

**APPENDIX U**

**ENGINEERING REPORT AND DESIGN PLANS  
AND SPECIFICATIONS FOR  
CONTAINER STORAGE FACILITY**

**ENGINEERING REPORT AND  
PLAN SUBMITTAL FOR A  
HAZARDOUS WASTE STORAGE FACILITY**

PREPARED FOR:  
**MILWAUKEE SOLVENTS & CHEMICALS CORPORATION**  
NORTH 59 WEST 14765 BOBOLINK AVENUE (OFFICE)  
NORTH 59 WEST 14776 BOBOLINK AVENUE (PLANT)  
NORTH 59 WEST 14706 BOBOLINK AVENUE (PLANT)  
MENOMONEE FALLS, WISCONSIN 53051

EPA ID NO. 023-35-0192

TRIAD ENGINEERING PROJECT NO. 10597

JANUARY 1993

**MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION  
ENGINEERING REPORT AND  
PLAN SUBMITTAL FOR A  
HAZARDOUS WASTE STORAGE FACILITY**

**1. INTRODUCTION**

Milwaukee Solvents and Chemicals Corporation (MILSOLV<sup>R</sup>) owns and operates a solvent recycling facility at N59 W14706 Bobolink Avenue in Menomonee Falls, Wisconsin. The recycling operations performed at this facility result in spent solvents being stored on site for more than 90 days; therefore, MILSOLV<sup>R</sup> has applied for a hazardous waste storage license. MILSOLV<sup>R</sup> currently operates under final license on the tank farm and interim status on container storage. One of the conditions with which MILSOLV<sup>R</sup> must comply to receiving approval on their plan of operation, is to construct a container storage facility. This report provides a detailed design for the proposed container storage facility. The detailed design plans and specifications are enclosed with this report and are being submitted to the WDNR for approval prior to commencing construction.

**2. FACILITY CONTACTS**

Questions on this project should be directed to the following individual:

Mr. Robert Heitzer  
Technical Director  
Milwaukee Solvents & Chemicals Corporation  
N59 W14765 Bobolink Avenue  
Menomonee Falls, Wisconsin 53051  
Phone: 414-252-3550

The design was prepared by Triad Engineering. The contact at Triad is as follows:

Mr. Richard J. Fulk, P.E.  
Project Manager  
Triad Engineering Incorporated  
325 East Chicago Street  
Milwaukee, Wisconsin 53202

### 3. FACILITY DESCRIPTION

Milwaukee Solvents and Chemicals proposes to modify an existing warehouse on the northwest corner of the property to be used for container storage and waste processing. The location of the proposed drum storage and waste processing rooms are shown on Drawing No. 10597-101 (Fig 3). The container storage area will be designed to store a maximum volume of 55,000 gallons in containers.

Triad Engineering conducted an evaluation of this building to determine its suitability for storing hazardous, flammable wastes. The building will require the following modifications to comply with applicable state and local codes:

- Letter of agreement restricting the use of neighboring property to the north to comply with setback requirements;
- Modify the building for fire separations;
- Place a sloped concrete pad over the existing floor;
- Place individual concrete pads to support storage racks;
- Install a fire protection system;
- Install collection trenches in the warehouse and an outdoor tank for spill collection;
- Modify the HVAC system in the building;
- Install sloped concrete pad and sump as secondary containment for the offloading docks;
- Install additional exit doors;
- Install additional alarm system; and
- Modify building electrical to explosion-proof type.



The following list of drawings provide detailed design information for the construction of the modifications.

<u>Sheet No.</u>	<u>Drawing No.</u>	<u>MILSOLV Fig No.</u>	<u>Title</u>
0		0	Title Page
1	10597-101	3	Facility Layout
2	10597-102	2	Site Survey
3	10597-201	1	Process Flow Diagram
4	10597-301	7	Storage & Process Rooms Structural Mod.
5	10597-302	4	Equipment and Rack Storage Layout
6	10597-303	6	Structural Sections and Details
7	10597-400	19	Mechanical Specifications
8	10597-401	5	Process Room Equipment & Piping Layout
9	10597-402	17	Facility Layout - Interconnecting Piping
10	10597-403	18	Mechanical Piping Sections & Details
11	10597-410	16	Heating and Ventilating Specifications
12	10597-411	14	Heating and Ventilating Layout
13	10597-412	15	Heating and Ventilating Details
14	10597-420	12	Rack Fire Protection and Notes
15	10597-421	13	Fire Protection Plan
16	10597-900	8	Electrical Specifications
17	10597-901	9	Electrical Power Wiring & Lighting Layout
18	10597-902	10	Emergency Alarm Panel and Heat Trace
19	10597-903	11	Electrical Motor Control Centers & Schematics

The following subsections provide descriptions of the building components as shown on the building record drawing included with this report.

#### 4. STRUCTURE

Figures 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16 show modifications to an existing building that will be required for the purposes of storage, handling, and processing of hazardous waste materials.

These figures include processing information on building classifications and facility zoning. The storage and process rooms, where the hazardous materials are handled, will be equipped with new sloped floors and ramped doorways in order to control any accidental spills. All spills inside the rooms will be conveyed to an outside secondary containment tank via floor trenches and gravity conveyance piping.

The truck dock area serving the storage and process rooms will also be equipped with a new secondary concrete containment structure to control accidental spills and prevent subsurface contamination.

Reference information regarding building classifications, fire rating of wall construction, and secondary containment system calculations are presented on the detailed construction drawing Fig. 4. Figures 6 and 7 also provide further details and layout of the building and secondary containment system.

Existing warehouse north and west walls are constructed of 12-inch-thick unit masonry and they are load bearing. These walls are supported by conventional spread footings constructed below frost level. The south wall of the storage room will be extended above the roof as a parapet wall and all existing openings will be blocked off to provide a four-hour separation between the storage room and other areas of the warehouse. The roof construction is made up of 10-inch-thick precast concrete planks topped with roof insulation and built-up roofing membrane. The connections between precast roof planks and walls are standard pin connection and the structural loadings are mainly beared by the east and west masonry walls as well as internal center steel beam-column framing.

The new reinforced concrete overlaying floor system will be varying in thickness, between 12 inches and 3 inches, ramped at door openings, and sloped toward a floor trench. The floor construction, as specified, is designed to be liquid tight by using waterstops at all control and construction joints. All joints including where floor meets wall will be sealed with special sealant material as specified on drawings. Refer to Figures 4, 6, and 7 for additional details.

## **5. HEATING AND VENTILATION**

The heating and ventilation system within the warehouse will be modified to comply with the NFPA requirements. Drawing 10597-410, 411, and 412 (Figures 14, 15, and 16) provide a detailed plan of the modifications. Three spark-proof exhaust fans with explosion-proof motors will be installed in the building. Hoods will be installed over the processing equipment. Heat will be supplied to the building by a 12,000 CFM direct gas-fired make-up unit with an explosion-proof motor. This unit will be located on the roof of the warehouse.

## 6. PROCESS EQUIPMENT AND PIPING DESCRIPTION

### 6.1 Process Equipment

The following is a list of process equipment that will be used in the process room.

#### Description

Tank 75 w/2HP Mixer  
Trough  
Vaughn Pump - 7.5 HP  
Arde Pump 30 HP  
Arde Pump 30 HP  
Lobe Pump 5 HP  
Lobe Pump 5 HP  
Small Shredder - 10 HP

Future equipment considered are; a two-stage shredder and an additional Roper Solv. pump.

As directed by EPA, Tank 75 was inspected and certified by a Registered Professional Engineer in July of 1985. A copy of the Certification Report is provided as an attachment. This tank will be visually inspected by the engineer during the tank relocation phase and a report of the inspection will then be provided. Ultrasonic testing will be included in this inspection report.

In addition to the process equipment, new gravity-type roller conveyors will be installed to assist in the handling of hazardous drums. Figure 4 provides specifications for the construction of the conveyor system.

### 6.2 Process and Utility Piping

Four process pipelines will be installed aboveground between the warehouse and the reclamation/tank farm:

- (2) 2-inch low viscosity waste to tank farm.
- (2) 3-inch high solids to tank farm.

The layouts, connection details, and specifications for the aboveground process piping system have been provided in the detailed design drawing package, Figures 1, 5, 17, 18, and 19.

The piping system has been designed to meet the requirements of NR 645. The specified carbon steel is a compatible material to be used for processing of solvent-type waste material. The welded construction type including welded flanges will be inspected daily by the plant personnel for leaks. The pipe line will be installed above an existing concrete walkway area to allow a more efficient detection method for potential leaks.

The pipe line has been designed with an adequate number of supports and bends as shown on the drawings to withstand its own weight, wind pressure, snow load, and elongations due to seasonal weather changes. For additional climatic changes, pipe insulation and heat tracing has also been specified for the exterior process piping system.

The process solvents piping will be provided with a pipe cleaning or "pigging" system which will use pressurized nitrogen as the motive force to propel a solid ball or bullet shaped device down the pipelines in order to clear the lines of standing product after the pumping operations have been completed. This operation will prevent material from solidifying within the provided pipeline.

Nitrogen will be provided by a local supplier who will furnish a 500-gallon liquid nitrogen storage tank with attached evaporating coil equipment. This supplier will be responsible for filling the storage tank on an as-needed basis.

Nitrogen will have a pressure of approximately 125 psig at the tank. The supply piping will be provided with a pressure regulator which will reduce the working pressure to approximately 40 psig, enough to propel the "pig" from the launching point to the end of rim.

The "pig" or pipe cleaner will be the same size as the pipe inside diameter and will be constructed in the shape of a ball or bullet. It will be constructed of a flexible material, compatible with the solvents being handled, and able to turn corners within the piping runs.

The "pigging" process will originate from the new process room and will clean the lines in the direction of the tank farm. A quick disconnect coupling will be used to connect the nitrogen supply to the pipeline to be cleaned after the "pig" is inserted into the end of the line. The other end of the piping will be fitted with a modified quick disconnect coupling and hose which will be connected to one of the selected tanks in the tank farm area. The modified coupler will stop the "pig" travel prior to the tank. This assembly is referenced on the drawings as the "pig catcher". Refer to Figures 5, 6, 7, 17, 18, and 19 for specifications, locations, and installation details.

## **7. FIRE PROTECTION SYSTEM**

Included in the detailed design drawing package, Figures 12 and 13 have been prepared for Rack and Ceiling automatic sprinkler system for both storage and process rooms. These drawings include details such as riser detail, pipe hanger details, rack cross sections, water supply and demand, etc. A copy of the sprinkler hydraulic calculations are also enclosed.

## 8. SECONDARY CONTAINMENT

Secondary containments have been considered for the storage and process rooms as well as the truck unloading area (refer to Section 4 "Structure" of this engineering report for additional information). Figure 4 includes additional information regarding secondary containment structures and capacity calculations.

The concrete sealant together with waterstop material have been specified on Figure 7 and will be installed at all control and construction joints in the new floor and outside truck unloading pad area. The system specified is exactly the same as what has been installed in the existing tank farm dike area which was reviewed by the WDNR prior to its construction in 1990.

Triad Engineering, after review of corrosiveness of the potential spill material, has determined that the specified material is compatible to be used under the conditions that all spills must be removed and area cleaned within 24 hours of a spill occurrence. Visual inspection of joints in the areas where a spill was detected must be conducted to assure that no damage has been incurred by the spilled chemicals such as swelling. Any effected sealant will then be reported to maintenance personnel for replacement. Enclosed please find a copy of chemical resistivity chart provided by the sealant and waterstop manufacturers.

There is only one level control device specified for the secondary containment system which is located in the first section of the secondary steel spill tank. This spill tank is located outside, near the northeast corner of the warehouse facility. Any accidental spill inside the warehouse facility is conveyed to the spill tank via sloped floors, floor trenches, and gravity piping. The first section of the spill tank is intended to capture a small spill volume which will avoid contaminating the entire spill tank and will allow the spill removal response team an easier time for cleaning.

This first section of the spill tank also allows the liquid level to rise more rapidly and activate the level sensor which enhances the alarm response time. Once the level switch is activated, it will send a signal to an emergency alarm panel located in the maintenance shop which will then sound an audible and visual alarm inside and outside the warehouse. Once alarms are activated, operator personnel will leave the building until such time as the spill is attended to and controlled. Refer to Figures 1, 6, 7, 9, 10, 11, and 19 regarding locations of level detector and specification.

Since the truck unloading pad area is designed to contain any accidental spills, the detection of spills will be provided by manual inspection prior to, during, and at completion of each offloading process.



**9. PROJECT SCHEDULE**

January 10, 1993	Revised MILSOLV Plans Received by DNR
March 1, 1993	Preliminary Determination - No Envir. Assess. Req'd.
April 16, 1993	45-Day Comment Period Ends

ASSUMING NO CONTESTED OR INFORMATION HEARING REQUEST, THEN...

May 3, 1993	Final DNR Approval
June 14, 1993	Bidding and Contractor Mobilization Completed; Construction Begins
October 18, 1993	18-Week Construction Period Ends
November 1, 1993	Construction Documentation and License Application Received by DNR
November 12, 1993	Construction Inspection & Approval; Public Notice by DNR of Intent to Issue
December 28, 1993	End of Public Comment Period

ASSUMING NO DETAILED DNR RESPONSE NEEDED TO PUBLIC COMMENT(S), THEN...

December 30, 1993	License Issuance
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**10. CERTIFICATION STATEMENT**

Triad Engineering certifies that the design of the proposed container storage facility described in this report is acceptable for storing the specified hazardous wastes and complies with applicable codes.

For: Triad Engineering

Richard J. Fulk, P.E.  
Executive Vice President

Date: January 8, 1998





# HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS

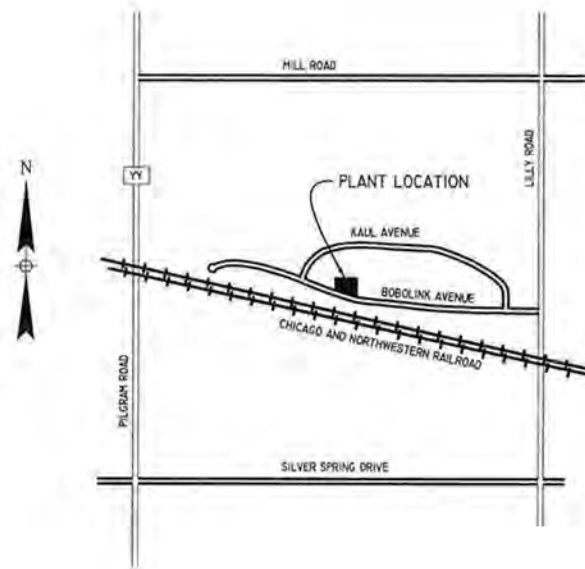
FOR

## MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION

N 59 W 14776 AND 4706 BOBOLINK AVENUE  
 MENOMONEE FALLS, WISCONSIN 53051

EPA IDENTIFICATION # WID 023-35-0192

LOCATION MAP:



DRAWING INDEX:

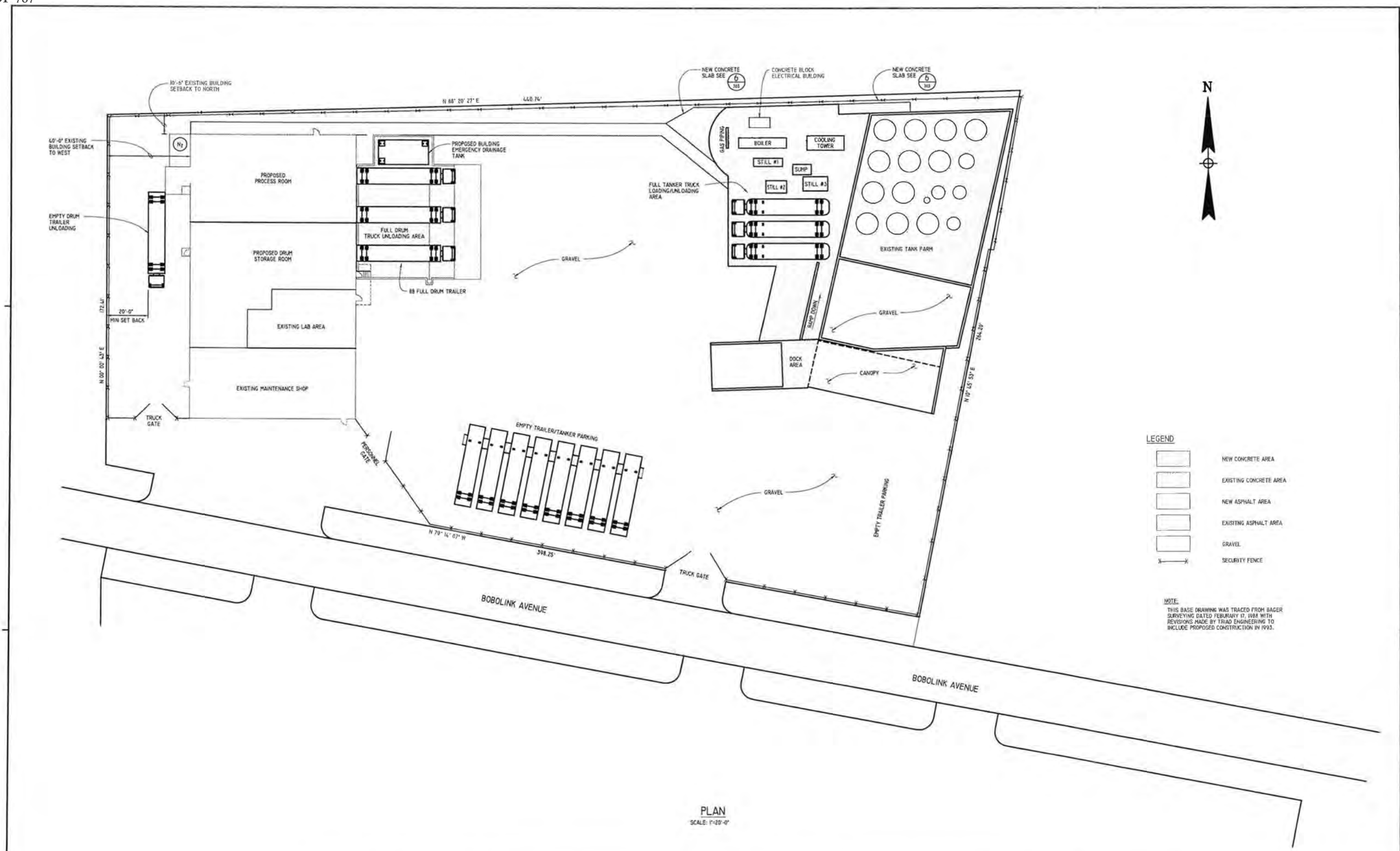
<u>SHEET NO.</u>	<u>DRAWING NO.</u>	<u>REVISION NO.</u>	<u>TITLE</u>
1	10597-101	0	FACILITY LAYOUT
2	10597-102	0	SITE SURVEY
3	10597-201	0	PROCESS FLOW DIAGRAM
4	10597-301	0	STORAGE AND PROCESS ROOMS STRUCTURAL MODIFICATIONS
5	10597-302	0	EQUIPMENT AND RACK STORAGE LAYOUT
6	10597-303	0	STRUCTURAL SECTIONS AND DETAILS
7	10597-400	0	MECHANICAL SPECIFICATIONS
8	10597-401	0	PROCESS ROOM EQUIPMENT AND PIPING LAYOUT
9	10597-402	0	FACILITY LAYOUT - INTERCONNECTING PIPING
10	10597-403	0	MECHANICAL PIPING SECTIONS AND DETAILS
11	10597-410	0	HEATING AND VENTILATING SPECIFICATIONS
12	10597-411	0	HEATING AND VENTILATING LAYOUT
13	10597-412	0	HEATING AND VENTILATING DETAILS
14	10597-420	0	RACK FIRE PROTECTION AND NOTES
15	10597-421	0	FIRE PROTECTION PLAN
16	10597-900	0	ELECTRICAL SPECIFICATIONS
17	10597-901	0	ELECTRICAL POWER WIRING AND LIGHTING LAYOUT
18	10597-902	0	EMERGENCY ALARM PANEL AND HEAT TRACE
19	10597-903	0	ELECTRICAL MOTOR CONTROL CENTERS AND SCHEMATICS

PREPARED BY:



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LEGEND

- NEW CONCRETE AREA
- EXISTING CONCRETE AREA
- NEW ASPHALT AREA
- EXISTING ASPHALT AREA
- GRAVEL
- SECURITY FENCE

NOTE:  
THIS BASE DRAWING WAS TRACED FROM RAGER SURVEYING DATED FEBRUARY 17, 1988 WITH REVISIONS MADE BY TRIAD ENGINEERING TO INCLUDE PROPOSED CONSTRUCTION IN 1993.

