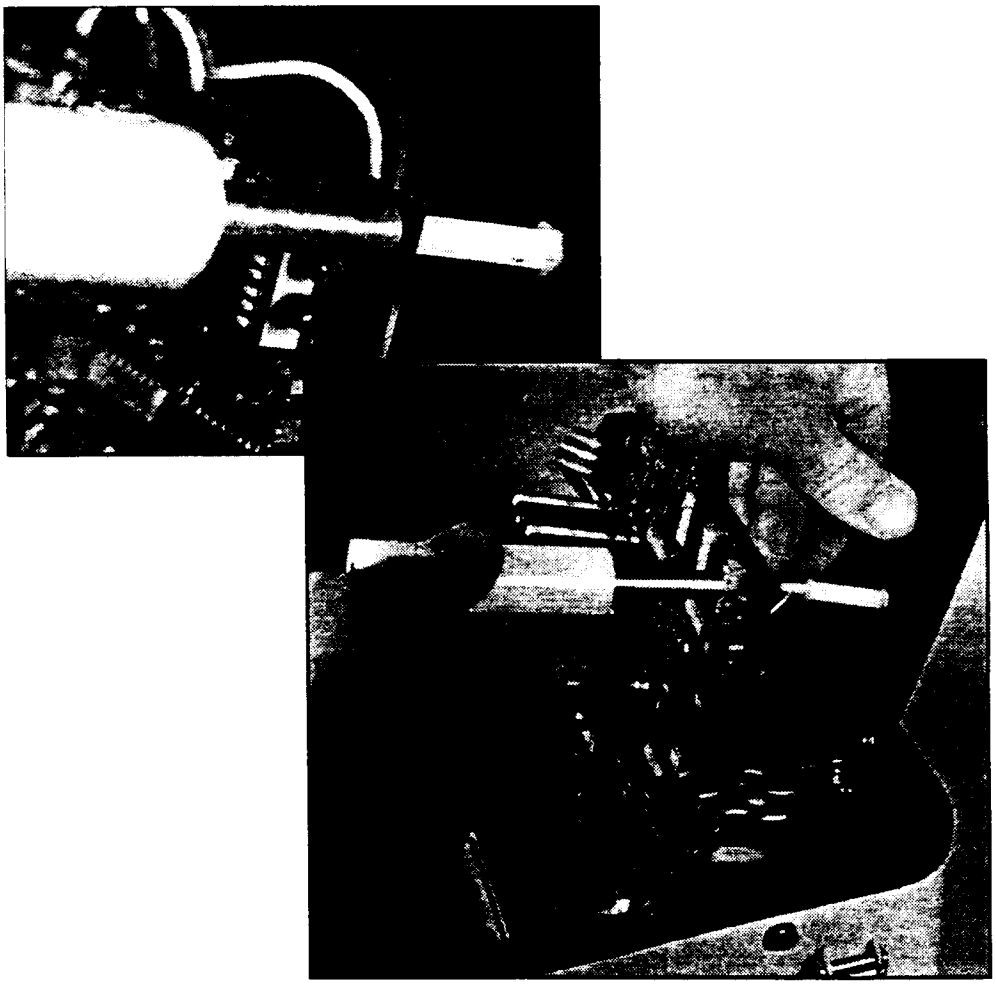
The PC board is mounted on six nylon stand-offs like the one shown here.



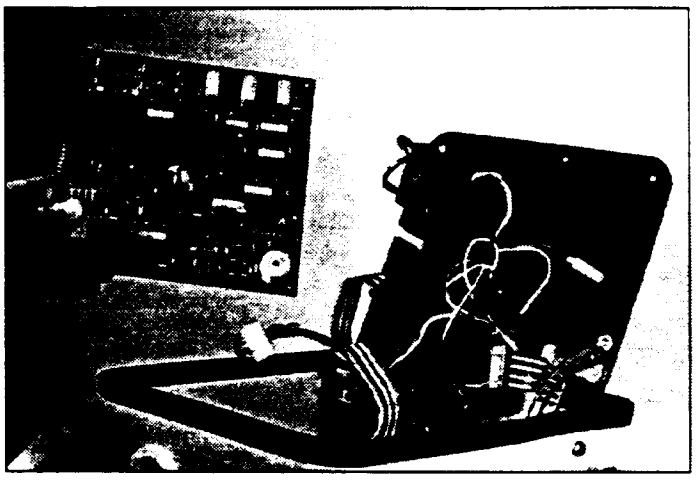
A pair of pliers can be used to squeeze the catch on the stand-off.