PLAN  
SCALE: 1"=20'-0"

VERIFY SCALE  
BAR IS ONE INCH ON ORIGINAL DRAWING.  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

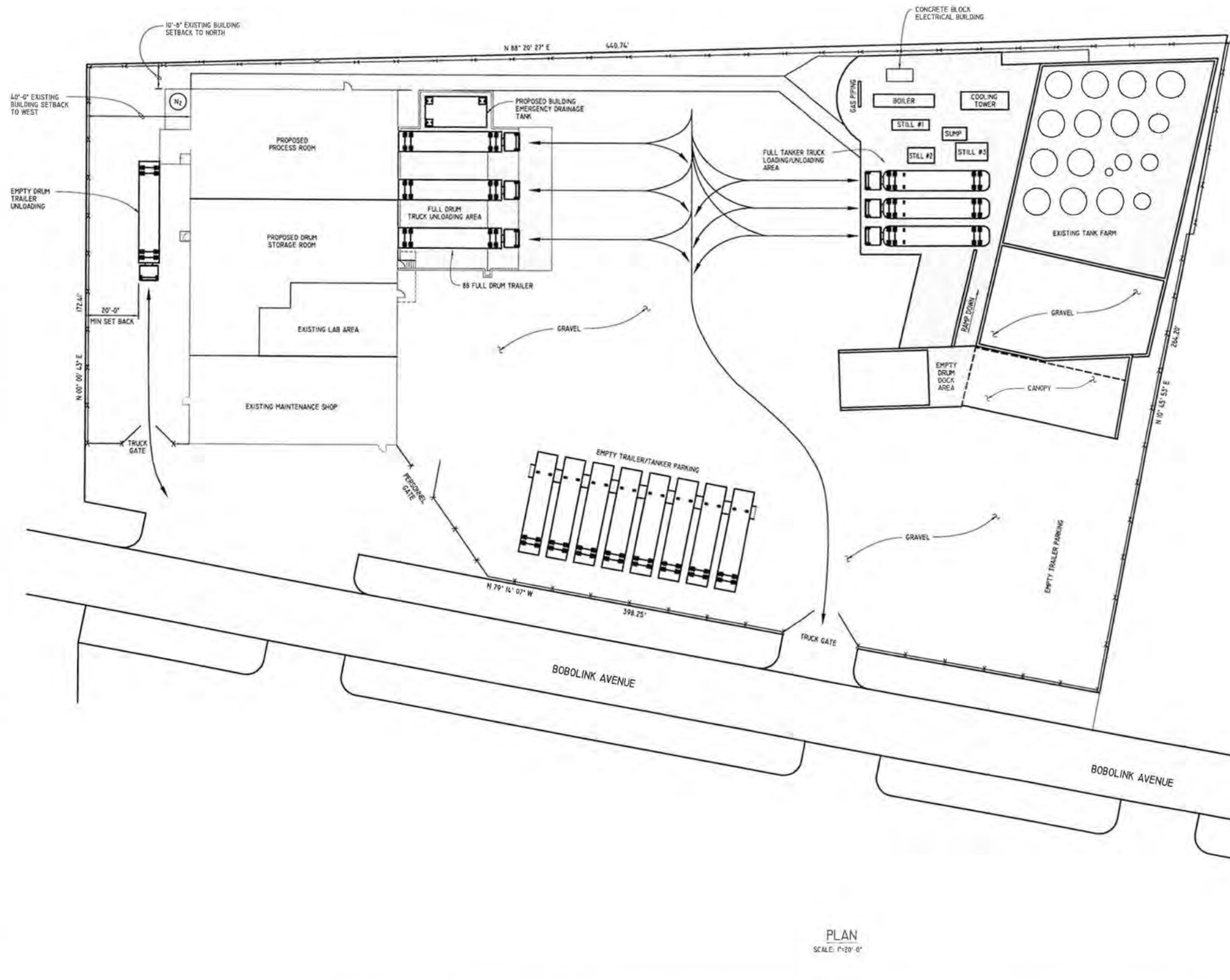
DSGN	F.MOHSENIAN				
DR	D.J.SCHUTTEN				
CHK	F.MOHSENIAN				
APVD					
NO.	DATE	REVISION	BY	APVD	

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MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION  
HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS FACILITY LAYOUT

SHEET NO.	1
DWG NO.	10597-101
DATE	12/18/92
PROJ NO.	10597



LEGEND

- NEW CONCRETE AREA
- EXISTING CONCRETE AREA
- NEW ASPHALT AREA
- EXISTING ASPHALT AREA
- GRAVEL
- SECURITY FENCE
- TRUCK TRAFFIC DIRECTION

NOTE:  
THIS BASE DRAWING WAS TRACED FROM BAGER SURVEYING DATED FEBRUARY 17, 1988 WITH REVISIONS MADE BY TRIAD ENGINEERING TO INCLUDE PROPOSED CONSTRUCTION IN 1993.

PLAN  
SCALE: 1"=20'-0"

VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0' 1' IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	DSGN	F. MOHSENIAN
	DR	D. J. SCHUTTEN
	CHK	F. MOHSENIAN
	APVD	

NO.	DATE	REVISION	BY	APVD

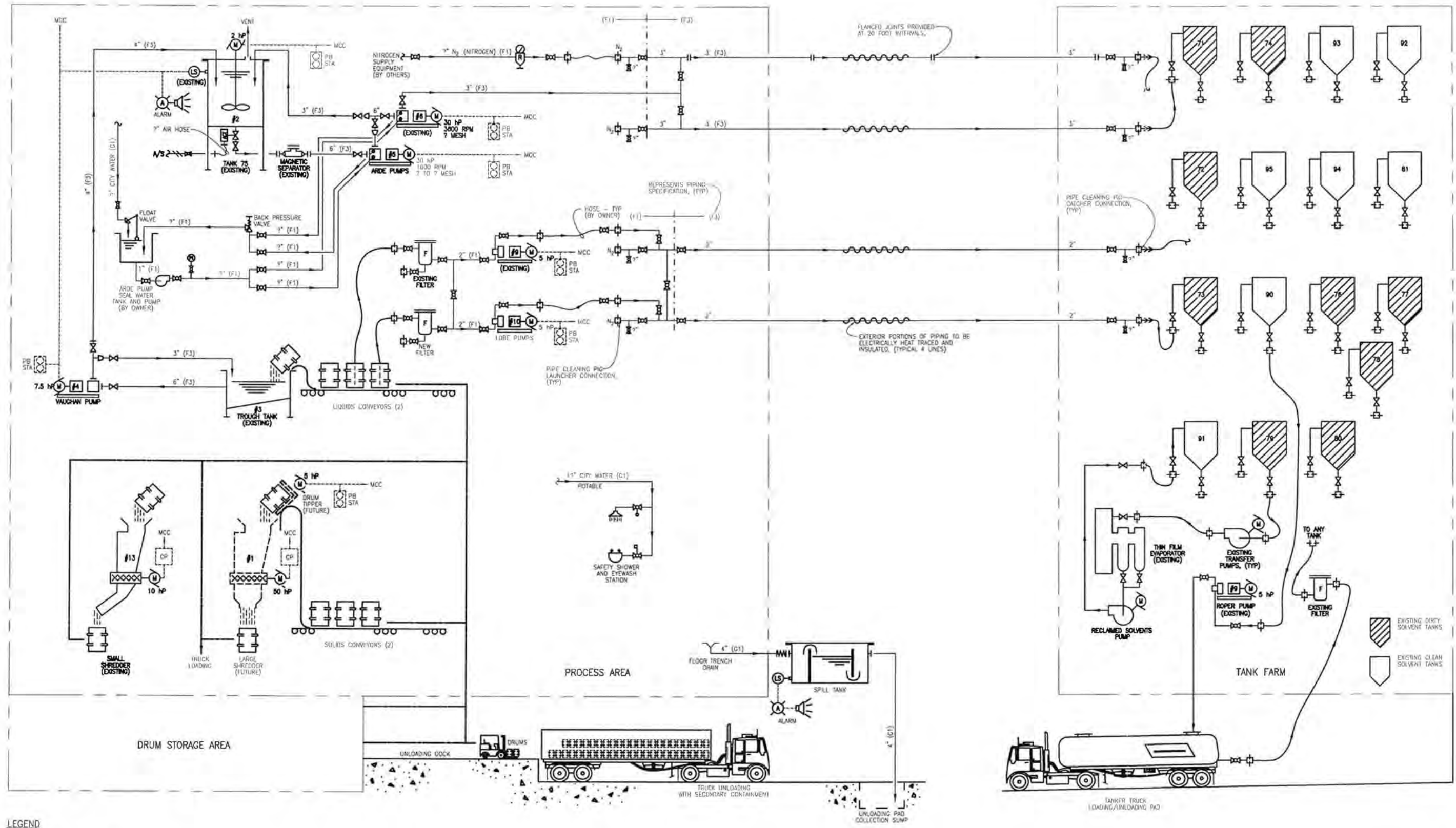
**TE TRIAD ENGINEERING INCORPORATED**  
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MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION  
 HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS  
 SECURITY AND TRAFFIC FLOW PATTERNS

SHEET NO.	1A
DWG. NO.	10597-101
DATE	12/28/92
PROJ. NO.	10597







**LEGEND**

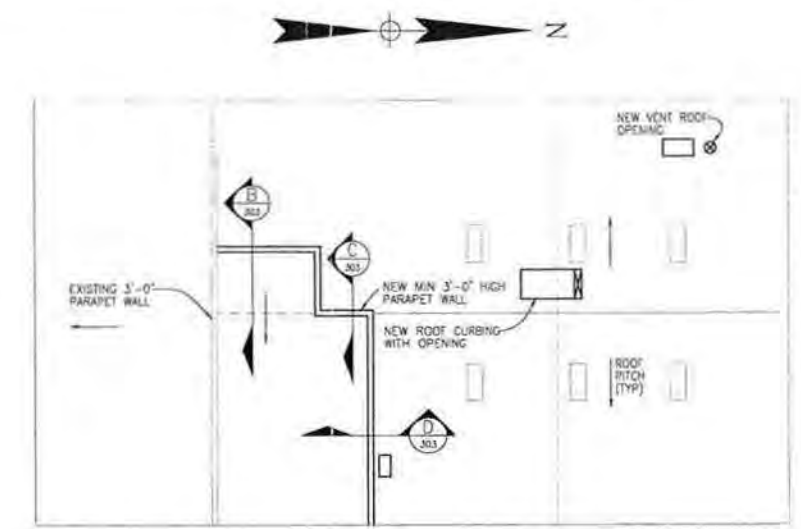
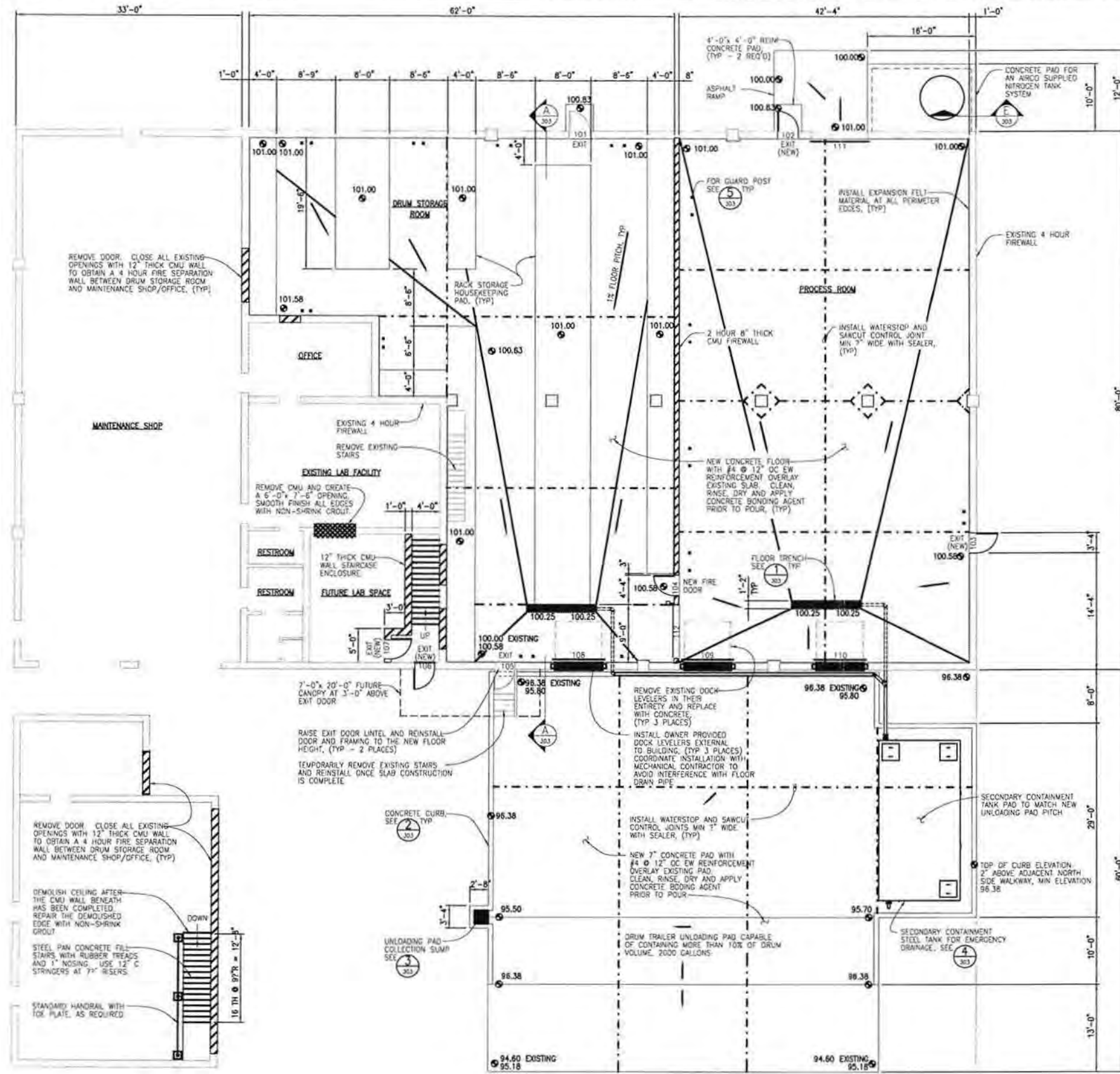
- NEW PIPING
- EXISTING EQUIPMENT AND/OR PIPING
- NEW EQUIPMENT
- ELECTRICAL
- FUTURE EQUIPMENT
- ELECTRICAL MOTOR CONTROL CENTER
- PB STA PUSH BUTTON STATION
- CP CONTROL PANEL

<b>VERIFY SCALE</b>	<b>DSGN</b> D.P. LEONARD
<b>BAR IS ONE INCH ON ORIGINAL DRAWING.</b>	<b>DR</b> D.J. SCHUITEN
<b>0 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.</b>	<b>CHK</b> D.P. LEONARD
	<b>APVD</b> APVD
<b>NO.</b>	<b>DATE</b> 8/30/93
<b>REVISION</b>	REMOVED FLANGE CONSTRUCTION ON (1) 3" LINE AND (2) 2" LINES

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**MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION**  
 HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS  
 PROCESS FLOW DIAGRAM

<b>SHEET NO.</b>	3
<b>DWG NO.</b>	10597-201
<b>DATE</b>	8/30/93
<b>PROJ. NO.</b>	10597



ROOF PLAN  
NOT TO SCALE

GENERAL NOTES AND SPECIFICATIONS

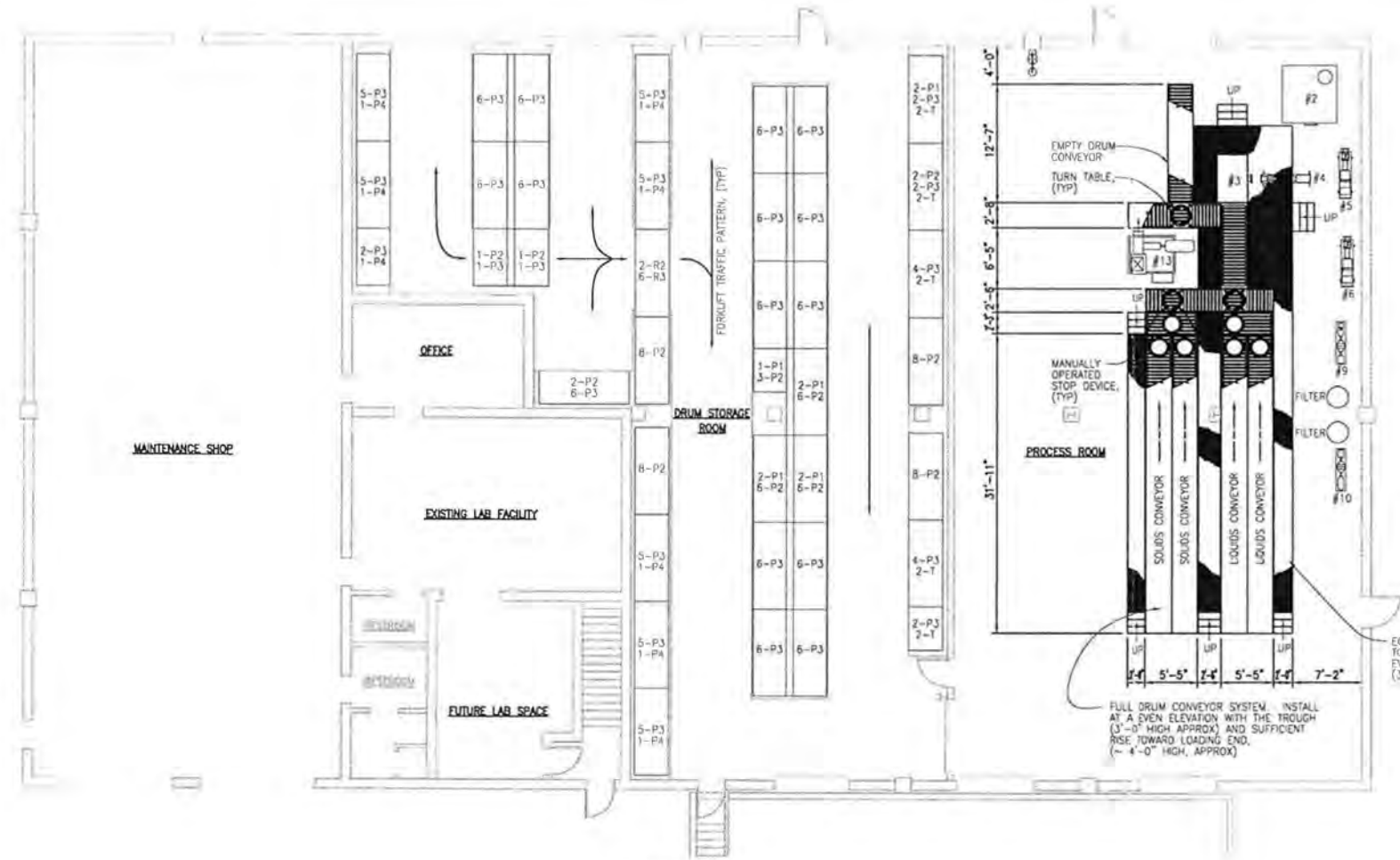
- GENERAL**
- CONTRACTOR MUST WARRANT THAT ALL WORK WILL BE IN COMPLIANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND WITH DUE REGARD TO WORKERS HEALTH AND SAFETY, AND WILL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER AGAINST ANY CLAIM DUE TO NEGLIGENCE OF THE PRIME CONTRACTOR.
  - ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STATE AND LOCAL ADMINISTRATIVE BUILDING AND HEATING VENTILATING AND AIR CONDITIONING CODES, LATEST EDITION.
  - ALL DIMENSIONS AND DETAILS OF EXISTING BUILDINGS WERE OBTAINED FROM ORIGINAL BUILDING DRAWINGS. ALL INFORMATION SHOWN ON THESE DRAWINGS OF EXISTING BUILDINGS MUST BE FIELD VERIFIED BY THE CONTRACTOR.
  - ALL DIMENSIONS AND/OR ELEVATIONS SHOWN ARE APPROXIMATE THIS MUST BE FIELD VERIFIED BY THE CONTRACTOR.
  - REFER TO DRAWING NO. 10597-302 AND 303 FOR ADDITIONAL NOTES, DETAILS, AND SPECIFICATIONS.
  - REFER TO DRAWING NO. 10597-302 FOR DOOR SCHEDULE.
- DEMOLITION**
- SCHEDULE FOR ALL DEMOLITION AND SAW CUTTING MUST BE REVIEWED WITH OWNER AND ENGINEER AND MARKED ACCORDINGLY PRIOR TO START OF WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY PROTECTING THE EXISTING EQUIPMENT AND BUILDING FROM DAMAGE. ALL DEMOLITION DEBRIS TO BE STORED AND WEATHER PROTECTED UNTIL SUCH TIME OFF SITE DISPOSAL AUTHORIZATION HAS BEEN GRANTED BY OWNER.
  - ALL NEW ROOF OPENINGS AND ROOF MODIFICATIONS MUST BE REVIEWED WITH OWNER, ENGINEER AND SPANCRETE PRIOR TO START OF LAYOUT.
- CONCRETE**
- ALL CAST-IN-PLACE CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3,500 PSI WITH REGULAR WIDTH NO. 57 (1" MAX) AGGREGATE AND MEET THE FOLLOWING:  
 MINIMUM CEMENT CONTENT = 517 LBS PER CU YD (ASTM C150 TYPE I)  
 MAXIMUM WATER/CEMENT RATIO = 0.44  
 SLUMP RANGE OF CONCRETE = 3 TO 4 INCHES  
 WATER-REDUCING = ASTM C494, TYPE A OR D W/RA-79 BY W.R. GRACE COMPANY OR EQUAL.  
 AMOUNT OF AIR-ENTRAINING AGENT = 8 PERCENT MIN
  - ALL CONCRETE SHALL CONTAIN THE FOLLOWING ADJUSTERS:  
 WATER-REDUCING = ASTM C494, TYPE A OR D W/RA-79 BY W.R. GRACE COMPANY OR EQUAL.  
 AIR-ENTRAINING AGENT = 8 PERCENT MIN
  - ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, INCLUDING SUPPLEMENT S1.
  - ALL REINFORCING STEEL SHALL BE DETAILED AND PLACED IN ACCORDANCE WITH THE ACI-318 BUILDING CODE, LATEST EDITION AND CRSI "PLACING REINFORCING BARS", RECOMMENDED PRACTICES.
  - ALL BENDS, UNLESS OTHERWISE SHOWN, SHALL BE A 90 DEGREE STANDARD HOOK AS DETAIL IN LATEST EDITION OF ACI-318.
  - ALL VERTICAL WALL REINFORCING BARS SHALL BE LAPPED WITH DOWELS OF THE SAME SIZE AND SPACING AS THE RESPECTIVE COLUMN AND WALL REINFORCING BARS.
  - ALL CONCRETE SHALL BE CONSOLIDATED WITH INTERNAL VIBRATORS AS REQUIRED TO CONSOLIDATE THE CONCRETE DURING PLACEMENT. ALL EQUIPMENT AND METHODS SHALL CONFORM TO ACI 309.
  - FORM 3/4-INCH BEVELS AT ALL CONCRETE EDGES.
  - FLOOR SLABS/SLAB-ON-GRADE SHALL HAVE A "SMOOTH" STEEL TROWELED FINISH. ALL EXPOSED PORTIONS OF VERTICAL WALLS SHALL BE RUBBED WITH NON-SHRINK GROUT TO PROVIDE WALL SURFACES FREE OF ALL DEFECTS.
  - ALL SURFACES SHALL RECEIVE 2 COATS OF URE-1V-SEAL DURING SEALING, AND DUST PROOFING COMPOUND AS MANUFACTURED BY SONNEBORN-REXNORD.
  - EXPANSION JOINT MATERIAL SHALL BE BITUMINOUS TYPE CONFORMING TO ASTM D 994 OR D 1751.
- CONCRETE MASONRY (CMU)**
- ALL CONCRETE MASONRY CONSTRUCTION SHALL CONFORM TO THE WISCONSIN ADMINISTRATIVE CODE AND "SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF LOAD BEARING CONCRETE MASONRY", NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA), LATEST EDITION.
  - ALL CONCRETE MASONRY (CMU) UNITS SHALL CONFORM TO ASTM C90, GRADE N.
  - ALL MORTAR SHALL CONFORM TO ASTM C270, TYPE S AND BE FRESHLY PREPARED AND UNIFORMLY MIXED AS FOLLOWS:  
 1 PART PORTLAND CEMENT (ASTM C150 TYPE I)  
 3 PARTS 1/2" PART I/2" PLUMP HYDRATED LIME (ASTM C207, TYPE S)  
 2 1/2 TO 3 PARTS CLEAN WELL-GRADED SAND
  - ALL HORIZONTAL AND VERTICAL MORTAR JOINTS SHALL HAVE FULL MORTAR COVERAGE ON THE FACE SHELLS.
  - ALL GROUT SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH OF 2,200 PSI AND CONFORM TO ASTM C 476. THE GROUT MIX SHALL HAVE A MINIMUM OF 855 LBS OF CEMENT PER CUBIC YARD.
  - ALL GROUTING OF MASONRY WALLS SHALL BE LOW-LIFT GROUTING WITH A MAXIMUM GROUT POUR HEIGHT OF FOUR FEET.
  - ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60.
  - ALL MASONRY WALLS SHALL BE REINFORCED AS FOLLOWS UNLESS DETAILED OTHERWISE:  
 WALL THICKNESS REINFORCEMENT LOCATION HORIZONTAL REINFORCEMENT VERTICAL REINFORCEMENT  
 12" CENTER OF WALL JOINT REINFORCING @ 16" #5 @ 48" AND DRILLED INTO FLOOR
  - ALL HORIZONTAL REINFORCING SHALL BE CONTINUOUS AROUND CORNERS AND THROUGH INTERSECTING WALLS. PROVIDE HORIZONTAL BOND BEAM WITH REINFORCEMENT AT THE FIRST BLOCK COURSE AND AT THE TOP OF THE WALL.
  - ALL JOINT REINFORCEMENT SHALL BE HOT DIP GALVANIZED AFTER FABRICATION AND CONFORM TO ASTM A153, AS MANUFACTURED BY QUI-O-WALL NATIONAL, INC. OR EQUAL.
  - ALL REINFORCING SHALL BE LAP SPICED 40 BAR DIAMETERS MINIMUM AND WIRE TIED TOGETHER.
  - ALL VERTICAL REINFORCING SHALL BE LAPPED WITH MATCHING DOWELS FROM FOUNDATION.
  - PROVIDE 1-#4 VERTICAL BARS FULL WALL HEIGHT EACH SIDE OF ALL OPENINGS.
  - ALL MASONRY CELLS WITH REINFORCING TO BE FULLY GROUTED.
  - ALL BOND BEAMS TO BE FULL DEPTH.
  - ALL OPENINGS TO BE SHORED AS REQUIRED UNTIL GROUT IS FULLY CURED.
  - JOINT SEALANT FOR MASONRY WALL JOINTS AND AT OPENINGS SHALL BE SILICONE BASED, SINGLE-COMPONENT, NONSAG CLASS A, NO. 790 MANUFACTURED DOR CORNING CORPORATION OR EQUAL.

MEZZANINE PLAN  
SCALE: 1/4"=1'-0"

FLOOR PLAN  
SCALE: 1/4"=1'-0"

<p>VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1" 2" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.</p>	<p>DESIGN: F. MOHSENIAN DRAWN: D.J. SCHUTTEN CHECKED: F. MOHSENIAN APPROVED: APYD</p>	<p>NO. DATE REVISION</p> <p>8/30/93 CHANGED OPENING LOCATIONS IN PRECAST ROOF PANELS.</p>	<p>WISCONSIN STATE PROJECT NO. SP</p>	<p>BY APYD</p>	<p>325 East Chicago Street Milwaukee, Wisconsin 53202 (414)-291-8840 FAX 291-8841</p>	<p>MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS STORAGE AND PROCESS ROOMS STRUCTURAL MODIFICATIONS</p>	<p>SHEET NO. 4 DWG NO. 10597-301 DATE 8/30/93 PROJ NO. 10597</p>
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FLOOR PLAN  
SCALE 1/8"=1'-0"

SECONDARY CONTAINMENT CAPACITIES

REFER TO DRAWING NO. 10597-301 FOR LAYOUT, CURBING LOCATIONS, DRAINAGE AND SECONDARY CONTAINMENT TANK LOCATION

1. STORAGE ROOM AND PROCESS ROOM FLOOR OF BOTH ROOMS SHALL BE CONSTRUCTED WITH MINIMUM OF 2" PER FOOT SLOPE TO THE DESIGNATED FLOOR TRENCHES. ALL DOORWAYS SHALL BE RAMPED TO ESTABLISH A MINIMUM OF 4" HEIGHT DIFFERENTIAL. ANY UNCONTROLLED ACCIDENTAL SPILLS WILL BE DRAINED AWAY FROM THE BUILDING VIA GRAVITY DRAIN PIPING TO AN OUTSIDE EPOXY COATED STEEL STORAGE TANK.

SECONDARY CONTAINMENT REQUIRED SHALL BE THE LARGER OF:  
 10% OF DRUM STORAGE VOLUME = 1 x 55,000 GALLONS = 5,500 GALLONS  
 OR  
 LARGEST STORAGE TANK (TANK 75) = 1,500 GALLONS

SECONDARY CONTAINMENT TANK HOLDING VOLUME = 24'-0" L x 12'-0" W x 2'-9" H = 792 cu ft  
 OR  
 792 cu ft x 7.481 GALLONS = 5,925 GALLONS  
 1 cu ft

SINCE THE SECONDARY TANK IS A COVERED TOP TANK, WHICH LIMITS VISUAL INSPECTION, A LIQUID DETECTOR IS LOCATED IN THE FRONT PORTION OF THE TANK WHICH IS CONNECTED TO THE EMERGENCY ALARM SYSTEM PANEL TO INFORM PERSONNEL OF A SPILL. IF VOLUME OF SPILLED LIQUID IS LARGER THAN THE WORKING VOLUME OF THE SECONDARY CONTAINMENT TANK, SPILL WILL OVERFLOW ON TO THE TRUCK UNLOADING CONTAINMENT PAD.

2. FULL DRUM TRUCK UNLOADING CONTAINMENT PAD  
 10% OF FULL 35 GALLON DRUMS ON TRUCKS  
 1 x 88 DRUMS/TRUCK x 3 TRUCKS x 35 GALLONS = 1,452 GALLONS  
 3" OF RAINFALL (1 HOUR 100 YEARS) = 5,274 GALLONS  
 TOTAL = 6,726 GALLONS

NEWLY SLOPED UNLOADING PAD SHALL BE EQUIPPED WITH RAMPS, CURBING AND A COLLECTION SUMP.  
 80'-0" W x 47'-0" L x 0'-9" H = 1,057.5 cu ft  
 OR  
 1,057.5 cu ft x 7.481 GALLONS = 7,911 GALLONS  
 1 cu ft

BUILDING CLASSIFICATION

LOCATION ZONING BY VILLAGE OF MENOMONEE FALLS: 11-1 LIGHT INDUSTRIAL

BUILDING CONSTRUCTION AS LISTED BY WISCONSIN ADMINISTRATION CODE:  
 ROOF LIVE LOAD 30 psf  
 ROOF DEAD LOAD 10 psf  
 ROOF SNOW LOAD 30 psf  
 NEAR MAINTENANCE SHOP  
 MEZZANINE LIVE LOAD 100 psf  
 WIND LOAD 20 psf

CLASS OF CONSTRUCTION: TYPE 5A EXTERIOR MASONRY PROTECTED

PERIMETER EXTERIOR WALL: 12" THICK MASONRY 4 HR RATED PER DLHRS1

INTERIOR WALL: 8" THICK REINFORCED MASONRY 2 HR RATED PER DLHRS1

ELECTRICAL CLASSIFICATION:  
 DUE TO STORAGE, HANDLING AND PROCESS OF CLASS 1B FLAMMABLE LIQUIDS, THE ELECTRICAL SERVICES SHALL BE INSTALLED PER NFPA 30 AND NEC REQUIREMENT AS LISTED BELOW:

STORAGE ROOM: 18" AND ABOVE - UNCLASSIFIED DUE TO NO OPEN CONTAINER LIMITATIONS  
 FLOOR TO 18" - CLASS 1, DIVISION 2, GROUP D

PROCESS ROOM: CLASS 1, DIVISION 1, GROUP D WITHIN 5 FEET OF PROCESS EQUIPMENT  
 CLASS 1, DIVISION 2, GROUP D REMAINING AREAS

OFFICE, LAB, AND MAINTENANCE SHOP: NOT HAZARDOUS RELATED

SPECIAL REQUIREMENTS:  
 NO SMOKING SHALL BE PERMITTED IN THE FACILITY. PRECAUTIONS SHALL BE TAKEN TO PREVENT THE IGNITION OF FLAMMABLE VAPORS SUCH AS FRICTIONAL HEAT OR SPARKS. ALL FORKLIFTS OR OTHER EQUIPMENT USED IN THIS AREA SHALL MEET THE SAME REQUIREMENTS.

SPECIFICATION NOTES:

- STEEL
- ALL STRUCTURAL STEEL MATERIALS SHALL CONFORM TO THE FOLLOWING, UNLESS OTHERWISE NOTED.  
 ROLLED PLATES, SHAPES, AND BARS: ASTM A36
  - ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN CONFORMANCE WITH THE AISC MANUAL OF STEEL CONSTRUCTION, NINTH EDITION.
  - ALL WELDING SHALL CONFORM TO AWS D1.1 STRUCTURAL WELDING CODE, LATEST EDITION, E70XX ELECTRODES. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS.
  - CONNECTION BOLTS FOR STEEL MEMBERS SHALL BE ASTM A 324-N. ALL BOLTS SHALL BE 7/8" UNLESS APPROVED OTHERWISE.
  - CONCRETE ANCHORS SHALL BE TYPE 303 STAINLESS STEEL, RAW-STEEL BY THE RAWPLUG COMPANY, KWK-BOLT BY HILTI INCORPORATED, OR EQUAL FURNISH SIZES SHOWN ON THE DRAWINGS.
  - LAPEYRE STAIR SHALL BE MODEL NO. 58-CST PREPARED DIMENSIONS SHOWN ON DRAWINGS SHALL BE FIELD VERIFIED PRIOR TO PURCHASING. LAPEYRE STAIR SHALL BE AS MANUFACTURED BY LAPEYRE STAIR, INC. (1-800-535-7631).
  - ALL SURFACES TO BE PAINTED SHALL BE FREE OF WELD SPATTER, ETC. ROUND OFF ALL SHARP EDGES, REMOVE ALL RUST, MILL SCALE, AND FOREIGN MATTER BEFORE APPLYING PRIME COAT.
  - ALL SURFACES TO BE PAINTED SHALL BE COMMERCIAL SANDBLASTED FINISH SSPC-SPC TO UNPRIMED METAL. AFTER PRIMING ALL SURFACES TO BE PAINTED WITH 2-PART EPOXY COATING'S APPLIED BY A SPRAY METHOD WHENEVER POSSIBLE TO MANUFACTURER'S RECOMMENDED THICKNESS.  
 PRIME COAT: PPG EPOXY PRIMER - 2 MIL DRY FILM  
 PRIME COAT: PPG AQUAPON EPOXY FUSION GREEN KIT 97-56/97-52 3-MIL DRY FILM  
 HANDRAILS AND POSTS, NOSINGS AT STAIR THREADS, AND NOSING AT THE EDGES OF PLATFORMS, GLID GUARD, DOUBLE BUILD EPOXY, SAFETY YELLOW, EC-21 NO. 512-L-01102

A TYPICAL STORAGE ROOM DRUM ARRANGEMENT

4'x 4' 0"-6" PALLET TYPES	REQUIRED SPACE BETWEEN RACKS	DRUM ARRANGEMENT ON PALLET	PALLET QTY. (EACH)	DRUM STORAGE QTY. (EACH)	TOTAL VOLUME (GALLONS)
SIX(6) 16 GALLON DRUMS, 14.5" x 27" HIGH	47"		9	54	864
FIVE(5) 30 GALLON DRUMS, 18.5" x 29" HIGH	47"		61	305	9,150
FOUR(4) 55 GALLON DRUMS, 23" x 34.5" HIGH	52"		143	380	31,900
FOUR(4) 55 GALLON DRUMS INSIDE 45 GALLON DRUMS, 27.5" x 39" HIGH	57"		8	32	2,720
ONE(1) 300 GALLON TOTE, 42" x 42" x 52" HIGH	64"		9	9	2,700

NOTE: ALTHOUGH THE CONTAINER ARRANGEMENT MAY VARY FROM TABLE ABOVE TOTAL VOLUME STORAGE SHALL NOT EXCEED 55,000 GALLONS.

PROCESS EQUIPMENT LEGEND

ITEM NO.	DESCRIPTION
1	2 STAGE SHREDDER - 50 HP (FUTURE - NOT SHOWN)
2	TANK 75 W/2HP MIXER (EXISTING)
3	TROUGH (EXISTING)
4	VAUGHN PUMP - 7.5 HP (EXISTING)
5	ARDE PUMP 30 HP (EXISTING)
6	ARDE PUMP 30 HP (NEW)
7	ROPER SOLV. PUMP - 5 HP (EXISTING - IN TANK FARM)
8	ROPER SOLV. PUMP - 5 HP (FUTURE - NOT SHOWN)
9	LOBE PUMP 5 HP (EXISTING)
10	LOBE PUMP 5 HP (NEW)
13	SMALL SHREDDER - 10 HP (EXISTING)

DOOR SCHEDULE

DOOR NO.	N- NEW E- EXISTING	TYPE	DOOR				FRAME				MASONRY OPENING		DETAIL		LABEL	
			WIDTH	HEIGHT	THKS	GLASS	MATL.	WIDTH	HEIGHT	THKS	MATL.	WIDTH	HEIGHT	HEAD		JAMB
101	N	LH	3'-0"	6'-8"	1 1/2"	V	STEEL	3'-0"	6'-8"	5/8"	STEEL	3'-4"	6'-10"	2"	2"	1 1/2 HR - B
102	N	LH	3'-0"	6'-8"	1 1/2"	V	L18	3'-0"	6'-8"	5/8"	F16	3'-4"	6'-10"	2"	2"	1 1/2 HR - H
103	N	LH	3'-0"	6'-8"	1 1/2"	V	L18	3'-0"	6'-8"	5/8"	F16	3'-4"	6'-10"	2"	2"	1 1/2 HR - H
104	N	RH	3'-0"	6'-8"	1 1/2"	V	L18	3'-0"	6'-8"	5/8"	F16	3'-4"	6'-10"	2"	2"	1 1/2 HR - B
105	E	RH	3'-0"	6'-8"	1 1/2"	V	STEEL	3'-0"	6'-8"	5/8"	STEEL	3'-4"	6'-10"	2"	2"	
106	N	RH	3'-0"	6'-8"	1 1/2"	V	L18	3'-0"	6'-8"	5/8"	F16	3'-4"	6'-10"	2"	2"	
107	N	LH	3'-0"	6'-8"	1 1/2"	V	L18	3'-0"	6'-8"	5/8"	F16	3'-4"	6'-10"	2"	2"	
108	E	OH ROLLING	8'-0"	10'-0"			STEEL GALV					8'-0"	10'-0"			
109	E	OH ROLLING	8'-0"	10'-0"			STEEL GALV					8'-0"	10'-0"			
110	E	OH ROLLING	8'-0"	10'-0"			STEEL GALV					8'-0"	10'-0"			
111	N*	OH ROLLING	8'-0"	10'-0"			STEEL GALV					8'-0"	10'-0"			1 1/2 HR MIN
112	E	OH ROLLING	8'-0"	10'-0"			STEEL GALV					8'-0"	10'-0"			ATLAS FIRE DOOR F-3

- NOTES:
- ALL NEW DOORS SHALL BE MANUFACTURED BY STEEL CRAFT AND BE EQUIPPED WITH DOUBLE KNOB A35 CHROME TYPE LOCK SETS PREPARED FOR A MASTER-KEY, NORTON T600 DOOR CLOSURES, BB1279 HINGES WITH NONREMOVABLE PINS (THREE PER DOOR), S204A ALUMINUM THRESHOLD, 323 SWEEPERS, AND NO. 160 WEATHERSTRIPS.
  - DOOR 112 IS AN EXISTING 3-HR FIRE RATED DOOR CURRENTLY INSTALLED BETWEEN THE MAINTENANCE SHOP AND STORAGE ROOM THIS DOOR TO BE CAREFULLY REMOVED AND PLACED IN ITS ENTIRETY AT THE SPECIFIED LOCATION. ATLAS REPRESENTATION MUST INSPECT AND CERTIFY PROPER INSTALLATION PRIOR TO ACCEPTANCE OF WORK.
  - EXISTING EXIT DOORS (101 AND 103) TO BE RAISED TO ALLOW FOR NEW FLOOR ELEVATION.
  - EXISTING OVERHEAD ROLLING DOORS AND THEIR TRACKS TO BE CUT TO ALLOW FOR THE NEW FLOOR ELEVATION. PROPER OPERATION MUST BE ACHIEVED PRIOR TO ACCEPTANCE.
  - OWNER PROVIDED

GALVANIZED STEEL GRATING

17" x 17" SIZE 19-W-2 TYPE WITH 3/4" CROSS BARS AS MANUFACTURED BY RYERSON RY-WELD. ALL GRATING SHALL BE HOT-DIPPED-GALVANIZED AND SHALL BE INSTALLED USING STAINLESS STEEL HOLD DOWN CLIPS. THE EQUIPMENT ACCESS PLATFORM GRATING SHALL HAVE SERRATED BEARING BARS STAIR TREADS SHALL BEAR SIMILAR SPECIFICATIONS WITH ABRASIVE NOSING.

STORAGE RACKS

NEW STORAGE RACKS SHALL BE DESIGNED AND/OR EXISTING RACKS SHALL BE REINFORCED TO MEET THE FOLLOWING REQUIREMENT PRIOR TO PLACEMENT:

- SINGLE RACK WIDTH 3'-9"
- DOUBLE RACK WIDTH 7'-9"
- FRONT ACCESS LENGTH 9'-0"
- EACH PLATFORM SHALL SUPPORT A TOTAL WORKING LOAD OF 6000 LB PER LEVEL
- STORAGE OF TOTES (T) AND 85 GALLON DRUM PALLET (PA) SHALL NOT BE PERMITTED ON RACKS, THEY SHALL BE STORED ON FLOOR PADS.