Alternatively, a tool is available from the factory that will release the board from the stand-off. Push the tool over the end of the stand-off and rotate it about 90 degrees or until the board is released. Pull gently on the board while rotating the tool or squeezing with the pliers.



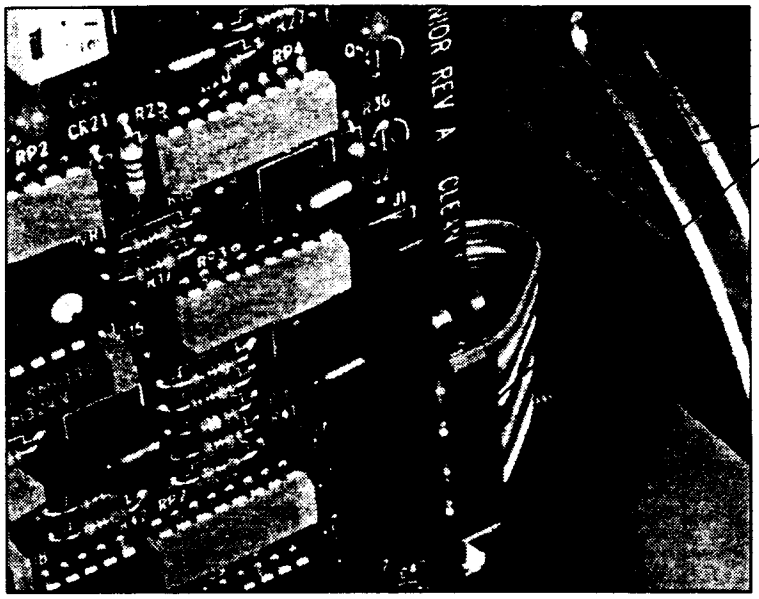
After disconnecting the electrical cabling, the nylon PC board stand-offs should be removed in the sequence shown below. Disengage the #1 stand-offs, then the #2 stand-offs, and lastly #3.



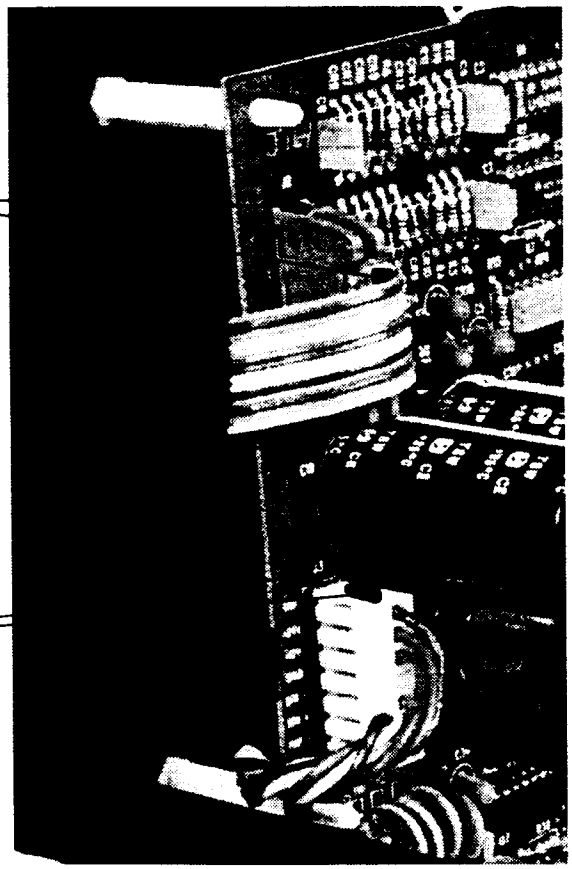
The PC board shown removed from the control box.