ALL MATERIAL SHALL BE PAINTED TO PROVIDE A NON-SPARKING SURFACE.

LIQUIDS/SOLIDS CONVEYOR

FULL AND EMPTY DRUM CONVEYOR SYSTEM SHALL BE DESIGNED PER LAYOUTS. THE DIMENSIONS ARE APPROXIMATE AND FINAL DIMENSIONS SHALL BE PROVIDED BY THE SUPPLIER AND MUST BE APPROVED PRIOR TO FABRICATION. CONVEYOR SYSTEM SHALL BE MANUFACTURED BY HYTRON OR APPROVED EQUAL. BEARING ROLLERS SHALL BE 31" WIDE 10 ACCUMULATORS A 27" DRUM

FULL DRUM WORKING WEIGHT = 1200 LBS/DRUM

CONVEYOR SYSTEM SHALL BE SUPPORTED BY PAINTED H-SHYPE FRAMING. SEE STEEL SURFACE PAINTING SPECIFICATION ABOVE. ALL ROLLERS SHALL BE HEX SHAFT SPRING LOADED AND SHALL BE HOT-DIPPED-GALVANIZED.

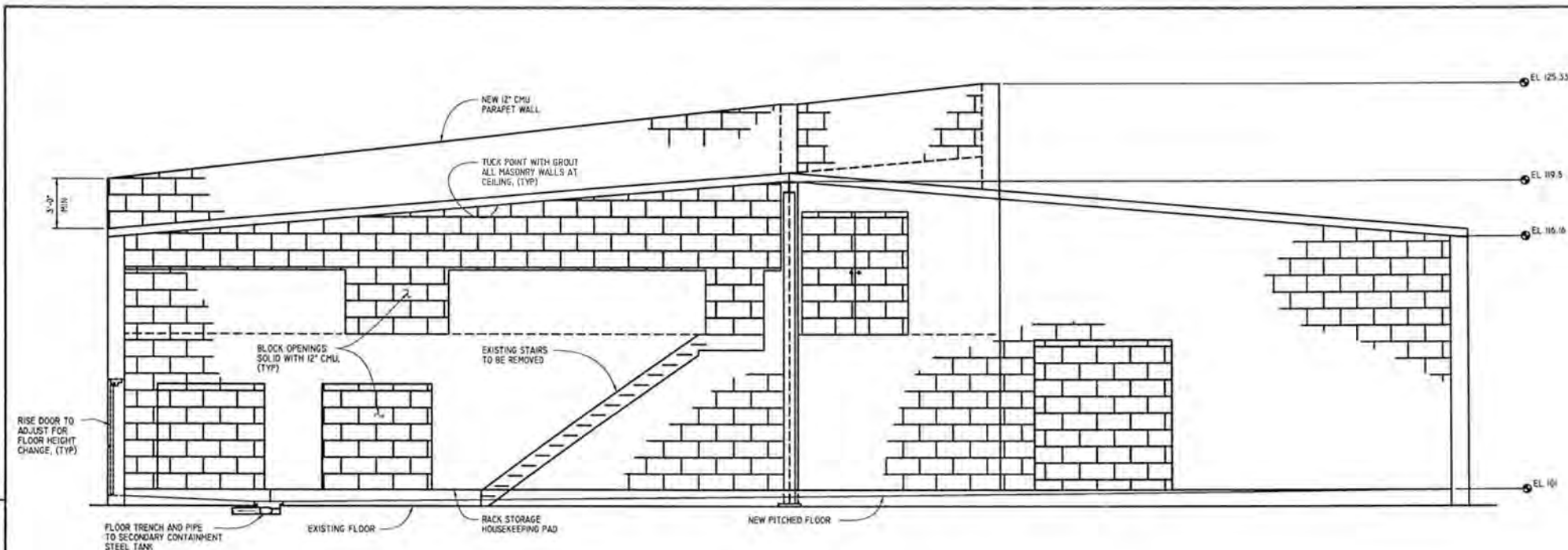
VERIFY SCALE	DSGN F. MOHSENIAN
BAR IS ONE INCH ON ORIGINAL DRAWING	DR D.J. SCHUTTEN
0 = 1"	CHK F. MOHSENIAN
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	APVD

NO.	DATE	REVISION	BY	APVD
	8/30/93	CHANGED STORAGE ROOM CLASSIFICATION AND REVISED DOOR SCHEDULE	MILSOLO	SP

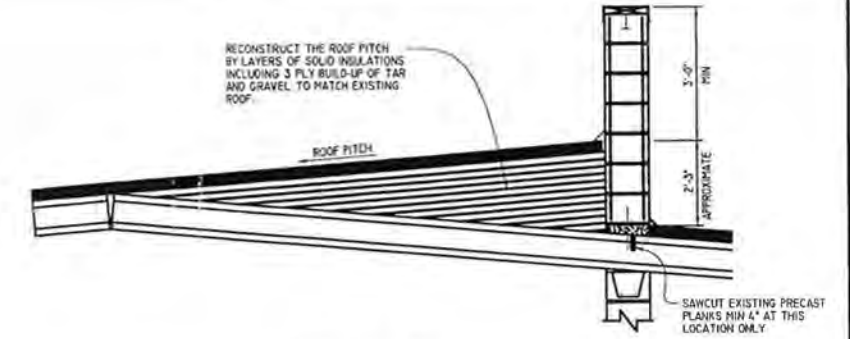
TRIAD ENGINEERING INCORPORATED  
 325 East Chicago Street  
 Milwaukee, Wisconsin 53202  
 (414)-291-8840  
 FAX 291-8841

MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION  
 HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS EQUIPMENT AND RACK STORAGE LAYOUT

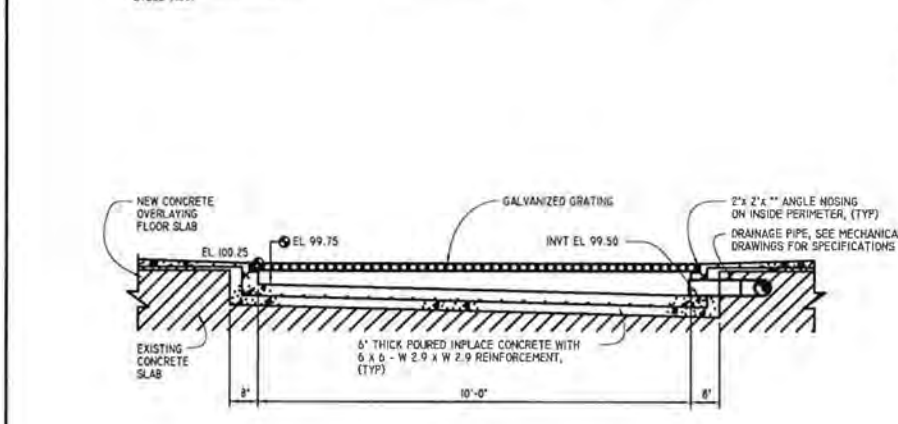
SHEET NO. 5  
 DATE 8/30/93  
 PROJ. NO. 10597



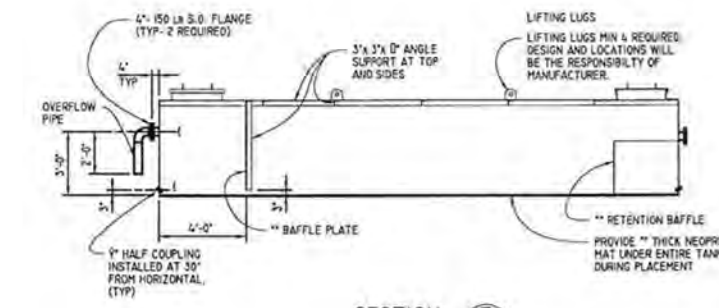
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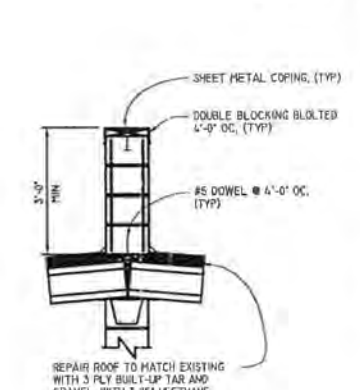
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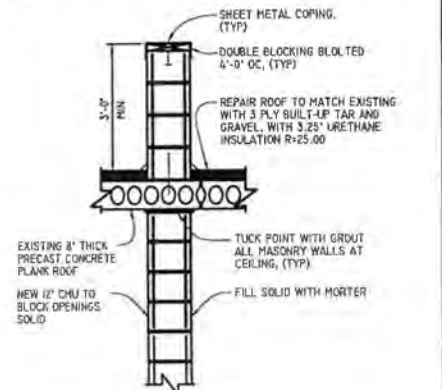
FLOOR TRENCH  
DETAIL 1  
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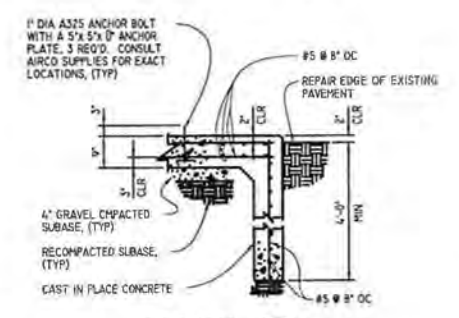
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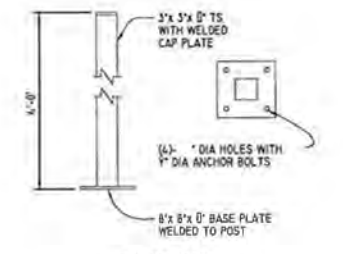
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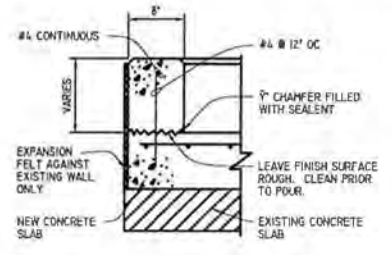
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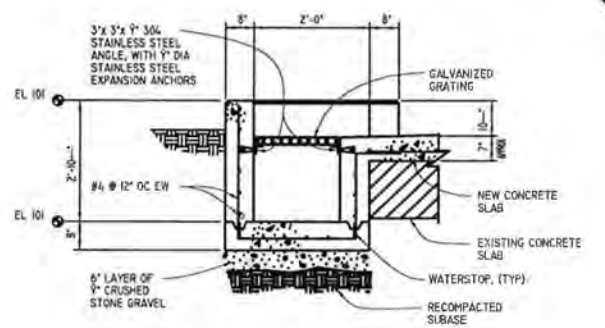
SECTION E  
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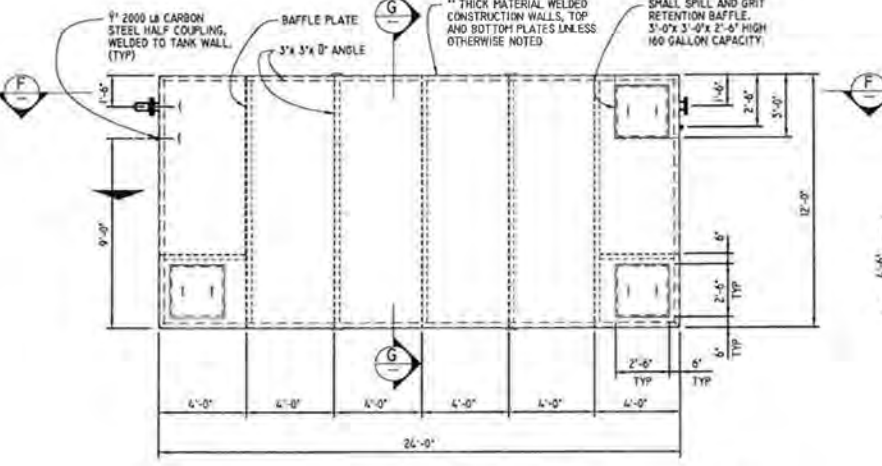
GUARD POST  
DETAIL 5  
SCALE: 1/4"=1'-0"



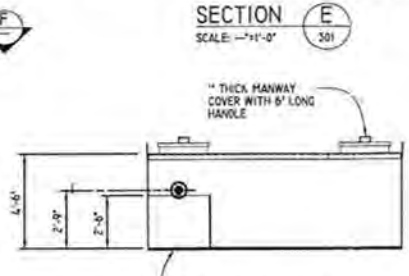
CONCRETE CURB  
DETAIL 2  
SCALE: 1/4"=1'-0"



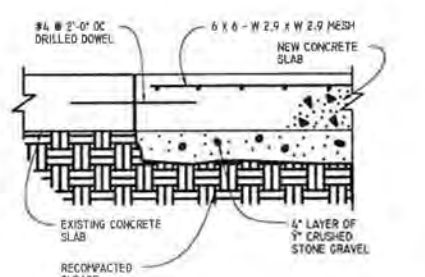
UNLOADING PAD COLLECTION SUMP  
DETAIL 3  
SCALE: 1/4"=1'-0"



SECTION G  
SCALE: 1/4"=1'-0"



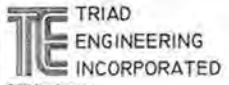
SECTION G  
SCALE: 1/4"=1'-0"



NEW CONCRETE TO EXISTING CONCRETE  
DETAIL 6  
SCALE: 1/4"=1'-0"

VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING.	DSGN F. MOHSENIAN
0 1'	DR D. J. SCHUTTEN
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHK F. MOHSENIAN
	APVD

NO.	DATE	REVISION	BY	APVD



325 EAST CHICAGO STREET  
MILWAUKEE, WISCONSIN 53202  
(414)-291-8840  
FAX 291-8841

MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION  
HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS  
STRUCTURAL SECTIONS AND DETAILS

SHEET NO.	6
DWG NO.	10597-303
DATE	12/18/92
PRJ NO.	10597



















INSTALLATION SPECIFICATIONS PIPING SYSTEMS

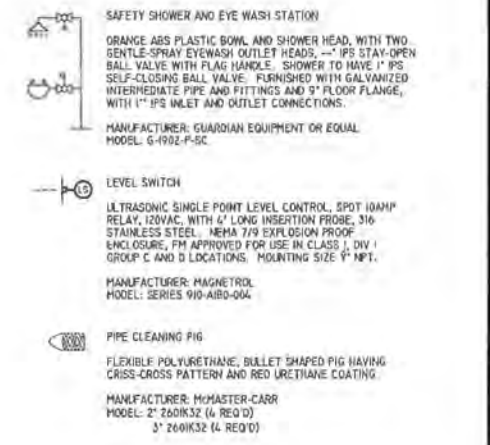
**1. SCOPE**  
 1.1 FURNISH ALL LABOR, SUPERVISION, MATERIALS, TOOLS, AND EQUIPMENT NECESSARY FOR THE PIPING SYSTEM ON THE DRAWINGS AND SPECIFIED HEREIN.  
 1.1.1 PURCHASE, UNLOAD, STORE, FABRICATE, INSTALL, SUPPORT, TEST, AND MAKE OPERABLE THE PROCESS AND UTILITY PIPING SYSTEMS OR PORTIONS OF PIPING SYSTEMS SHOWN ON THE DRAWINGS.  
 1.1.2 LABOR, MATERIALS, SUPPLIES, TOOLS, EQUIPMENT, AND SERVICES INCIDENTAL TO, AND NECESSARY FOR, THE COMPLETE AND PROPER INSTALLATION AND OPERATION OF ALL PIPING SYSTEMS DESCRIBED IN THE CONTRACT DOCUMENTS WHICH ARE NOT SPECIFICALLY MENTIONED, BUT WOULD REASONABLY BE DETERMINED BY THE OWNER, ARE IMPLIED AS NECESSARY, SHALL BE FURNISHED AS IF CALLED FOR IN DETAIL.  
**2. PIPING DIMENSIONS**  
 2.1 DRAWINGS  
 2.1.1 THE DRAWINGS SHOW THE VARIOUS PIPING SYSTEMS BY PIPING FLOW DIAGRAMS AND DETAILED PIPING DRAWINGS. THE PIPING FLOW DIAGRAMS SHOW A SCHEMATIC OF EACH PIPING SYSTEM. THE DETAILED PIPING DRAWINGS SHOW THE ARRANGEMENT AND PHYSICAL LAYOUT OF THE PIPING SYSTEMS IN EACH AREA.  
 2.1.2 WHERE PIPING FLOW DIAGRAM INFORMATION DIFFERS FROM DETAILED PIPING DRAWING INFORMATION, THE INFORMATION ON THE PIPING FLOW DIAGRAM SHALL GOVERN, EXCEPT WHERE THE SPECIFICATIONS CALL OUT DETAILS SUCH AS STEAM TRAPS, INSTRUMENTS, ETC., THAT DO NOT APPEAR ON FLOW DIAGRAMS. WHERE ANY DOUBT EXISTS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER A WRITTEN REQUEST FOR INFORMATION OR CLARIFICATION AND SHALL ABIDE BY THE REPLY AS IF SPECIFIED, WITHOUT ADDITIONAL COST TO OWNER. IF THE PHYSICAL DRAWINGS INDICATE A VALVE, FITTING, ETC., WHICH IS NOT SHOWN ON THE FLOW DIAGRAMS, THIS CONTRACTOR SHALL FURNISH SAME AS IF IT WERE SHOWN ON THE FLOW DIAGRAM UNLESS CLARIFICATION BY ENGINEER EXEMPTS ITEM PRIOR TO BID.  
**3. MATERIAL PROCUREMENT**  
 3.1 GENERAL  
 3.1.1 MATERIALS SHALL CONFORM TO THE STANDARDS SPECIFIED, SHALL BE NEW DOMESTIC, FREE FROM DEFECTS AND IMPERFECTIONS, AND SHALL BE OF RECENT MANUFACTURE. MATERIALS NOT COVERED BY DETAILED SPECIFICATIONS SHALL BE STANDARD PRODUCTS OF REPUTABLE MANUFACTURERS AND SUITABLE FOR INTENDED USE.  
 3.2 PIPING MATERIALS: INDIVIDUAL PIPING SPECIFICATION TABLES FOLLOW. THESE TABLES DESCRIBE IN DETAIL THE STANDARDS FOR SIZE, SCHEDULE, MATERIAL, AND DIMENSIONS ALLOWED BY EACH PIPING SPECIFICATION.  
 3.3 PIPING EQUIPMENT: INDIVIDUAL PIPING EQUIPMENT TABLES FOLLOW. THESE TABLES GIVE INDIVIDUAL SPECIFICATIONS FOR PIPING EQUIPMENT.  
**4. GENERAL REQUIREMENTS**  
 4.1 GENERAL  
 4.1.1 CHECK CONNECTIONS TO MECHANICAL AND PIPING EQUIPMENT AND PROVIDE MATCHING PIPING CONNECTIONS AS REQUIRED.  
 4.1.2 THE CONTRACTOR SHALL BE RESPONSIBLE FOR AND IMMEDIATELY NOTIFY THE OWNER IN WRITING OF ALL DAMAGE CAUSED DIRECTLY OR INDIRECTLY BY HIS WORKMEN TO STRUCTURES, BUILDINGS, EQUIPMENT, SERVICES, ROADWAYS, AND SIGNAGE. THE CONTRACTOR SHALL REPAIR OR REPLACE THE DAMAGED ITEMS AT HIS OWN EXPENSE AND AT THE WRITTEN DIRECTION AND APPROVAL OF THE ENGINEER.  
 4.2 MAINTAIN ADEQUATE CLEARANCE AROUND PIPING, EQUIPMENT, AND BUILDING STRUCTURE.  
 4.3 FIELD MEASUREMENTS  
 4.3.1 FIELD CHECK THE DIMENSIONS SHOWN ON THE DRAWINGS FOR INTERFERENCES. RESOLVE ANY DISCREPANCIES WITH THE ENGINEER BEFORE STARTING THE WORK.  
 4.4 THE CONTRACTOR SHALL SUBMIT TO THE OWNER SIX (6) COPIES OF THE OPERATION AND MAINTENANCE MANUALS FOR THE EQUIPMENT SPECIFIED HEREIN WITHIN TWO (2) WEEKS AFTER THE EQUIPMENT ORDER HAS BEEN PLACED.  
**5. INSTALLATION DETAILS - GENERAL**  
 5.1 PIPING CODE: ALL PIPING SYSTEMS INSTALLED AND TESTED UNDER THIS SECTION SHALL CONFORM TO THE APPLICABLE PORTIONS AND THE SPECIFIC REFERENCED PARAGRAPHS OF THE AMERICAN NATIONAL STANDARDS INSTITUTE'S "CODE FOR PRESSURE PIPING"  
 5.1.1 CHEMICAL PLANT AND PETROLEUM REFINERY PIPING, HEREINAFTER REFERRED TO AS "THE CODE".  
 5.2 PIPE: THE USE OF THE WORDS "PIPE" OR "PIPING" IN THIS SECTION IS UNDERSTOOD TO INCLUDE BOTH PIPE AND TUBE OR PIPING AND TUBING. USE FULL LENGTH OF PIPE WHERE LENGTH BETWEEN FITTINGS IS LESS THAN THE MANUFACTURER LENGTHS OF PIPE. AVOID EXTRA JOINTS.  
 5.3 WELDING QUALIFICATIONS, WELD RECORDS AND QUALITY CONTROL SAMPLES.  
 5.3.1 PERFORM ALL WELDING OF PIPING SYSTEMS WITH QUALIFIED WELDERS AND/OR WELDING OPERATORS. QUALIFY WELDERS AND/OR WELDING OPERATORS IN ACCORDANCE WITH CODE PARAGRAPH 327.5.  
 5.3.2 MAINTAIN QUALIFICATION WELD RECORDS IN ACCORDANCE WITH CODE PARAGRAPH 327.6. GIVE THE OWNER A COPY OF THE QUALIFICATIONS WELD RECORDS. KEEP RECORDS CURRENT AT ALL TIMES.  
 5.4 FABRICATION ACCURACY: ACCURATELY FABRICATE AND INSTALL PIPING PARALLEL TO BUILDING LINES. ALL HORIZONTAL PIPING SHALL BE INSTALLED TO LEVEL UNLESS NOTED OTHERWISE. ALL VERTICAL PIPING SHALL BE INSTALLED PLUMB.  
 5.5 FLANGED JOINTS:  
 5.5.1 BOLT HOLE OF THE FLANGES SHALL STRADDLE THE NORMAL VERTICAL AND HORIZONTAL CENTERLINES, UNLESS OTHERWISE SHOWN ON THE DRAWINGS.  
 5.5.2 INSTALLATION OF GASKETS AND BOLTING PROCEDURE SHALL CONFORM TO STANDARD ACCEPTANCE PRACTICE. USE ONE AND ONLY ONE GASKET PER JOINT. NUTS ON BOLTS AND/OR STUD BOLTS SHALL BE TIGHTENED BY THE CROSSOVER METHOD TO LOAD GASKETS EVENLY. TIGHTENING SHALL BE REPEATED BY GOING OVER AND ACROSS UNTIL THE JOINT IS UNIFORMLY TIGHT. TORQUE WRENCHES SHALL BE USED WHERE REQUIRED TO UNIFORMLY TORQUE BOLTS AS NECESSARY.  
 5.5.3 FLANGE BOLTS AND/OR STUDBOLT LENGTH SHALL COMPLY WITH ANSI B16.5.  
 5.5.4 FLANGE BOLTS AND/OR STUDBOLTS SHALL BE LUBRICATED WITH OIL AND GRAPHITE AT TIME OF INSTALLATION.  
 5.5.5 ALL FLANGES SHALL BE AS SHOWN IN THE PIPING SPECIFICATIONS, EXCEPT FOR PIPE FLANGES THE JOIN EQUIPMENT. THESE FLANGES SHALL BE FACED AND DRILLED TO MATCH EQUIPMENT FLANGES.  
 5.6 ALL DEVICES INSTALLED IN THE PIPING SYSTEM WHICH REQUIRE PERIODIC REMOVAL FOR MAINTENANCE OR RE-ALIGNMENT SHALL BE INSTALLED SO THEY CAN BE REMOVED WITHOUT CUTTING OR DAMAGING THE PIPE.  
 5.7 UNIONS: UNIONS ARE NOT NORMALLY SHOWN ON THE DRAWINGS. INSTALL UNIONS AT EACH OF THE FOLLOWING LOCATIONS IN ALL SYSTEMS WHICH ARE NOT FLANGED:  
 5.7.1 NEAR THREADED CONNECTIONS TO MECHANICAL OR PIPING EQUIPMENT.  
 5.7.2 ON BOTH SIDES OF THREADED CONTROL VALVES AND OTHER IN-LINE INSTRUMENTS.  
 5.7.3 ON THE BRANCH SIDE OF BRANCH CONNECTION VALVES.  
 5.7.4 WHERE SHOWN ON THE DRAWINGS.  
**6. INSTALLATION DETAILS - THREADED SYSTEMS**  
 6.1 THREADED JOINTS: CUT OFF PIPE SQUARELY WITHOUT DEFORMATION. THREAD PIPE AND REAM PIPE TO FULL BORE AFTER THREADING. CLEAN THREADS TO REMOVE CHIPS, BURRS, OIL, AND OTHER FOREIGN MATTER. APPLY SPECIFIED PIPE JOINT COMPOUND OR TAPE TO CLEANED MALE THREADS ONLY. ASSEMBLE JOINT AND REMOVE ANY EXCESS PIPE JOINT COMPOUND FROM TIGHTENED JOINT. BACKING OFF TO PERMIT ALIGNMENT OF THREADED JOINT IS NOT PERMITTED.  
 6.2 BRANCH CONNECTIONS: USE STANDARD OR REDUCING THREADED TEES, CROSSERS, LATERALS, AND/OR THREADED WELDING OUTLET FITTINGS (THREADED-OUTLET).  
 6.3 REWORKING FITTINGS: USE REWORKING FITTINGS AND/OR SWAGED NIPPLES FOR CHANGE IN PIPE SIZE. USE BUSHINGS ONLY WHEN REDUCING IN SIZES AND/OR SWAGED NIPPLES ARE NOT MANUFACTURED IN SIZES REQUIRED, OR NOTED ON THE DRAWINGS.  
 6.4 DEAD ENDS: USE THREADED NIPPLES AND CAPS. USE THREADED PLUGS ONLY WHEN SPACE DOES NOT PERMIT THREADED NIPPLES AND CAPS.