Installing the PC board is the reverse of removal. Note the correct orientation of the connectors as shown below.

There are paint dots located on the ends of the connectors to aid in correctly orienting the connectors.



Connector J1
paint dots



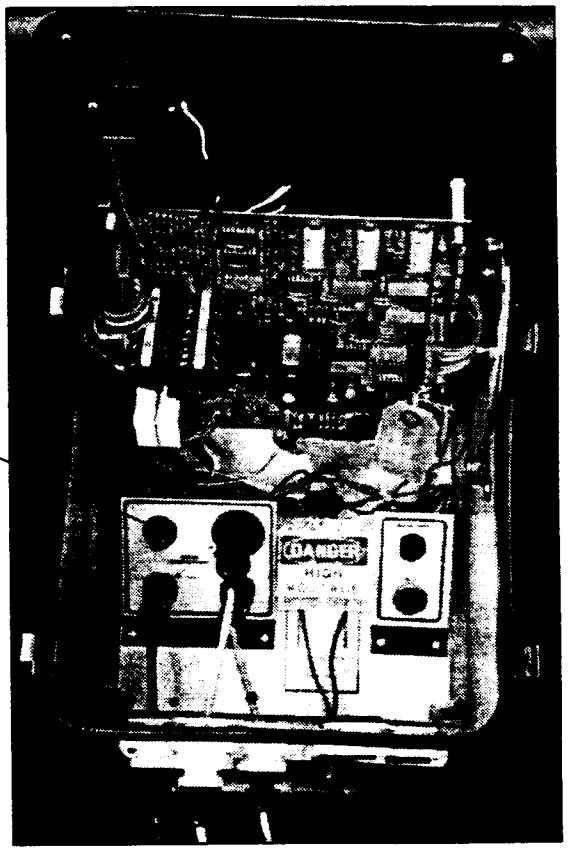
Connector J2
paint dots

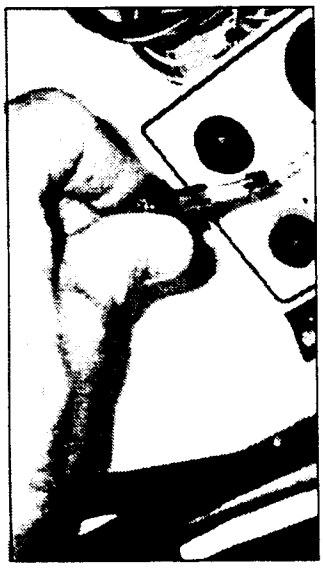
Connector J3
paint dots

Product Pump Fuse - Testing/Changing

The product pump is protected from a current overload by a fuse located in the control box. The fuse is in a quarter-turn type fuse holder on the upper left side of the cable connector panel as shown below.

To remove the fuse holder push in slightly and turn counter-clockwise. The holder will release from the panel and can be withdrawn.

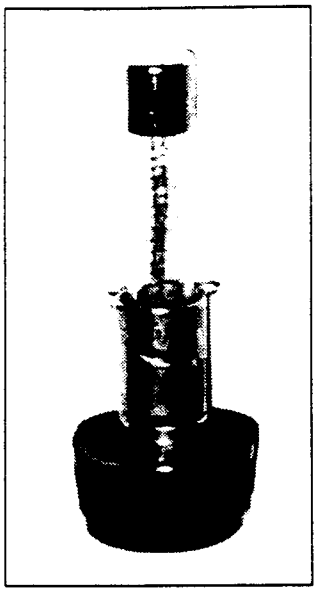




The correct fuse is a 7.5 Amp Slow-Blow. These can be obtained at electronics stores or direct from Clean Earth Technology. A spare fuse is provided in the control box taped to the left side of the box behind the control panel.