**7. INSTALLATION DETAILS - BUTT WELDED CARBON STEEL SYSTEMS**  
 7.1 SHOP FABRICATE MAJOR PIPING ASSEMBLIES TO KEEP FIELD WELDS TO A MINIMUM.  
 7.2 PREPARE, CLEAN, ALIGN, AND SPACE GIRTH BUTT WELD ENDS PER CODE PARAGRAPH 327.3. EACH AND EVERY STEEL WELD MUST BE CHIPPED, FILED, AND WIRE BRUSHED AFTER EACH PASS.  
 7.3 WELDING PROCEDURE FOR GIRTH BUTT WELDS SHALL CONFORM TO CODE PARAGRAPH 327.4.  
 7.4 MAKE ALL BRANCH CONNECTIONS USING STABLE FITTINGS AND ADDITIONAL REINFORCEMENTS AS DESCRIBED IN CODE PARAGRAPH 327.5. FACTORY-MADE WELDING OUTLET FITTINGS MANUFACTURED BY BOWNEY FORD, INC. ARE RECOMMENDED FOR THIS BRANCH CONNECTION SERVICE. FISH MOUTH PIPE CONNECTIONS AT BRANCHES, LATERALS, TEES, OR CROSSERS WILL NOT BE PERMITTED WITHOUT WRITTEN APPROVAL OF THE ENGINEER. IF INTERCEPTS ARE ALLOWED BY THE ENGINEER, THEY MUST BE STRESS-RELIEVED.  
**8. INSTALLATION DETAILS - MISCELLANEOUS**  
 8.1 VALVES  
 8.1.1 MANUAL VALVES: INSTALL VALVES AT A LOCATION EASILY ACCESSIBLE FOR PERIODIC MAINTENANCE, FLOW DIRECTION, AND FLOW CONTROL.  
 8.1.2 CHECK VALVES: INSTALL THE SPRING CHECK VALVES IN A VERTICAL POSITION UNLESS OTHERWISE NOTED ON THE DRAWINGS. INSTALL CHECK VALVES AT A LOCATION EASILY ACCESSIBLE FOR PERIODIC MAINTENANCE, INSPECTION AND CLEANING.  
 8.1.3 CONTROL VALVES: INSTALL VALVES AT A LOCATION EASILY ACCESSIBLE FOR PERIODIC MAINTENANCE AND MANUAL OVERTIDE.  
**9. PIPE SUPPORTS, AUXILIARY STEEL, AND PENETRATIONS**  
 9.1 FURNISH ALL PIPE HANGERS, PIPE SUPPORTS, ANCHORS, AND GUIDES REQUIRED BY THE PIPING AND EQUIPMENT WHETHER SHOWN ON THE DRAWINGS OR NOT.  
 9.1.1 FABRICATE AND INSTALL PIPING TO PROVIDE FOR AND CONTROL THE MOVEMENT DUE TO THERMAL EXPANSION AND/OR CONTRACTION AND INSTALL ANCHORS AND GUIDES AS DETAILED ON THE DRAWINGS. ENGINEER WILL PROVIDE ALL DESIGN FOR EXPANSION/CONTRACTION GUIDES AND ANCHORS BASED ON PIPE INSTALLED AS SHOWN ON DRAWINGS. ANY MODIFICATIONS TO PIPE LENGTHS, LOCATIONS AND/OR CONFIGURATIONS SHALL REQUIRE THE CONTRACTOR TO RE-CALCULATE AND DESIGN EXPANSION/CONTRACTION CONTROLS AND SUBMIT DETAILED CALCULATION AND DRAWINGS TO ENGINEER FOR APPROVAL. BEFORE PROCEEDING WITH MODIFICATIONS, WRITTEN APPROVAL MUST BE OBTAINED FROM THE ENGINEER.  
 9.1.2 THE CONTRACTOR SHALL FURNISH ANY AUXILIARY STEEL REQUIRED TO PROPERLY SUPPORT THE PIPE HANGERS.  
 9.2 FURNISH AND INSTALL ALL SLEEVES, PLATES, FLASHINGS, CALKING, AND OTHER PENETRATION REQUIREMENTS WHERE PIPING PASSES THROUGH WALLS, FLOORS, OR ROOFS.  
 9.3 WHERE REQUIRED, THE CONTRACTOR SHALL CORE DRILL WALL, CEILING, OR FLOOR PENETRATIONS TO INSTALL THE PIPE AS SHOWN ON THE DRAWINGS.  
 9.4 ANY EXCESSIVE MOTION, AS DETERMINED BY THE ENGINEER, OF THE PIPING SYSTEMS OCCURRING AFTER THEY ARE PLACED IN OPERATION SHALL BE IMMEDIATELY REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.  
**10. PROTECTION AND CLEANING**  
 10.1 CONTRACTOR SHALL KEEP ALL PIPE, TUBING, AND FITTINGS IN A CLEAN AND DRY ENVIRONMENT. PIPING END PLUGS OR CAPS SHALL NOT BE REMOVED UNTIL JUST PRIOR TO INSTALLATION. LEFTOVER CUT LENGTHS UNLESS USED IMMEDIATELY SHALL HAVE ENDS WIPED CLEAN, PLUGGED, OR CAPPED AND RETURNED TO CLEAN-DRY STORAGE. ALL FITTINGS SHALL BE STORED IN A CLEAN, DRY PLACE AND SHALL BE THOROUGHLY CLEANED INSIDE IMMEDIATELY BEFORE FIT-UP.  
 10.2 PIPING EQUIPMENT: IMMEDIATELY PRIOR TO INSTALLATION, REMOVE THE PROTECTIVE END COVERS APPLIED BY THE EQUIPMENT MANUFACTURER.  
**11. INSPECTION, TEST AND ACCEPTANCE**  
 11.1 INSPECTION  
 11.1.1 PROVIDE THE OWNER AND ENGINEER WITH INSPECTION ACCESS TO PIPING DURING ANY PHASE OF FABRICATION AND/OR INSTALLATION.  
 11.2 TESTS - GENERAL  
 11.2.1 TEST ALL PIPING SYSTEMS. TEST PIPING SYSTEMS AND/OR PORTIONS OF PIPING SYSTEMS TO BE INSULATED AND/OR CONCEALED BEFORE THE INSULATION IS APPLIED OR BEFORE CONCEALMENT. FLUSH ALL LINES PRIOR TO TESTING HYDROSTATICALLY. ISOLATE OR REMOVE PIPING EQUIPMENT AND/OR INSTRUMENTS WHICH WILL NOT SAFELY WITHSTAND THE TEST PRESSURES.  
 11.2.2 PERFORM TESTS IN THE PRESENCE OF THE OWNER. MAINTAIN PRESSURE FOR A MINIMUM PERIOD OF ONE HOUR. DURING THIS PERIOD, THE PIPING SYSTEM SHALL SHOW NO SIGN OF FAILURE, LEAKAGE, AND/OR DISTORTION. THERE SHALL BE NO LOSS OF TEST PRESSURE DURING THIS ONE-HOUR PERIOD.  
 11.2.3 USE TEST MEDIA AND PRESSURES AS SPECIFIED BY THE OWNER.  
 11.2.4 APPLY PNEUMATIC TEST PRESSURE IN STEPS TO EQUALIZE STRAINS. CHECK PIPING SYSTEMS JOINTS WITH A SOAP SOLUTION DURING FINAL STEP OF PNEUMATIC TEST.  
 11.2.5 THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, REPAIR ALL DEFECTS DISCLOSED BY TESTING AND REPEAT TEST PROCEDURE UNTIL A SATISFACTORY TEST IS WITNESSED BY THE OWNER.  
**12. PIPELINE INSULATION**  
 12.1 INSULATE EXTERIOR PORTIONS OF NEW PROCESS SOLVENT LINES.  
 12.1.1 CONTRACTOR SHALL NOT APPLY INSULATION UNTIL TESTING OF THE PIPING SYSTEM HAS BEEN SUCCESSFULLY COMPLETED AND ANY REPAIRS MADE, AND AFTER HEAT TRACING HAS BEEN APPLIED.  
 12.1.2 INSULATION SHALL NOT BE APPLIED UNTIL ALL SURFACES ARE CLEAN, DRY, FREE OF DIRT, OIL, GREASE, FROST, MOISTURE AND OTHER IMPERFECTIONS. THE CONTRACTOR IS RESPONSIBLE FOR CLEANING SURFACES TO BE INSULATED. CARE SHOULD BE TAKEN TO PREVENT DAMAGE TO HEAT TRACING CABLES.  
 12.1.3 ALL PIPING INSULATION SHALL BE CONTINUOUS THROUGH SLEEVES, HANGERS AND ACROSS RACKS. ALL PIPING INSULATION SHALL BE CONTINUOUS OVER FLANGES, UNIONS, AND VALVES.  
 12.2 MATERIALS  
 12.2.1 PIPE: INSULATE PIPING WITH PREHOLEDED SECTIONS OF FLEXIBLE ELASTOMERIC CELLULAR INSULATION. USE APPLICATION TECHNIQUES DESCRIBED IN MANUFACTURER'S PRINTED BULLETIN FOR CUTTING, PETERING, FITTING, AND JOINING INSULATION TO PIPING AND FITTINGS. SEAL ALL LENGTHWISE SEAMS AND BUTT JOINTS WITH ADHESIVE. SEAL ALL PIPE PENETRATIONS, PIPE ENDS AND BRANCHES. SEALS SHALL NOT PERMIT ACCUMULATION OF WATER IN SEAMS OR BETWEEN INSULATION AND PIPE WALL.  
 FITTINGS: USE HOLEDED SECTIONS OF THE SAME MATERIAL.  
 HANGERS: HORIZONTAL PIPE SHALL BE PROTECTED AT THE POINT OF SUPPORT BY A HIGH DENSITY POLYISOCYANURATE INSERT AND/OR INSULATION PROTECTION SHEED. SECURE EACH INSULATION PROTECTION SHEED TO THE INSULATION OUTER SURFACE WITH TWO BANDED VERTICAL PIPE SUPPORTS SHALL BE SEALED OVER WITH VAPOR BARRIER MASTIC.  
 INSULATION  
 12.2.2 THICK PREFORMED PIPE AND FITTING SECTIONS OF FLEXIBLE ELASTOMERIC CELLULAR PIPE INSULATION. INSULATION SHALL HAVE A FLAME -SPREAD RATING OF 25 OR LESS BY ASTM E811. MANUFACTURER: ARMSTRONG ARMAFLEX II OR EQUAL.  
 ADHESIVE  
 AIR-DRYING CONTACT ADHESIVE, ARMSTRONG 520 OR EQUAL.  
 FINISH  
 MANUFACTURER'S INDOOR/OUTDOOR FINISH, ARMSTRONG ARMAFLEX OR EQUAL.

VERIFY SCALE	DSGN	NO.	DATE	REVISION	BY	APVD
1" = 10'	D.P. LEONARD					
1" = 10'	D.J. SCHULTEN					
1" = 10'	D.P. LEONARD					
1" = 10'	F. MOHSENIAN					