Warning

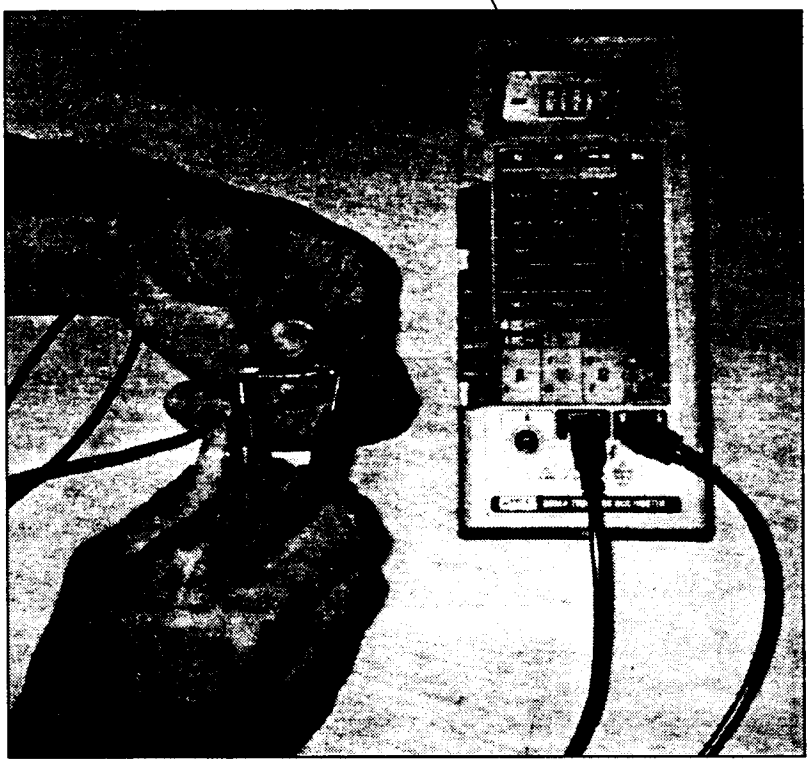
NEVER use a higher capacity fuse than 7.5 Amps.



An example of the proper fuse; a 7.5 Amp Slow-Blow fuse in the fuse holder.

It is difficult to tell if the fuse is good or bad by looking at it because it contains a very fine wire wound around a core inside the glass. The only sure way to tell whether a replacement is neccessary is to use a continuity test. An example of a continuity test is shown below.

Typical reading on a good fuse (0 Ohms)



The fuse removed from the holder. Always replace with the proper part; 7.5 Amp Slow-Blow.

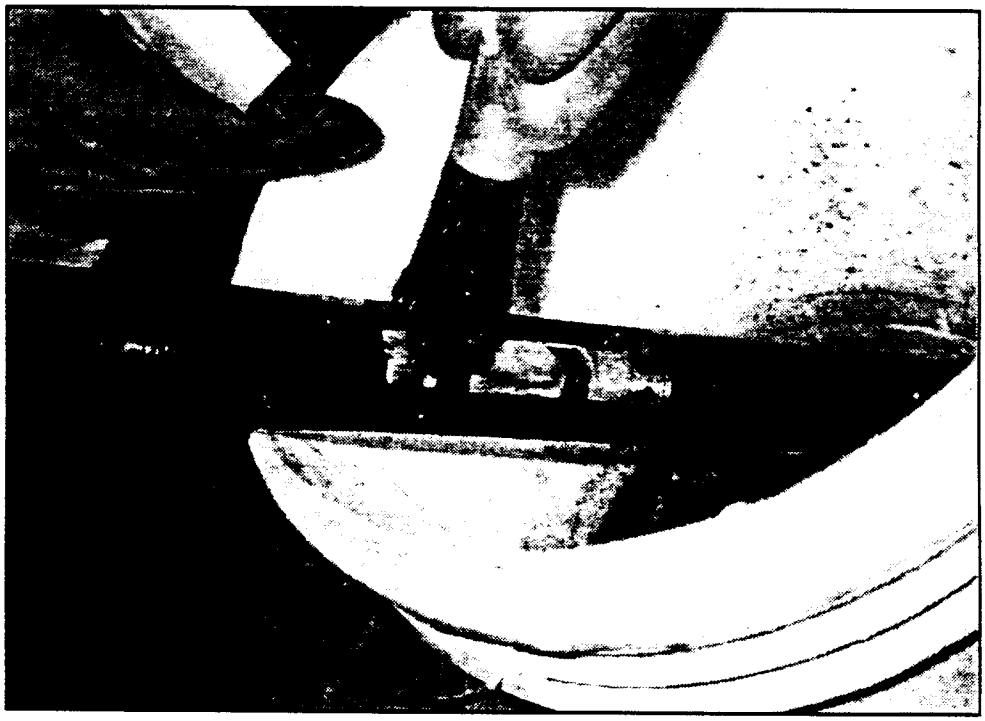
Using an Ohm meter, the fuse is good if there is no resistance (0 Ohms) and the fuse is bad if the resistance is very high (Infinite Ohms or Overload on some meters).