PIPING MATERIALS AND EQUIPMENT SPECIFICATIONS

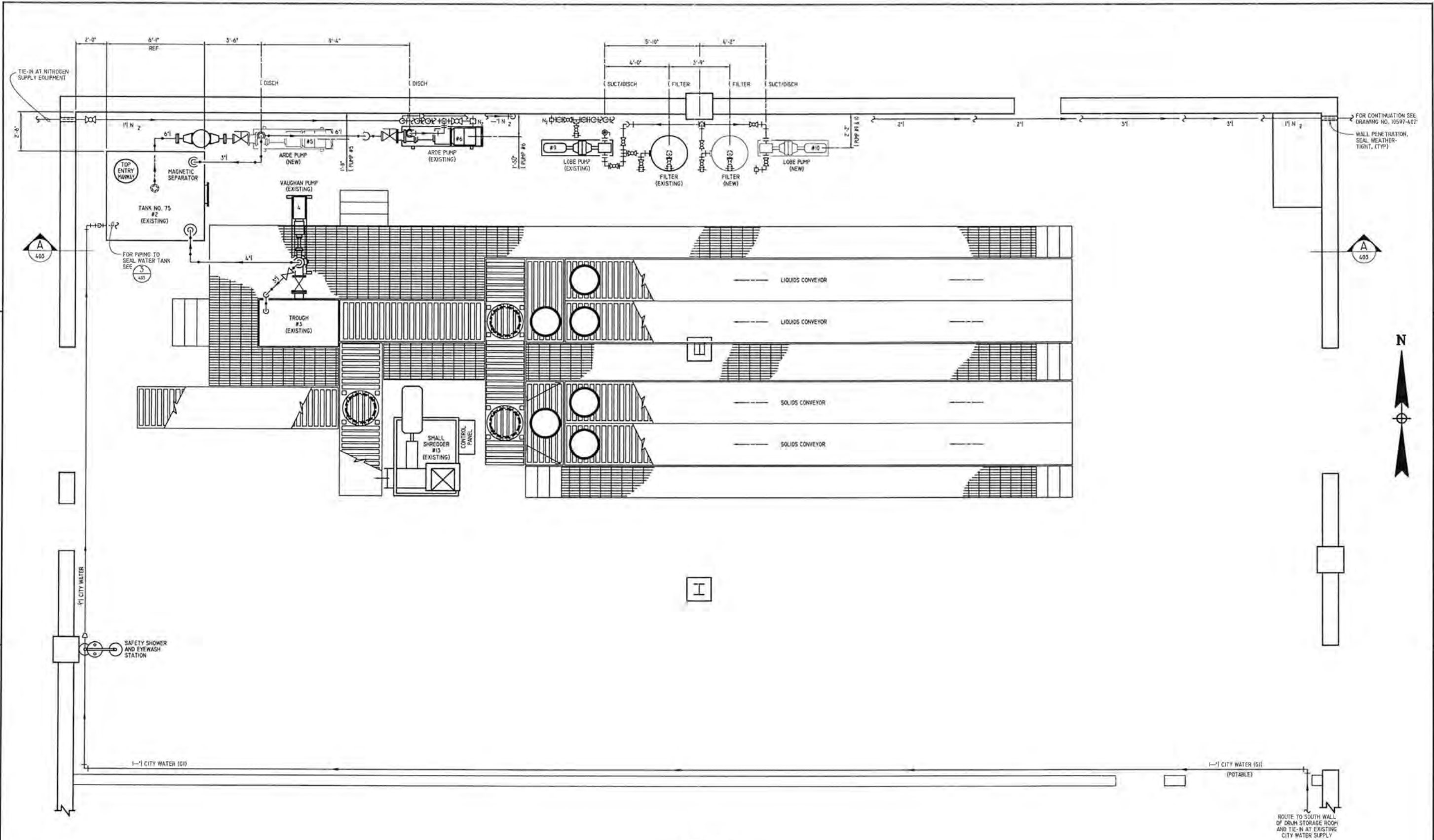
PIPING SPECIFICATION G1			PIPING SPECIFICATION F1			PIPING SPECIFICATION F3		
<b>MATERIALS</b>			<b>MATERIALS</b>			<b>MATERIALS</b>		
PIPE	3" THRU 6"	STANDARD WEIGHT	SALVANIZED CARBON STEEL, BUTT-WELDED SEAM	3" THRU 3"	SCHEDULE 40	CARBON STEEL, BUTT-WELDED SEAM	2" THRU 6"	SCHEDULE 40
FITTINGS	3" THRU 6"	100 LB	SALVANIZED MALLEABLE IRON, BAKED, THREADED	3" THRU 3"	100 LB	MALLEABLE IRON, BAKED, THREADED	2" THRU 6"	STANDARD WEIGHT
UNIONS	3" THRU 6"	100 LB	SALVANIZED MALLEABLE IRON, ALL-RON SEALS, GROUND JOINT, THREADED ENDS	3" THRU 3"	100 LB	MALLEABLE IRON, BAKED, THREADED ENDS	2" THRU 6"	CLASS 150
FLANGES	3" THRU 6"	CLASS 150	SALVANIZED MALLEABLE IRON, FLAT FACE, THREADED	3" THRU 3"	CLASS 150	FORGED STEEL, RAISED FACE OR FLAT FACED TO MATCH VALVE OR EQUIPMENT, THREADED CARLOCK 912 EPDM OR CARLOCK 912-100 EPDM ON CARLOCK 912-100 FULL FACE	2" THRU 6"	THICK
GASKETS	3" THRU 6"	1" THICK	RED RUBBER	3" THRU 3"	1" THICK	FORGED STEEL, RAISED FACE OR FLAT FACED TO MATCH VALVE OR EQUIPMENT, THREADED CARLOCK 912 EPDM OR CARLOCK 912-100 EPDM ON CARLOCK 912-100 FULL FACE	2" THRU 6"	THICK
BOLTS AND NUTS	3" THRU 6"	1" THICK	CARBON STEEL, HEX HEAD BOLTS, HEAVY SPRING-WASHERS, COLD-FINISHED HEX NUTS, TEFLON THREAD DOPE	3" THRU 3"	1" THICK	CARBON STEEL, HEX HEAD BOLTS, HEAVY SPRING-WASHERS, COLD-FINISHED HEX NUTS, TEFLON THREAD DOPE	2" THRU 6"	THICK
PIPE JOINT COMPOUND								
<b>SPECIFICATIONS</b>	<b>MATERIAL ASTM</b>	<b>DIMENSIONAL ANSI</b>	<b>SPECIFICATIONS</b>	<b>MATERIAL ASTM</b>	<b>DIMENSIONAL ANSI</b>	<b>SPECIFICATIONS</b>	<b>MATERIAL ASTM</b>	<b>DIMENSIONAL ANSI</b>
PIPE	A106	B36.10	PIPE	A53, TYPE F	B36.10	PIPE (2" THRU 6")	A53, TYPE F	B36.10
PIPE THREADS	A191	B1.1 (FIPER)	PIPE THREADS	A191	B1.1 (FIPER)	FITTINGS	A53, TYPE F	B36.10
FITTINGS (3" THRU 6")	A191	B1.1	FITTINGS	A191	B1.1	BRANCHES	A53	B1.1
UNIONS	A191	B1.1	UNIONS	A191	B1.1	FLANGES (2" THRU 6")	A53	B1.1
FLANGES	A191	B1.1	FLANGES	A191	B1.1	GASKETS	A507, CR 8	B1.1
GASKETS	A307, CR 8	B1.1, B1.2, B1.3	GASKETS	A507	B1.1	BOLTS AND NUTS	A307, CR 8	B1.1, B1.2, B1.3
BOLTS AND NUTS	A307, CR 8	B1.1, B1.2, B1.3	BOLTS AND NUTS	A507	B1.1, B1.2, B1.3	BOLT LENGTH	A307, CR 8	B1.1, B1.2, B1.3
BOLT THREADS	A307, CR 8	B1.1	BOLT LENGTH	A507	B1.1, B1.2, B1.3	BOLT THREADS	A307, CR 8	B1.1
<b>EQUIPMENT SPECIFICATIONS</b>								
	BALL VALVE	FOR SOLVENT PROCESS - ALL CARBON STEEL CONSTRUCTION, CLASS 150 FLANGED ENDS, GRAPHITE STEM PACKING, LIMBOODY CONSTRUCTION, CERTIFIED FIRE-SAFE TO API 670, WITH MANUAL NO. HANDLE. MANUFACTURER: APOLLO OR EQUAL MODEL: 85-100 SIZE: 3"				QUICK DISCONNECT - PROCESS CONNECTION	DUCTILE IRON CONSTRUCTION, MALE NPT/END x MALE PIPE THREAD. MANUFACTURER: PT COUPLING CO., INC. MODEL: F ADAPTER SIZE: 2" AND 3"	
	BALL VALVE	FOR SOLVENT PROCESS - ALL CARBON STEEL CONSTRUCTION, FULL PORT, MANUAL, 150 WOG, THREADED ENDS, WITH GRAPHITE PACKING AND GRAPHITE END CAP GASKETS FOR FIRE SAFE DESIGN. MANUFACTURER: APOLLO OR EQUAL MODEL: 85-500 SIZE: 2"				QUICK HOSE COUPLER (PIG CATCHER)	SEMI-STEEL (CAST IRON) CONSTRUCTION, FEMALE NPT/END x HOSE SHANK. MANUFACTURER: PT COUPLING CO., INC. MODEL: C COUPLER SIZE: 2" AND 3" NOTE: MODIFY AS INDICATED IN DETAIL 2 ON DRAWING NO. 10597-402.	
	BALL VALVE	FOR SOLVENT PROCESS - ALL CARBON STEEL CONSTRUCTION, BARSTOCK DESIGN, MANUAL, 200 WOG, THREADED ENDS, WITH GRAPHITE PACKING FOR FIRE SAFE DESIGN. MANUFACTURER: APOLLO OR EQUAL MODEL: 75-103 SIZE: 3"				NITROGEN HOSE COUPLER ASSEMBLY	ASSEMBLY COMPRISED OF THE FOLLOWING: QUICK COUPLER DUCTILE IRON CONSTRUCTION, FEMALE NPT/END x FEMALE PIPE THREAD. MANUFACTURER: PT COUPLING CO., INC. MODEL: D COUPLER SIZE: 2" AND 3"	
	BALL VALVE	FOR WATER, GAS (N <sub>2</sub> ) AND (AIR) SERVICE ONLY - BRONZE BODY, 500 PSI WOG, COLD NON-SHOCK, THREADED ENDS, WITH TEFLON SEALS AND STUFFING BOX RING. MANUFACTURER: APOLLO OR EQUAL MODEL: 70-100 SERIES SIZE: 1" THROUGH 2"				COUPLER END HOSE SHANK	BLACK MALLEABLE IRON, 300# THREADED, SIZE: 2" x 1" AND 3" x 1" CARBON STEEL, 1/2" MALE PIPE THREAD x 1/2" HOSE SHANK, SIZED FOR TWO HOSE CLAMPS MANUFACTURER: DIXON VALVE AND COUPLING CO., OR EQUAL MODEL: 10M 402	
	GATE VALVE	125# IRON WEDGE TYPE, ALL IRON CONSTRUCTION, 200 PSI NON-SHOCK WOG, BOLTED BONNET, OUTSIDE SCREW AND YOKER (OS&Y), 50:10 RISE, FLANGED ENDS. MANUFACTURER: GRINWELL, OR EQUAL MODEL: FIGURE NO. 6020 A1 SIZE: 3" THROUGH 6"				SUPPLY PIPE END HOSE SHANK	CARBON STEEL, 1/2" FEMALE PIPE THREAD x 1/2" HOSE SHANK, MANUFACTURER: DIXON VALVE AND COUPLING CO., OR EQUAL MODEL: 355T	
	BACKPRESSURE VALVE	DIAPHRAGM ACTUATED, BRONZE BODY, RUBBER DIAPHRAGM, TEFLON DISCS, SPRING LOADED WITH ADJUSTABLE T-HANDLE, PRESSURE RANGE 15 - 100 PSIG MANUFACTURER: WATTS REGULATOR MODEL: BPS08 SIZE: 1/2"				NITROGEN REGULATOR	REDUCED PRESSURE RANGE 0-125 PSIG, 350 PSIG MAX SUPPLY PRESSURE, TEMPERATURE RANGE 40° - 100° F, DIAPHRAGM OPERATED, NON-RELEASING TYPE, ZINC BODY, WITH T-HANDLE, FLUSHED WITH 0-100 PSIG RANGE PRESSURE GAUGE. MANUFACTURER: WATTS FLUID AIR MODEL: RH-02X / W275160MS GAUGE PORT SIZE: 1/2" FPT	
	FLOAT VALVE	BRONZE BODY, FLOAT AND LEVER STYLE, SINGLE SEATED, INTERNAL PILOT CONTROL, ANGLE PATTERN, Y SCREWED ENDS, INLET PRESSURE 30 PSIG MIN., 35 GPM CAPACITY AT 30 PSIG DIFFERENTIAL PRESSURE, DEAD END SERVICE. MANUFACTURER: D.C. KECKLEY COMPANY MODEL: NO. 7				PRESSURE INDICATOR	FOR WATER SERVICE - 2" DIA STEEL CASE, 1" BRASS NPT LOWER CONNECTION, 0 - 100 PSIG RANGE, PLASTIC WINDOW, SPRING SUSPENDED MOVEMENT, ADJUSTABLE POINTER. MODEL: 25 W 1000 H 02 L(X)F 100#	
	EXTERNAL EMERGENCY VALVE	COMPRISED OF THE FOLLOWING: WORCESTER CONTROLS SERIES AF 51 FIRE-RATED ANTI-STATIC FLANGED BALL VALVE, CAST CARBON STEEL BODY, CHROME PLATED CARBON STEEL BALL, REINFORCED TFE SEATS, GRAPHITE STEM SEALS, AND 150# RAISED FACE FLANGED ENDS, FIRE-RATED TO API 607 STANDARDS. FURNISH COMPLETE WITH A WORCESTER CONTROLS PNEUMATIC ACTUATOR WITH SPRING RETURN TO CLOSE FEATURE, MODEL: L039 TO BE FACTORY ASSEMBLED AND TESTED PRIOR TO SHIPMENT. SIZE: 6"				EXPANSION JOINT	SINGLE ARCH, NITRILE TUBE WITH NEOPRENE COVER, STANDARD PRESSURE SERVICE, 150# FLANGED ENDS, 1" F.F. DIM. MANUFACTURER: GOODALL RUBBER CO. MODEL: E-1622 SIZE: 4"	



**TE TRIAD ENGINEERING INCORPORATED**  
 325 EAST CHICAGO STREET  
 MILWAUKEE, WISCONSIN 53202  
 (414)-291-8840  
 FAX 291-8841

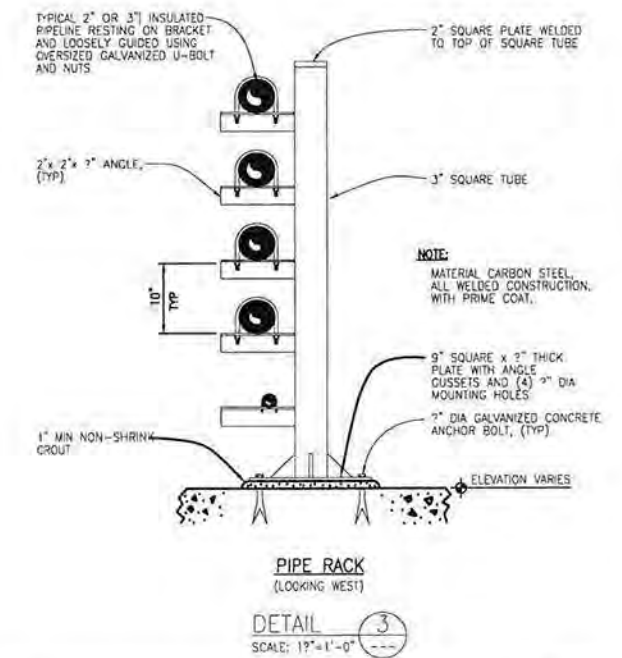
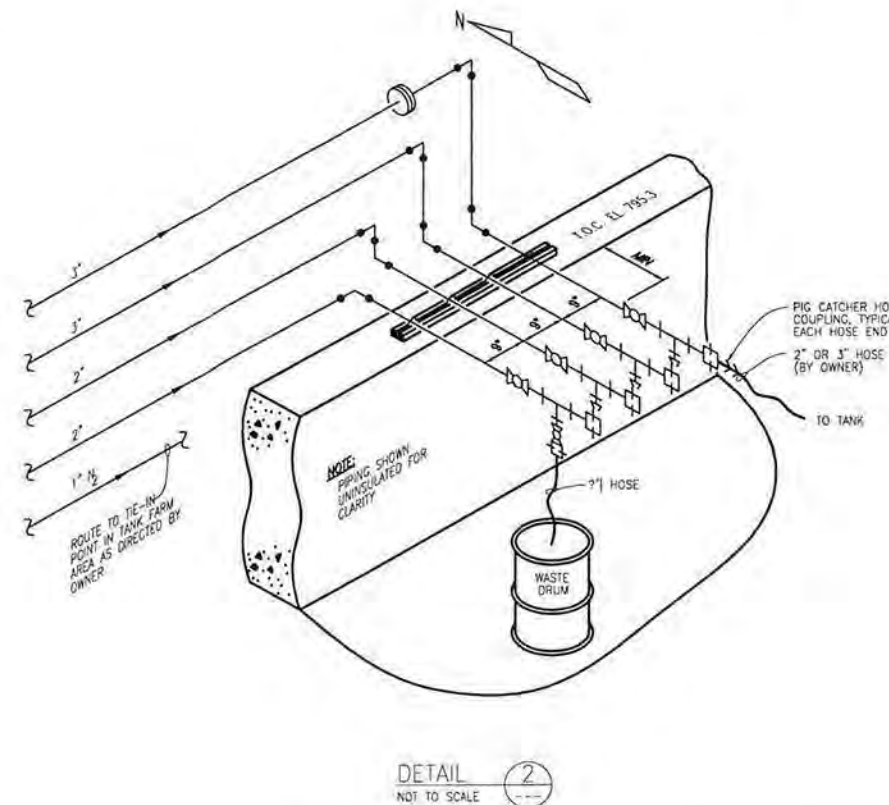
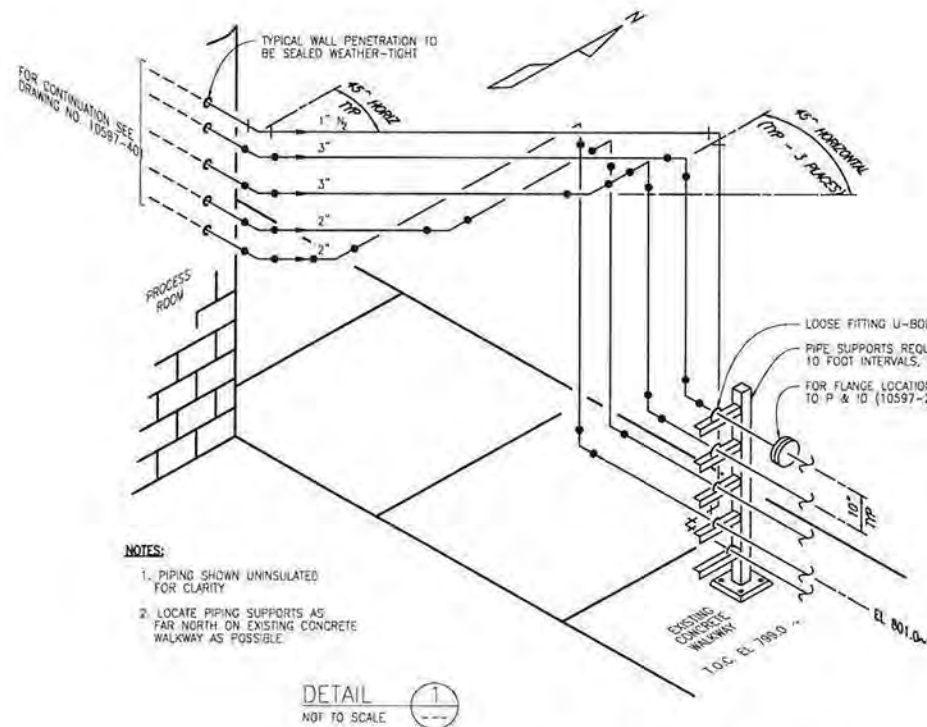
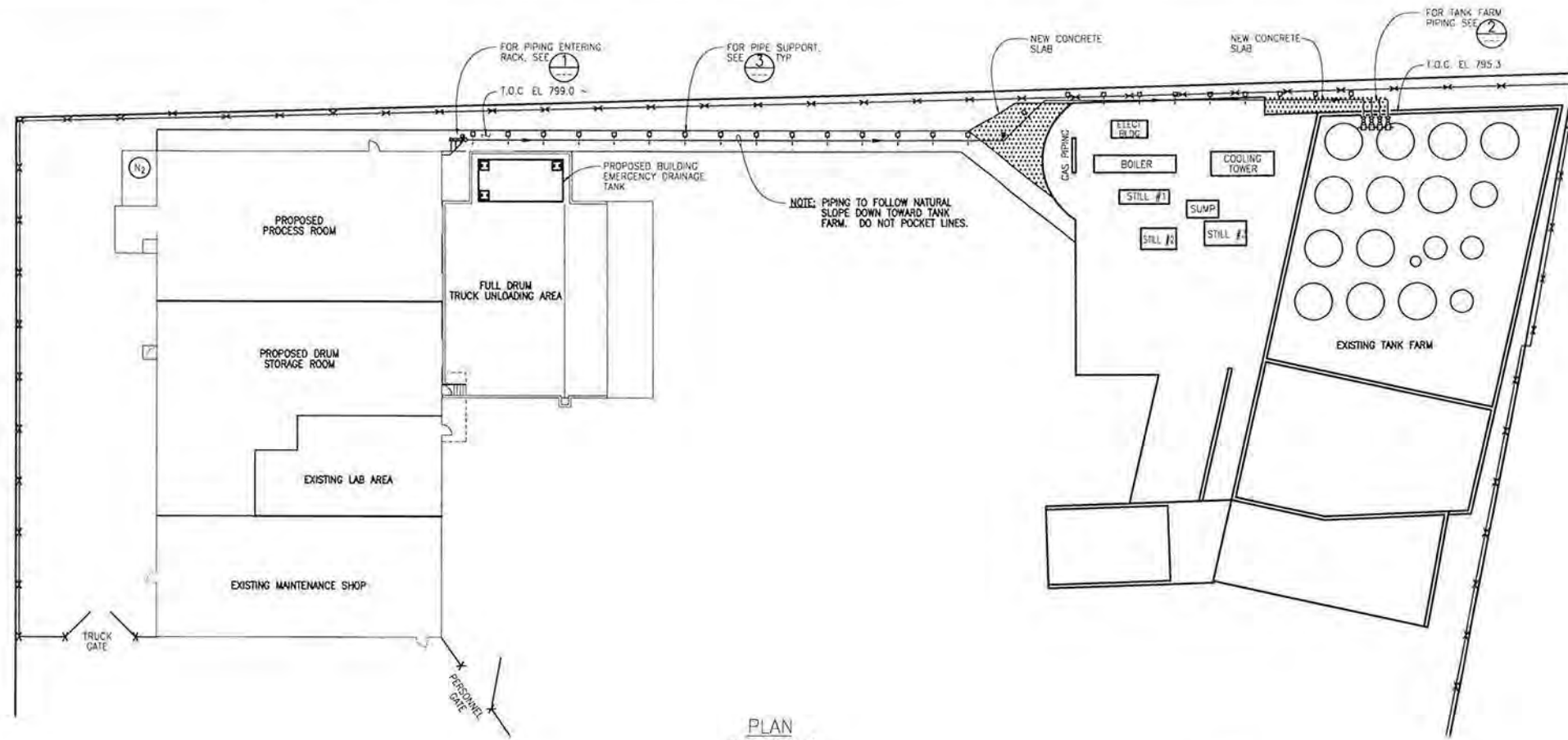
**MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION**  
 HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS  
 MECHANICAL SPECIFICATIONS

SHEET NO.	7
DRG NO.	10597-400
DATE	12/18/92
PROJ. NO.	10597



FLOOR PLAN  
SCALE: 1/4"=1'-0"

VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0" = 1'-0" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	DSGN D.P. LEONARD	NO. DATE REVISION BY APVD	TRIAD ENGINEERING INCORPORATED 325 EAST CHICAGO STREET MILWAUKEE, WISCONSIN 53202 (414)-291-8860 FAX 291-8861	MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS PROCESS ROOM EQUIPMENT AND PIPING LAYOUT	SHEET NO. 8
	DR D.J. SCHUTTEN				DRG NO. 10597-401
	CHK D.P. LEONARD				DATE 12/18/92
	APVD F. MOHSENIAN				PROJ NO. 10597



VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0" = 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	DSON D.P. LEONARD	DR D.J. SCHUITEN	CHK D.P. LEONARD	APVD F. MOHSENIAN	NO.	DATE	8/30/93	REMOVED FLANGE CONSTRUCTION ON (1) 3" LINE AND (2) 2" LINES	REVISION	MILSOLV BY APVD	SP	© 1992 Triad Engineering	325 East Chicago Street Milwaukee, Wisconsin 53202 (414)-291-8840 FAX 291-8841	MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS FACILITY LAYOUT - INTERCONNECTING PIPING	SHEET NO. 9 DWO NO. 10597-402 DATE 8/30/93 PROJ NO. 10597
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**SPECIFICATIONS**