Example of a test on a bad fuse

Probe Cleaning

If the probe sensors or product inlet become fouled with biological growth, emulsion, or other materials, the probe will not function properly. The probe can be cleaned as shown below by using Formula 409 or a similar spray cleaner and a brush. Care must be taken to avoid damaging the sensor bands or sensor wiring, either by brushing too hard or by using a hard tool to perform cleaning.

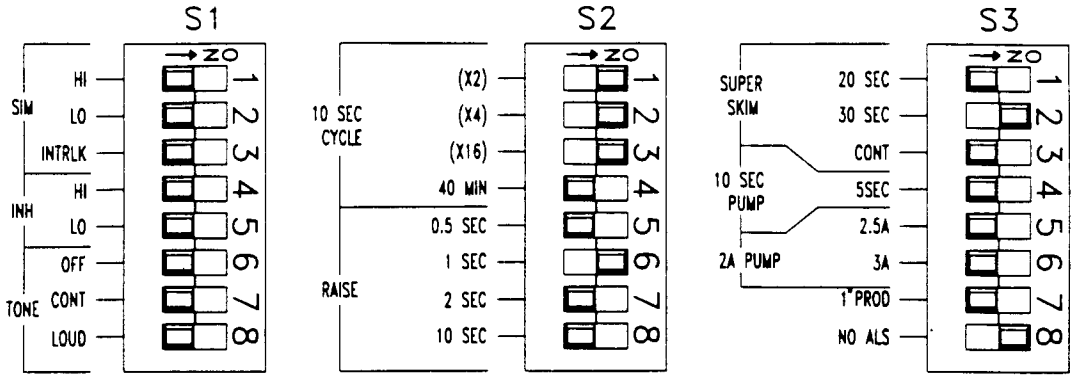
Clean sensors using a brush and a spray cleanser.



Don't use a hard tool that might damage the sensor band or sensor wiring.

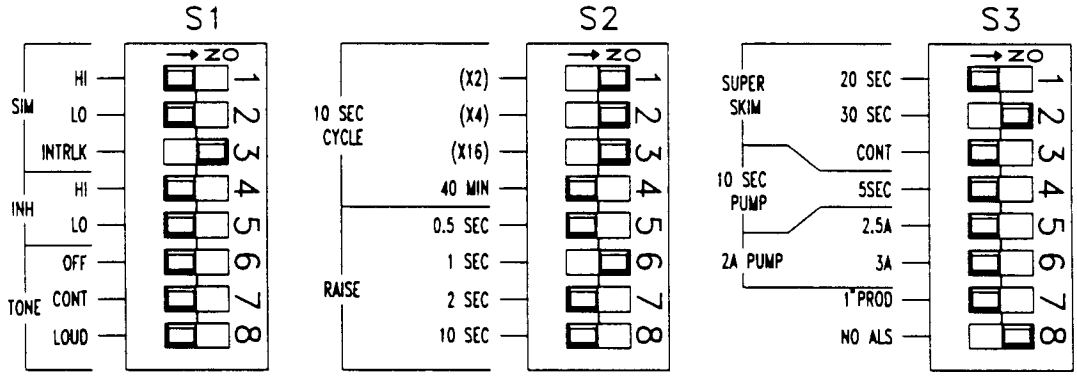
Appendix A - Dip Switch Settings

A1. Product only with product tank over-ride and no auto level seek



SWITCH 1 (S1)	SWITCH 2 (S2)	SWITCH 3 (S3)
ON	**ON**	**ON**
NONE	**S2-1**	**S3-2**
	S2-2	**S3-8**
	S2-3	
	S2-6	

A2. Product only with no product tank over-ride and no auto level seek

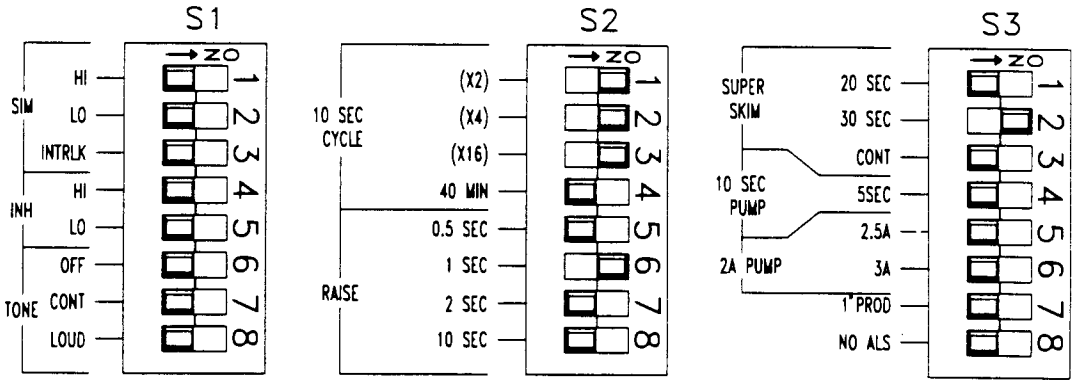


SWITCH 1 (S1)	SWITCH 2 (S2)	SWITCH 3 (S3)
ON	**ON**	**ON**
S1-3	**S2-1**	**S3-2**
	S2-2	**S3-8**
	S2-3	
	S2-6	

WARNING!

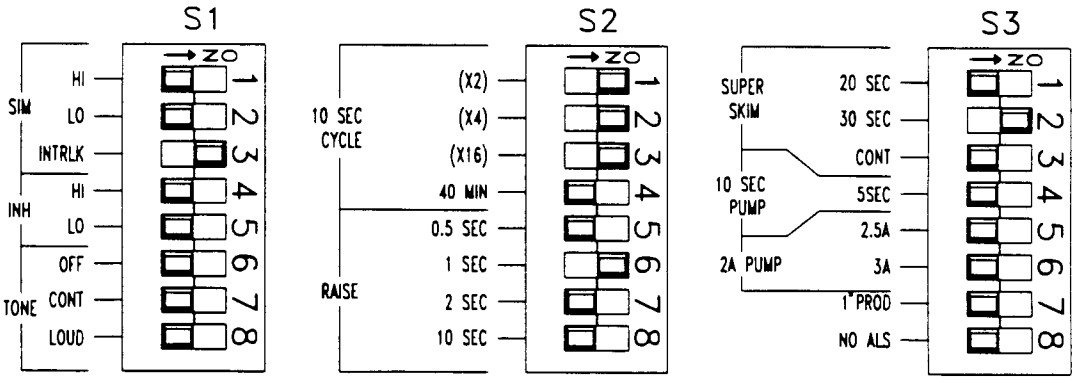
Dip switch settings other than those shown in this manual are not approved by the manufacturer and may result in product spillage.

A3. Product only with product tank over-ride and auto level seek (shown with 20 minute ALS cycle) (These are the settings that that are shipped from the factory)



SWITCH 1 (S1)	SWITCH 2 (S2)	SWITCH 3 (S3)
ON	**ON**	**ON**
NONE	**S2-1**	**S3-2**
	S2-2	
	S2-3	
	S2-6	

A4. Product only with no product tank over-ride and with auto level seek (shown with 20 minute ALS cycle)