- ALL WORK, MATERIALS, EQUIPMENT, AND INSTALLATIONS SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF CHAPTER 63 AND 64 OF THE WISCONSIN ADMINISTRATIVE CODE AND NFPA.
- THE HVAC CONTRACTOR SHALL FURNISH AND INSTALL EVERYTHING ESSENTIAL TO PROVIDE A COMPLETE AND PROPERLY OPERATING HVAC SYSTEM AS SHOWN ON THE PLANS AND HEREAFTER SPECIFIED, INCLUDING BUT NOT LIMITED TO, ALL ARTICLES LISTED IN THIS SPECIFICATION.
- ALL WORK SPECIFIED OR NOTED ON THE DRAWINGS SHALL BE PART OF THIS CONTRACT EXCEPT FOR WORK IDENTIFIED AS BY THE ELECTRICIAN.
- SECURE ALL REQUIRED PERMITS, FEES, LICENSES, AND APPROVALS REQUIRED FOR THIS INSTALLATION.
- THERE SHALL BE NO SOLD CONNECTIONS OF PIPING, DUCTWORK, OR CONDUIT TO MOVING EQUIPMENT. FINAL CONNECTIONS SHALL BE BY FLEXIBLE CONNECTORS. CONNECTION SHALL BE OF FIRE RETARDANT MATERIAL.
- FURNISH ENGINEER WITH OPERATING AND MAINTENANCE MANUALS FOR ALL SPECIFIED EQUIPMENT.
- GUARANTEE THIS INSTALLATION, EQUIPMENT, AND ITS PERFORMANCE FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE BY OWNER.
- CHECK CONDITIONS AT THE ACTUAL JOB SITE AND DETERMINE FACILITIES FOR DELIVERY, PLACING, HANDLING, AND REMOVAL OF MATERIALS AND EQUIPMENT AND ANY AND ALL DIFFICULTIES THAT MAY BE ENCOUNTERED IN THE COMPLETE EXECUTION OF ALL WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- HVAC PLANS AND DETAILS ARE INTENDED AS A GUIDE AND BECAUSE OF THE REMODELING NATURE OF THIS PROJECT, PIPING AND EQUIPMENT MAY NOT BE ABLE TO BE INSTALLED EXACTLY AS SHOWN ON PLANS. THIS CONTRACTOR MUST INCLUDE IN THE BASE BID, ANY REQUIRED PIPING AND EQUIPMENT LOCATION CHANGES WHICH DIFFER FROM PLAN LOCATIONS AT NO EXTRA COST TO OWNER.
- FINAL ESTABLISHMENT OF ALL DATA SHALL BE DETERMINED ON THE SITE, AS JOB CONDITIONS DEMAND, AND SUBJECT TO THE APPROVAL OF THE ENGINEER.
- DUCT WORK:**
  - ALL SUPPLY AIR DUCTWORK SHALL BE GALVANIZED SHEET METAL AND SPIRAL 2" W.G. RATED LOW PRESSURE DUCT WORK, ASTM A-524 FABRICATION, INSTALLATION, AND SUPPORTS SHALL BE IN ACCORDANCE WITH THE HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE LATEST PRINTING, PUBLISHED BY SMACNA.
  - ALL EXHAUST AIR DUCTWORK SHALL BE GALVANIZED SHEET METAL AND SPIRAL RATED FOR CLASS 1, ASTM A-527 FABRICATION, INSTALLATION AND SUPPORTS SHALL BE IN ACCORDANCE WITH ROUND AND RECTANGULAR INDUSTRIAL DUCT CONSTRUCTION STANDARDS AS PUBLISHED BY SMACNA.
- CONSTRUCTION**
  - ALL 90 DEGREE TURNS SHALL BE FITTED WITH BARBER COLEMAN COMPANY OR CARNES "AIR TURNS"
  - ELBOWS HAVING A CENTERLINE TURNING RADIUS OF 1.5 TIMES THE DUCT WIDTH DO NOT REQUIRE TURNING VANES.
  - ALL BRANCH TAKEOFFS AND SUPPLY CONNECTIONS SHALL BE EQUIPPED WITH BARBER COLEMAN COMPANY OR CARNES EXTRACTORS WITH EXTERNAL OPERATORS AND POSITION INDICATORS.
  - FLANGE DUCT WORK FOR ATTACHMENT OF GRILLES, REGISTERS, ETC.
  - PROVIDE 2" DUCT CLEARANCE FROM NONCOMBUSTIBLE WALLS AND DECK.
- HOODS:**

SHALL BE CONSTRUCTED OF 14 GAGE GALVANIZED STEEL WITH SOLDER OR WELDED JOINTS AND SMOOTH GROUND EDGES. ALL CONSTRUCTION AS PER ACCM AND SMACNA INDUSTRIAL STANDARDS. AIR SLOTS SHALL BE FINISHED SMOOTH WITH S-SLIP ON ALL FOUR SIDES. SLOTS SHALL BE FLANGED TO ADJOINING SURFACES AND SEALED WITH SILICONE SEALANT. HOODS SHALL NOT BE SUPPORTED FROM AUXILIARY EQUIPMENT, RATHER BY INDEPENDENT EXTERNAL SUPPORTS AND HANGERS.
- FLASH AND WATERPROOF ALL PENETRATIONS OF THE OUTSIDE WALLS AND ROOF. REPAIR AND RETURN TO ORIGINAL CONDITION, ANY BUILDING MEMBER OR ITEMS DAMAGED AS A RESULT OF THIS WORK.
- BALANCE HVAC SYSTEMS TO AIRFLOWS INDICATED ON PLANS IN ACCORDANCE WITH NEBB STANDARDS WHEN INSTALLATION IS COMPLETED. ADJUST AND LOCK ALL VOLUME DAMPERS, AND ADJUST FAN DRIVES AS REQUIRED TO DISTRIBUTE AIR QUANTITIES AS SHOWN. SEND FINAL AIR BALANCE REPORT TO EMPLOYER WITH THE FOLLOWING TABULATED TEST RESULTS FOR EACH SYSTEM: SUPPLY AND EXHAUST AIR CFM, STATIC AND TOTAL PRESSURE, OUTSIDE AIR CFM, FAN RPM, BHP, AMP DRAW, EACH DIFFUSER CFM, AND EACH HOOD CFM.
- GRILLES AND DIFFUSERS**

JET DIFFUSER: METAL-AIRE MODEL H4154-0, DU WITH 45 DEGREE DEFLECTION. INSTALL EACH DIFFUSER IN A PROTRUDING BRANCH DUCT THAT EXTENDS 4" FROM THE MAIN DUCT DROP TO ALLOW FOR THE DIFFUSER DEPTH.

EXHAUST AND TRANSFER GRILLES: METAL-AIRE MODEL HDRH SIDEWALL DIFFUSER: METAL-AIRE MODEL VHD.
- PROVIDE CHANNELS, ANGLES, LINTELS, I-BEAMS, ROOS, ETC., AS REQUIRED FOR SUPPORT OF ALL HEATING AND VENTILATING EQUIPMENT IN ACCORDANCE WITH DETAILS AND AS REQUIRED.
- EQUIPMENT AND DUCTS SHALL NOT BE SUPPORTED FROM PLASTER, DRYWALL, CEILING SUSPENSION CHANNELS, ELECTRICAL CONDUIT, OTHER PIPING DUCTS OR EQUIPMENT, OR ANY PART OF BUILDING NOT DESIGNED TO CARRY THESE LOADS.
- REMOVE ALL RUBBISH, PROTECTION, DIRT, DEBRIS, TOOLS, EQUIPMENT AND UNUSED MATERIALS FROM BUILDING SITE AND LEAVE BUILDING AND PREMISES IN CLEAN, ORDERLY CONDITION.
- SHOP DRAWINGS: SUBMIT FOUR COPIES OF SHOP DRAWINGS FOR APPROVAL OF ALL SPECIFIED EQUIPMENT OR PREVIOUSLY APPROVED EQUIPMENT.
- MU-1:**

TRANE MODEL CHND-005 HIGH EFFICIENCY PROPELLER UNIT HEATER WITH 60MBH-IN, 48 WSH-OUTPUT, 1050 CFM, 1/20 HP FAN MOTOR, 115 VOLT, 1/20 HP FLUE VENT FAN, 115 VOLT, ELECTRONIC IGNITION, SINGLE-STAGE GAS VALVE AND FACTORY INSTALLED 24 VOLT FLUE VENT FAN, PRESSURE SWITCH, SAFETY & OPERATING CONTROLS. THE UNIT SHALL BE CONTROLLED BY A HONEYWELL MODEL JSD-0015-01 24 VOLT SINGLE-STAGE ROOM THERMOSTAT AND AN ALLEN BRADLEY MODEL 800TAXS 120 VOLT MANUAL STARTER. THE THERMOSTAT SHALL CYCLE THE UNIT BURNER AND FAN AS REQUIRED TO SATISFY THE THERMOSTAT SETPOINT OF 60°F (ADJUSTABLE). IN ADDITION THE UNIT FAN SHALL NOT BE ALLOWED TO OPERATE UNLESS THE FLUE VENT FAN OPERATION IS FIRST PROVEN BY THE PRESSURE SWITCH 115 VOLT POWER WIRING PROVIDED BY ELECTRICAL AND ALL CONTROL WIRING BY HVAC CONTRACTOR.

- SLEEVES, OPENINGS AND PATCHING:**
  - ALL HOLES AND OPENINGS REQUIRED FOR THE HVAC INSTALLATION SHALL BE THE RESPONSIBILITY OF THE HVAC CONTRACTOR.
  - THE HVAC CONTRACTOR SHALL CUT HIS OWN OPENINGS AND PROVIDE FRAMINGS AND LINTELS FOR ALL HIS WORK. NO CHOPPING OR BREAKING OUT WILL BE PERMITTED. PROVIDE 20 GAUGE SLEEVES FOR ALL DUCT OPENINGS AND 2" LARGER DIAMETER PIPE SLEEVES. INSULATE AND CAULK SLEEVES TO BE WATER TIGHT. PATCH AND PAINT ALL AFFECTED AREAS TO MATCH EXISTING.
- GAS LINE:**

INSTALL A GAS COCK WITH CAPPED DRIP AND UNION AT CONNECTION TO GAS MAKEUP AIR UNIT AND UNIT HEATER. GAS PIPING SHALL BE BLACK STEEL SCHEDULE 40 PER ASTM A-122, AND BLACK STEEL SCREW THREAD FITTINGS 150 W.P. WITH THREADED JOINTS. TEST ALL NEW AND EXISTING PIPING AT 60 PSI FOR ONE HOUR PERIOD (WITH ALL PRESSURE SENSITIVE EQUIPMENT SECURELY ISOLATED) AND REPAIR ALL LEAKS AS REQUIRED. PROVIDE GAS PRESSURE REGULATORS AS REQUIRED.
- BACKDRAFT DAMPER IN EXHAUST DUCT STACK SHALL BE ARROW MODEL 388 GALVANIZED STEEL SELF-ACTING TYPE.**
- ROOF SUPPORTS:**

FURNISH AND INSTALL RPS OR PATE EQUIPMENT RAILS AND CURBS FOR ROOF MOUNTED EQUIPMENT. SUPPORTS SHALL BE 1/2" GAUGE GALVANIZED STEEL WITH INTEGRAL BASE PLATE, CONTINUOUS WELDED SEAMS, WOOD NAILER AND COUNTER FLASHING. REMOVE EXISTING BUILT-UP ROOFING AND INSULATION AS REQUIRED TO FASTEN THE EQUIPMENT SUPPORTS TO THE EXISTING ROOF STRUCTURE AND REROOF AS REQUIRED TO PROVIDE A WEATHERPROOF INSTALLATION.
- EF-1 & 2:**

ENVIROFAN MODEL 36F-9 PROPELLER FAN WITH 36" SWEEP DIAMETER, 8000 CFM, 115 VOLT, 360 RPM, 40 WATT MOTOR AND 10" DOWNROD LENGTHS. EACH FAN SHALL BE CONTROLLED BY AN ENVIROFAN MODEL 100F, 110 VOLT VARIABLE SPEED CONTROL SWITCH FURNISHED BY HVAC AND INSTALLED BY THE ELECTRICAL DIVISION.
- EF-1:**

PEERLESS MODEL 200J ULTRAFAN-PAK CENTRIFUGAL BLOWER SIZED FOR 6200 CFM AT 1.25" ESP, 2674 RPM, 3 HP EXPLOSION-PROOF MOTOR, 480 VOLTS, 3 PHASE, WEATHERPROOF COVER, VIBRATION RAIL BASE, BELT GUARD, TYPE "B" SPARKPROOF CONSTRUCTION, DRAIN FITTING, INLET/OUTLET FLANGES AND FACTORY WIRE DISCONNECT SWITCH UNDER HOUSING.
- MU-1:**

FURNISH AND INSTALL A POWERMATIC, INC. MODEL GA-115 DIRECT FIRED 0002 MAKEUP AIR UNIT DESIGNED FOR OUTDOOR APPLICATION. THE UNIT SHALL HAVE BOTTOM DISCHARGE AND BE DESIGNED FOR EASY ADAPTION TO EXTERNAL DUCTWORK. UNIT CAPACITY SHALL BE 5800 CFM AT 1.15" ESP, 460 V, 3 PHASE, 750 MBH HEATING CAPACITY AND 5 HP MOTOR. UNIT MUST HAVE CAPABILITY TO HAVE AIR FLOW INCREASED TO 8750 CFM AT 1.1" ESP, 5 HP AND STILL PROPERLY FUNCTION.

GAS BURNER SHALL BE ETL APPROVED AND BE FOR NATURAL GAS. PRESSURE REGULATOR TO BE PROVIDED AS REQUIRED FOR PROPER REGULATION OF INCOMING 4.5 PSIG GAS SUPPLY OPERATION.

MANIFOLD TO BE LOCATED OUTSIDE OF AIRSTREAM AND SHIELDED FROM ATMOSPHERIC CONDITIONS BY MEANS OF PROTECTIVE COMPARTMENT WITH HINGED ACCESS.

UNIT TO BE ASSEMBLED AND TEST FIRED PRIOR TO SHIPMENT.

THE UNIT SHALL BE SUPPLIED WITH A FACTORY MOUNTED CONTROL PANEL AND ALL CONTROLS MOUNTED WITHIN THIS COMPARTMENT ARE TO BE WIRED TO A NUMBER TERMINAL BLOCK AND BE COLOR CODED AND IN ACCORDANCE WITH THE NEC. A CIRCUIT DIAGRAM OF THE APPROVED ELECTRICAL DRAWINGS IS TO BE GUELED TO THE INSIDE OF THE CONTROL CABINET DOOR. ALL ELECTRICAL COMPONENTS SHALL BEAR THE UL LABEL.

CONTROLS SHALL INCLUDE, BUT NOT BE LIMITED TO:

  - MAIN FAN STARTER AND OVERLOADS.
  - CONTROL CIRCUIT FUSES.
  - HIGH TEMPERATURE LIMIT SWITCH.
  - AIR PROVING DIFFERENTIAL SWITCH.
  - CONTROL CIRCUIT TRANSFORMER.
  - IGNITION TRANSFORMER.
  - AUTOMATIC PILOT VALVE.
  - MAIN GAS AUTOMATIC SHUTOFF VALVE.
  - MODULATING CONTROL VALVE.
  - (2) RELAYS FOR EXHAUST FAN INTERLOCKED OPERATION.

UNIT ACCESSORIES SHALL INCLUDE, BUT NOT BE LIMITED TO:

  - MOTORIZED INLET DAMPER.
  - V-BANK FILTER SECTION.
  - DISCONNECT SWITCH AND CONTROL STEP-DOWN TRANSFORMER.
  - HIGH PRESSURE REGULATOR (4 PSIG INCOMING PRESSURE).
  - SYSTEM 203 ELECTRIC MODULATING GAS VALVE, DISCHARGE SENSOR AND REMOTE EXPLOSION PROOF THERMOSTAT.

REMOTE CONTROL PANEL WITH WINTER-SUMMER SWITCH AND BLOWER, BURNER AND SAFETY PILOT LIGHTS.

SEVEN-DAY TIME CLOCK (110 V) AND NIGHT SETBACK THERMOSTAT. THE THERMOSTAT SHALL BE SOLID STATE AND EXPLOSION PROOF.
- AUTOMATIC CONTROL:**

THE HVAC CONTRACTOR IS REQUIRED TO PROVIDE A 100% COMPLETE AND OPERATING INSTALLATION OF AN AUTOMATIC FAI SAFE ELECTRIC CONTROL SYSTEM. IT IS HIS RESPONSIBILITY TO SEE THAT THE WORK AND EQUIPMENT ESSENTIAL TO THE OPERATION OF THIS SYSTEM IS PROVIDED IN ACCORDANCE WITH THE INTENT OF THIS PLAN AND SEQUENCE OF OPERATION.

THE MAIN HVAC CONTROL SYSTEM SHALL BE DESIGNED BY/UNDER THE DIRECTION OF A PROFESSIONAL ENGINEER. THE MANUFACTURER OF THE EQUIPMENT AND SUBMIT SHOP DRAWINGS OF THE PROPOSED SYSTEM FOR APPROVAL. ANY CONTROL WIRING REQUIRED BUT NOT SHOWN ON THE ELECTRICAL DRAWINGS SHALL BE THE RESPONSIBILITY OF THE HVAC CONTRACTOR, FURNISHED AND INSTALLED BY THE HVAC CONTRACTOR IN CONDUIT AND IN ACCORDANCE WITH NEC, THE PROCESS ROOM IN ACCORDANCE WITH HAZARDOUS CLASS I, DIVISION II, GROUP D NEC. ELECTRICAL CONTRACTOR SHALL PROVIDE THE FOLLOWING WORK UNDER THE SUPERVISION OF THE HVAC CONTRACTOR (REFER TO ELECTRICAL SPECIFICATIONS):

  - PROVIDE POWER WIRING TO HVAC MAIN CONTROL PANEL (MCP).
  - PROVIDE POWER WIRING FROM THE MCP TO ROOFTOP MOUNTED EQUIPMENT (MU-1 AND EF-1).
  - PROVIDE WIRING AND EQUIPMENT INSTALLATION FOR AUDIBLE AND VISUAL ALARMS IN THE PROCESS AREA.
  - PROVIDE POWER WIRING TO MU-1 MANUAL STARTER AND MOTOR, TO CEILING FANS AND RHEOSTATS.