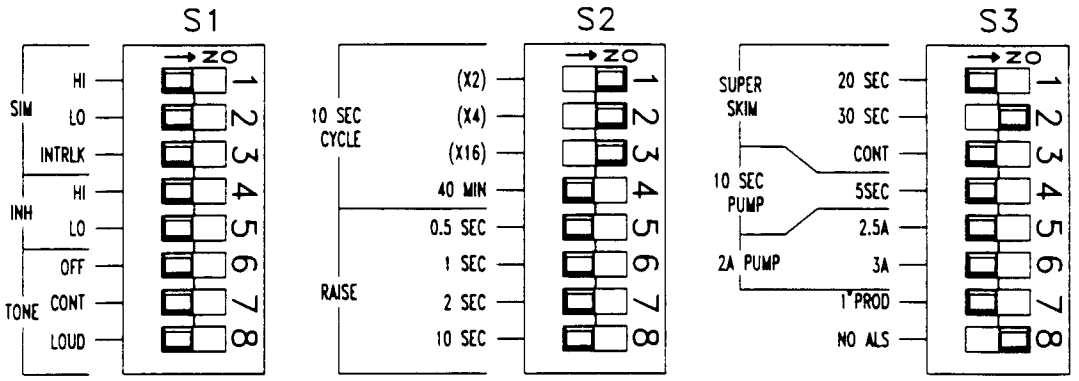


SWITCH 1 (S1)	SWITCH 2 (S2)	SWITCH 3 (S3)
ON	**ON**	**ON**
S1-3	**S2-1**	**S3-2**
	S2-2	
	S2-3	
	S2-6	

WARNING!

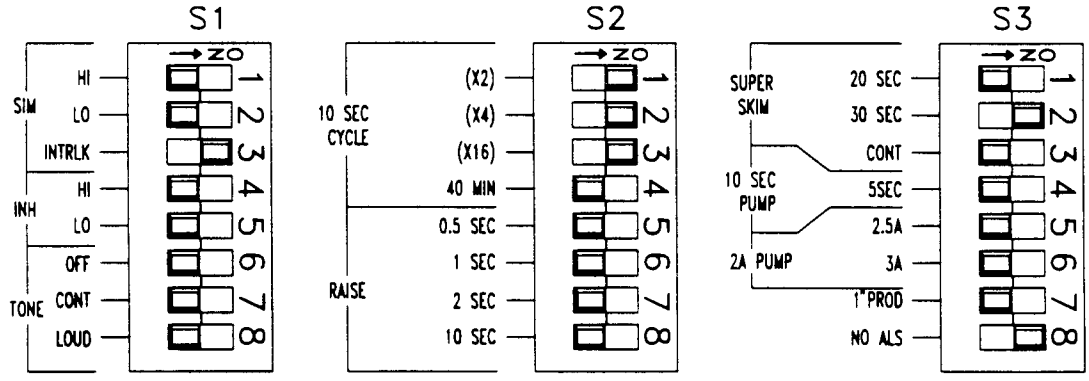
Dip switch settings other than those shown in this manual are not approved by the manufacturer and may result in product spillage.

A5. Dual pump system with add-on Spillbuster water depression system and with product tank override (no Auto Level Seek)



SWITCH 1 (S1)	SWITCH 2 (S2)	SWITCH 3 (S3)
ON	**ON**	**ON**
NONE	**S2-1**	**S3-2**
	S2-2	**S3-8**
	S2-3	

A6. Dual pump system with add-on Spillbuster water depression system and no product tank override (no Auto Level Seek)

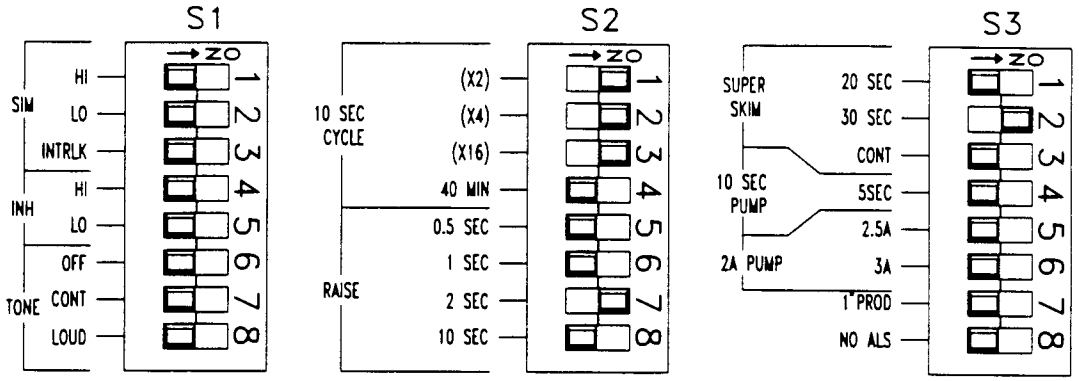


SWITCH 1 (S1)	SWITCH 2 (S2)	SWITCH 3 (S3)
ON	**ON**	**ON**
S1-3	**S2-1**	**S3-2**
	S2-2	**S3-8**
	S2-3	

WARNING!

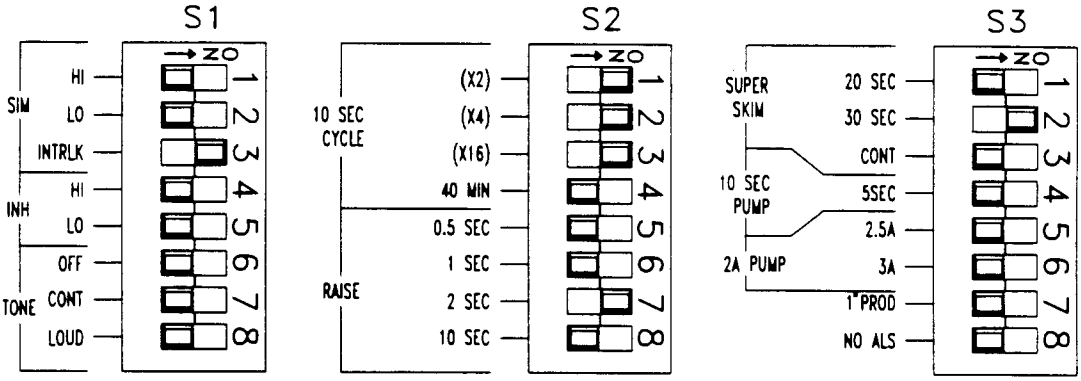
Dip switch settings other than those shown in this manual are not approved by the manufacturer and may result in product spillage.

A7. Dual pump system with non-Spillbuster water depression system and with product tank over-ride (Auto Level Seek is required - shown with 20 minute ALS cycle)



SWITCH 1 (S1)	SWITCH 2 (S2)	SWITCH 3 (S3)
ON	**ON**	**ON**
NONE	**S2-1**	**S3-2**
	S2-2	
	S2-3	
	S2-7	

A8. Dual pump system with non-Spillbuster water depression system and with no product tank over-ride (Auto Level Seek is required - shown with 20 minute ALS cycle)



SWITCH 1 (S1)	SWITCH 2 (S2)	SWITCH 3 (S3)
ON	**ON**	**ON**
S1-3	**S2-1**	**S3-2**
	S2-2	
	S2-3	
	S2-7	

WARNING!

Dip switch settings other than those shown in this manual are not approved by the manufacturer and may result in product spillage.

Appendix - Dip Switch Settings

Notes:

Index

(See following page)

Index

Spillbuster Pump Maintenance Checklist

1.) Check that the pull rope is on the reel correctly; if not, twist the reel backwards to drop the probe into the well and then twist the reel forward to reel the pull rope up correctly. Make sure that the rope is not overlapping on the reel.

2.) Check that the pump cable is over the reel with adequate slack. Make sure the cable is not catching on anything.

3.) Wipe off any water present on the top of the control box. Open the box cover. Check that the low limit light is ON and the high limit light is OFF. If not, rotate the A.L.S. reel by hand to obtain.

4.) Press the Super Skim switch to check pump operation. After pressing the switch, the panel lights should alternate pump/high/pump/high for 30 seconds. You may see fluid or bubble movement in the product tube. Listen down the well for the pump hum during the 30 second Super Skim operation. If the pump does not appear to working pull the probe out of the well and press the Super Skim switch while holding the probe. You should hear and feel the pump running. If not, try replacing the fuse behing the control panel (see Service Operations - Changing Product Pump Fuse on page 64).

If this does not work, the product pump is probably broken. Replace the pump with a spare pump (if provided). If there is no spare pump or if this does not work, call Clean Earth for assistance at 802/425-3710.