- MAIN CONTROL PANEL (MCP)**
  - FURNISH AND INSTALL ONE MCP WHICH SHALL CONTAIN THE MAKEUP AIR UNIT REMOTE PANEL, TIME CLOCK, EXHAUST FAN STARTERS, INTERLOCK RELAYS, CONTROL SWITCHES, TRANSFORMERS, PILOT LIGHTS, AND ANY OTHER ACCESSORIES NECESSARY FOR THE SYSTEM TO FUNCTION PROPERLY AND ACCORDING TO THE SEQUENCE OF OPERATION.
  - PANEL SHALL BE NEMA 12 RATED, MADE OF STEEL WITH PRIME COAT FINISH, AND EQUIPPED WITH HINGED FRONT DOOR, AND LOCKING HANDLE. ALL MANUAL SWITCHES AND PILOT LIGHTS SHALL BE FLUSH MOUNTED ON THE FRONT FACE, IDENTIFIED BY ENGRAVED LAMINATED PLASTIC NAMEPLATES WITH WHITE LETTERS ON BLACK BACKGROUND. EACH ITEM OF EQUIPMENT SHALL HAVE ITS OWN MANUAL SWITCH, PILOT LIGHT, AND NAMEPLATE.
  - CONTROL DEVICES INSIDE THE MCP SHALL BE PREWIRED INTERNALLY. TERMINATE ALL WIRES LEAVING THE MCP AT SEPARATELY NUMBERED TERMINAL STRIPS (ONE TERMINAL PAIR PER CIRCUIT). PROVIDE INDIVIDUAL CONNECTORS FOR EVERY ITEM OF MECHANICAL EQUIPMENT, ALL INTEGRAL AND REMOTE PILOT LIGHTS, AND OTHER DEVICES DESCRIBED FOR EACH PANEL. ALL WIRES SHALL BE IDENTIFIED BY NUMERICAL TAGS AT BOTH ENDS. EACH CONTROL DEVICE SHALL BE WIRED WITHOUT SPLICES TO THE TERMINAL STRIP PROVIDE INTEGRAL CIRCUIT PROTECTION FOR ALL PANEL MOUNTED CONTROL DEVICES. PROVIDE THREE PHASE MOTOR STARTER CIRCUITS FOR EACH EXHAUST FAN. ALLEN BRADLEY STARTERS OR APPROVED EQUAL.
  - TERMINAL BLOCKS SHALL BE ONE-PIECE MOLDED PLASTIC BLOCKS WITH SCREW TYPE TERMINALS. TERMINALS SHALL BE DOUBLE SIDED AND SUPPLIED WITH REMOVABLE COVERS TO PREVENT ACCIDENTAL CONTACT WITH LIVE CIRCUITS. TERMINALS SHALL HAVE PERMANENT, LEGIBLE IDENTIFICATION, CLEARLY VISIBLE WITH THE PROTECTIVE COVER REMOVED.
  - WIRES SHALL BE TERMINATED AT THE TERMINAL BLOCKS WITH CRIMP TYPE, PRE-INSULATED, RING-TONGUE LUGS. LUGS SHALL BE OF THE APPROPRIATE SIZE FOR THE TERMINAL BLOCK SCREWS AND FOR THE NUMBER AND SIZE OF THE WIRES TERMINATED.
  - FURNISH PANEL WITH ELECTRICAL WIRING DIAGRAMS ENCLOSED IN PLASTIC JACKETS PLACED INSIDE THE PANEL. PROVIDE PLASTIC OR STICK-ON LABELS ON ALL INTERIOR CONTROL DEVICES TO IDENTIFY THEM.
- EQUIPMENT REQUIRING SWITCHES**
  - MU-1 - "ON/OFF/AUTO" SUMMER-WINTER SWITCH
  - EF-1 - "ON/OFF/AUTO" SWITCH
- EQUIPMENT REQUIRING RED-ON PILOT LIGHTS**
  - MU-1 (BLOWER, BURNER, AND SAFETY)
  - EF-1
- EQUIPMENT REQUIRING AMBER-ALARM PILOT LIGHTS**
  - MU-1-1, FAILURE OF BLOWER, IGNITION AND SAFETY CONTROLS (3 LIGHTS)
  - EF-1, FAILURE OF AIRFLOW AND HIGH TEMPERATURE DETECTED IN DUCTWORK (FIRE) (2 LIGHTS)
  - BUILDING FIRE ALARM
- EQUIPMENT REQUIRING DRY CONTACTS CONNECTION FOR SIGNALING AUXILIARY ALARMS (AUXILIARY ALARMS IN EMERGENCY ALARM PANEL, BY ELECTRICAL)**
  - EF-1, FAILURE OF AIRFLOW OR HIGH TEMPERATURE DETECTED IN DUCTWORK (FIRE)
  - MU-1-1, FAILURE OF EITHER BLOWER, IGNITION OR SAFETY CONTROLS
- MISCELLANEOUS CONTROL DEVICES**
  - FIRE ALARM RELAY
  - DAY AND NIGHT EXPLOSION PROOF THERMOSTATS
- SEQUENCE OF OPERATION:**
  - THE FIRE ALARM RELAY SHALL DE-ENERGIZE ALL SUPPLY AND EXHAUST FAN EQUIPMENT WHEN RECEIVING AN ALARM SIGNAL FROM THE BUILDING FIRE ALARM SYSTEM. ONE DRY CONTACT RELAY WILL BE PROVIDED FOR INTERFACE WITH THE MECHANICAL SYSTEMS.
  - EF-1 AND MU-1-1 SHALL BE INTERLOCKED THROUGH THE AUTO POSITION TO OPERATE CONTINUOUSLY. THE FANS SHALL OPERATE CONTINUOUSLY IN THE ON POSITION.
  - EF-1 SAFETY OPERATION - UPON SENSING EITHER A NO-FLOW CONDITION OR UPON SENSING A DUCT AIR TEMPERATURE OF 125 DEGREES FAHRENHEIT, DRY CONTACTS IN THE MCP SHALL ENERGIIZE (FOR SIGNALING THE AUXILIARY AUDIO AND VISUAL ALARMS IN THE EMERGENCY ALARM PANEL BY THE ELECTRICAL DIVISION) ENERGIIZE MCP PILOT LIGHTS, AND DE-ENERGIIZE THE FAN.
    - HIGH TEMPERATURE LIMIT SWITCH IN DUCTWORK EQUAL TO AMERICAN FLUID POWER COMPANY MODEL 2015-0125-UB-07A, EXPLOSION PROOF, 316 STAINLESS STEEL, SINGLE POLE, DOUBLE THROW, FM APPROVED WITH MANUAL RESET AND AUXILIARY CONTACT (FOR AUDIBLE ALARM SIGNAL).
    - AIRFLOW PROOF SWITCH IN DUCTWORK EQUAL TO W.E. ANDERSON FLOTECT MODEL V455-2-U, EXPLOSION PROOF, STAINLESS STEEL, SINGLE POLE, DOUBLE THROW SEALED VANE OPERATED FLOW SWITCH (CONTACT ASP AT 312-436-1200).
- MU-1 CONTROL**

A SEVEN-DAY TIME CLOCK (PARAGON OR EQUAL) SHALL INDEX A DAY THERMOSTAT AND NIGHT SETBACK THERMOSTAT BASED ON TIME OF DAY. THE RESPECTIVE THERMOSTAT AND RELATED MU-1-1 DISCHARGE STAT SHALL MODULATE THE MU-1 AUTOMATIC GAS VALVE AS REQUIRED TO MAINTAIN THE THERMOSTAT SETPOINT. THE MU-1 DA DAMPERS SHALL BE INTERLOCKED WITH THE OPERATION OF THE BLOWER AND SHALL BE OPEN WHENEVER THE BLOWER IS IN OPERATION.

UPON SENSING A FAILURE OF THE BLOWER, GAS IGNITION OR SAFETY CONTROLS, THE MCP PILOT LIGHTS SHALL BE ENERGIIZE MU-1 DE-ENERGIIZE, AND DRY CONTACTS IN THE MCP SHALL ENERGIIZE (FOR SIGNALING THE AUXILIARY AUDIO AND VISUAL ALARMS BY THE ELECTRICAL DIVISION).
- FLUE VENTING**

FURNISH AND INSTALL FACTORY BUILT VENTING EQUAL TO METALBESTOS MODEL DC, TYPE B, INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS.
- PIPE PORTALS**

FURNISH AND INSTALL RPS OR PATE PIPE PORTALS AT ALL PIPE PENETRATIONS THROUGH THE EXISTING ROOF. THE PIPE SEALS SHALL BE PREFABRICATED SPUN ALUMINUM BASE WITH SLOPED ROOF SURFACE FLANGE, GRADUATED STEPPED PVC BOOT AND ADJUSTABLE STAINLESS STEEL CLAMPS.

**HEAT LOSS CALCULATIONS**

DESIGN TEMPERATURES: WDOOR = 60° F, OUTDOOR = -10° F

**A. BUILDING BARRIER OVERALL HEAT TRANSFER COEFFICIENTS**

ITEM	R"	U"
<b>ROOF</b>		
Fo	17	
BUILT-UP ROOF	33	
3" URETHANE	25.00	
10" PRECAST CONCRETE	1.23	
F1	27.41	0.36
<b>WALLS</b>		
Fg	17	
12" CONCRETE BLOCK WITH INSULATION	3.2	.25
F2	8.8	
	4.05	
<b>SKYLIGHTS</b>		.25
GARGE DOORS		.72
SLAB ON GRADE INFILTRATION		1.08

**B. BUILDING ENVELOPE THERMAL PERFORMANCE (BETP)**

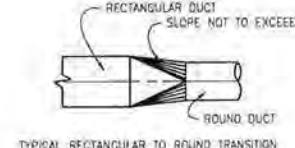
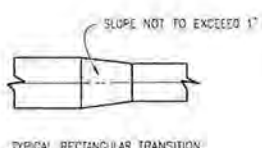
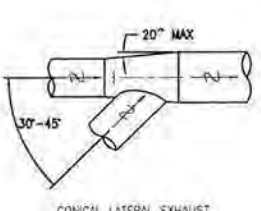
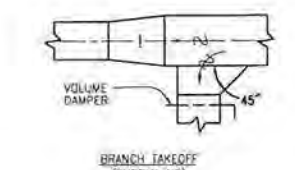
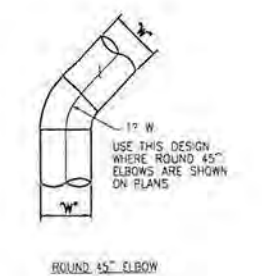
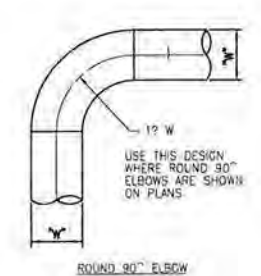
ITEM	SQ. FEET	U"	T"	BTU/HR
ROOF	6,780	X 0.36	X 70	= 17,096
WALLS	4,130	X .25	X 70	= 72,275
SKYLIGHTS	144	X .55	X 70	= 5,544
GARGE DOORS	162	X .6	X 70	= 15,204
	11,416			110,109 BTU/HR

BETP = 110,109 = 9.6 BTU/HR SQ. FEET  
11,416

**C. BUILDING HEAT LOSS**

ITEM	SQ. FEET	U"	T"	BTU/HR
<b>PROCESS ROOM</b>				
ROOF	3,336	X 0.36	X 70	= 8,407
WALLS	2,748	X .25	X 70	= 48,090
SKYLIGHTS	96	X .55	X 70	= 3,888
GARGE DOORS	240	X .6	X 70	= 10,080
SLAB	166	X .6	X 70	= 8,366
INFILTRATION	52	X .6	X 70	= 3,311
				82,579 BTU/HR
<b>SOLVENT STORAGE ROOM</b>				
ROOF	3,300	X 0.36	X 70	= 8,316
WALLS	1,624	X .25	X 70	= 28,420
SKYLIGHTS	46	X .55	X 70	= 1,848
GARGE DOORS	122	X .6	X 70	= 5,124
SLAB	97	X .6	X 70	= 4,889
INFILTRATION	39	X .6	X 70	= 2,945
				57,545 BTU/HR

TOTAL: 134,115 BTU/HR (WITHOUT VENTILATION)



**DUCTWORK FITTINGS**

NOT TO SCALE

VERIFY SCALE	DSGN	S.PRUSINSKI
BAR IS ONE INCH ON ORIGINAL DRAWING.	DR	L.M.JILES
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	CHK	T.C.BACHMAN
	APVD	S.PRUSINSKI

NO.	DATE	REVISION
8/30/93		MECHANICAL SUPPLY AND EXHAUST FAN ELIMINATED FOR DRUM STORAGE ROOM, UNIT HEATER & CEILING FANS ADDED. MU-1 DOWN SIZED AND ALL EF-2 CONTROL SEQUENCES ELIMINATED.

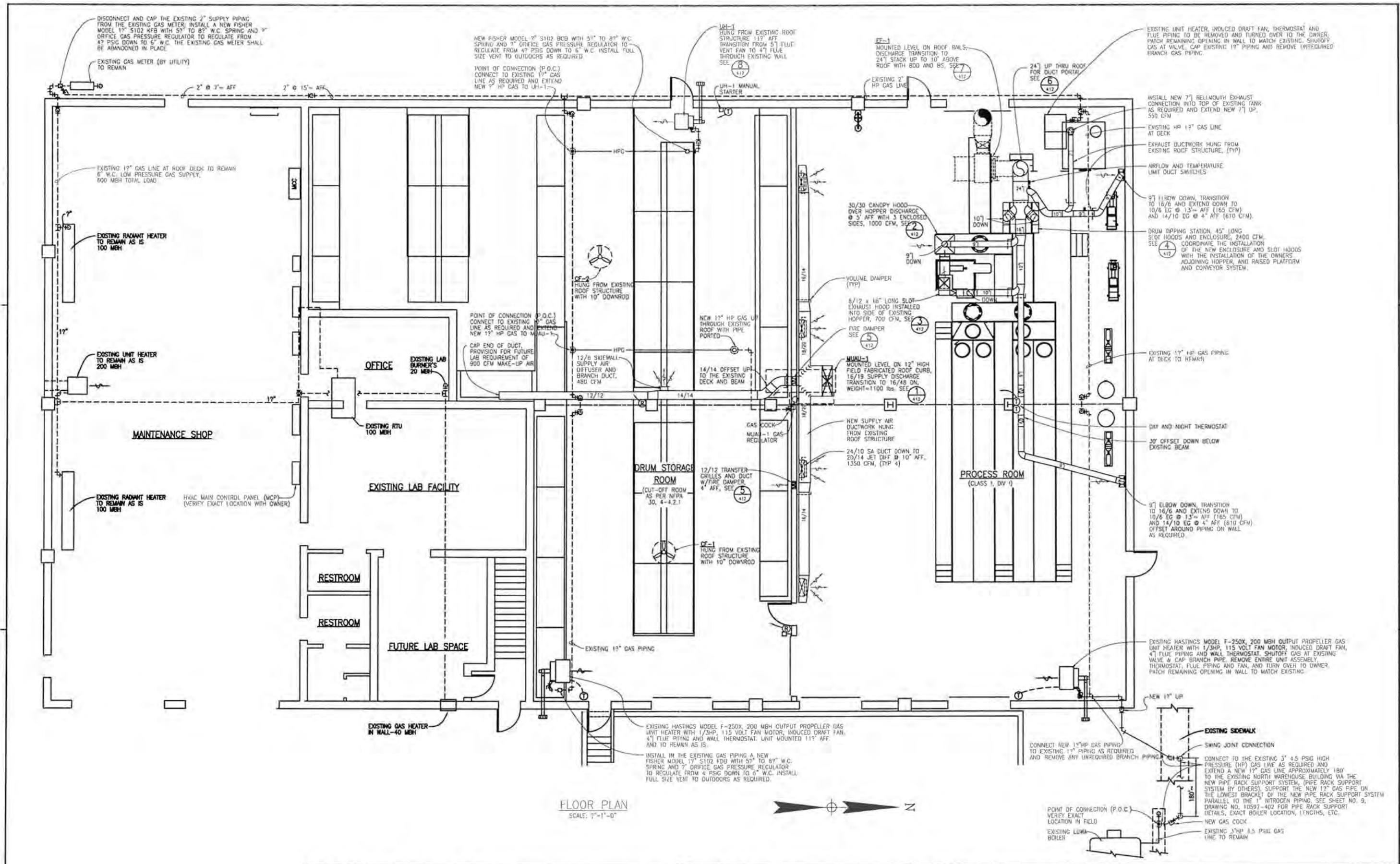
MILSOLV SP

**TE TRIAD ENGINEERING INCORPORATED**

325 East Chicago Street  
Milwaukee, Wisconsin 53202  
(414)-291-8840  
FAX 291-8841

MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION  
HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS  
HEATING AND VENTILATING SPECIFICATIONS

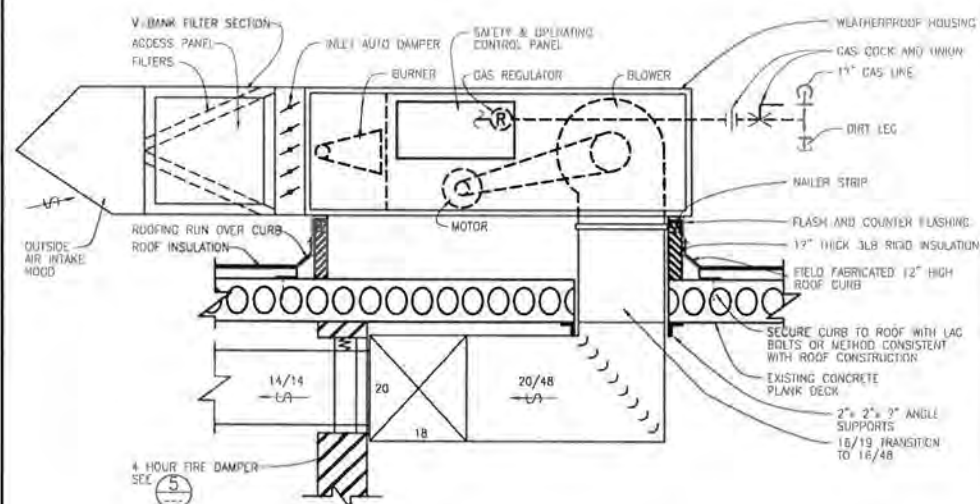
SHEET	11
DRG NO.	10597-410
DATE	8/30/93
PROJ NO.	10597



FLOOR PLAN  
SCALE: 1/8" = 1'-0"

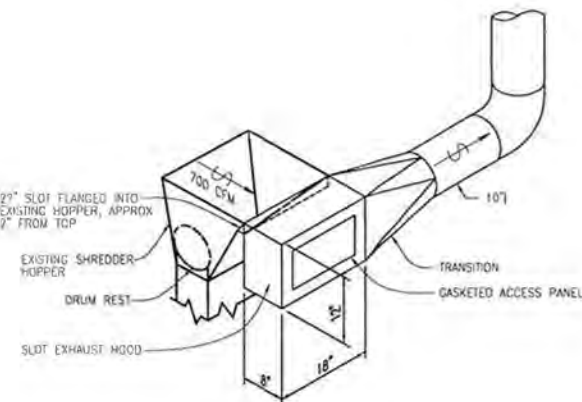
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0" = 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	DSON S. PRUSINSKI DR L.M. JILES CHK T.C. BACHMAN APVD S. PRUSINSKI	8/30/93 DRUM STORAGE ROOM DECLASSIFIED AND MECHANICAL SUPPLY AND EXHAUST SYSTEM ELIMINATED. DRUM TIPPING STATION EXHAUST HOOD REDESIGNED. FUTURE EXHAUST REQUIREMENTS ELIMINATED & MAKEUP AIR UNIT DOWN SIZED. ENTIRE BUILDING CONVERTED TO HP GAS SERVICE.	MLSOLV SP <b>TE TRIAD ENGINEERING INCORPORATED</b> © 1992 Triad Engineering	325 East Chicago Street Milwaukee, Wisconsin 53202 (414)-291-8840 FAX 291-8841	MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS HEATING AND VENTILATING LAYOUT	SHEET NO. 12 DWG NO. 10597-411 DATE 8/30/93 PROJ NO. 10597
	NO. DATE REVISION BY APVD					





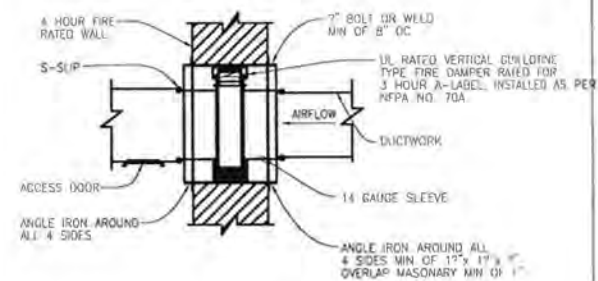
MUAU-1

DETAIL 1  
NOT TO SCALE 411



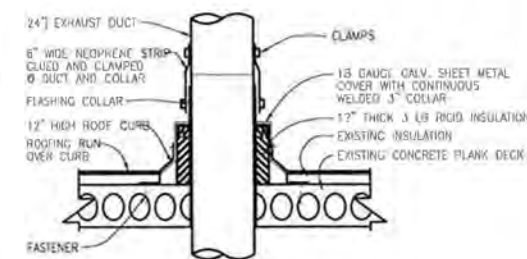
SHREDDER HOPPER EXHAUST HOOD

DETAIL 3  
SCALE 3/4\"/>



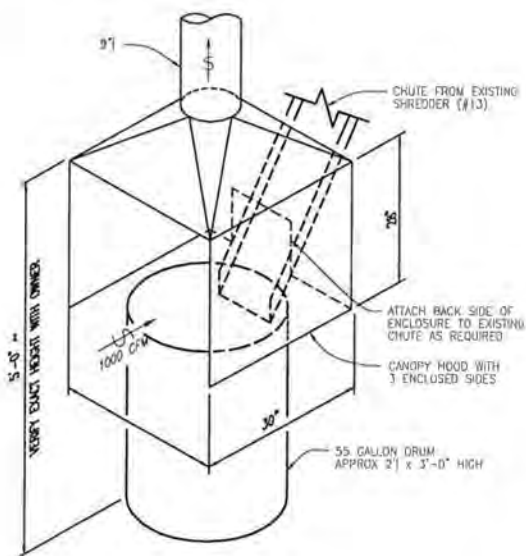
FIRE DAMPER DETAIL

DETAIL 5  
NOT TO SCALE 411



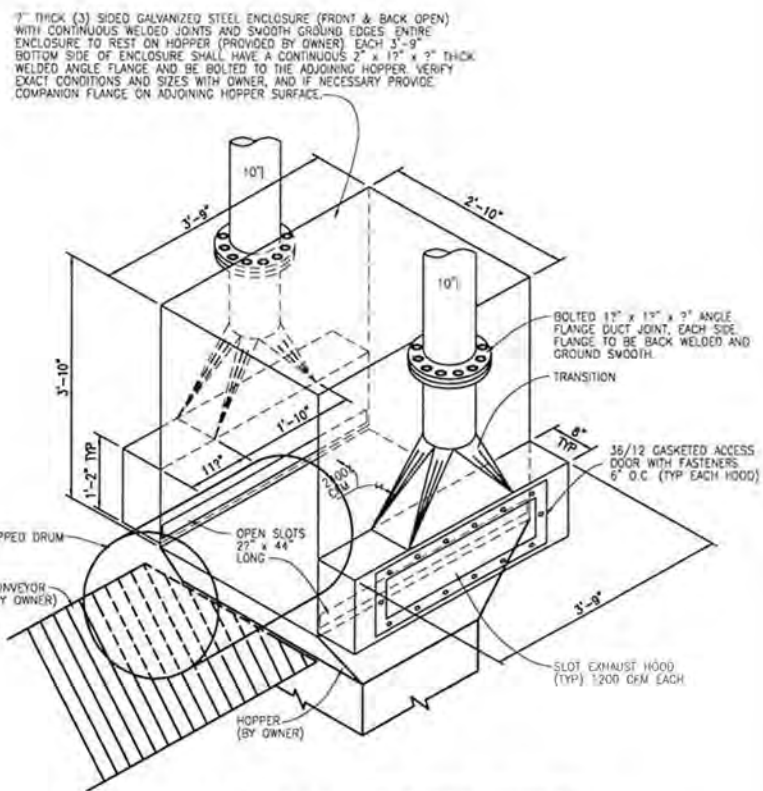
DUCT PORTAL DETAIL

DETAIL 6  
NOT TO SCALE 411



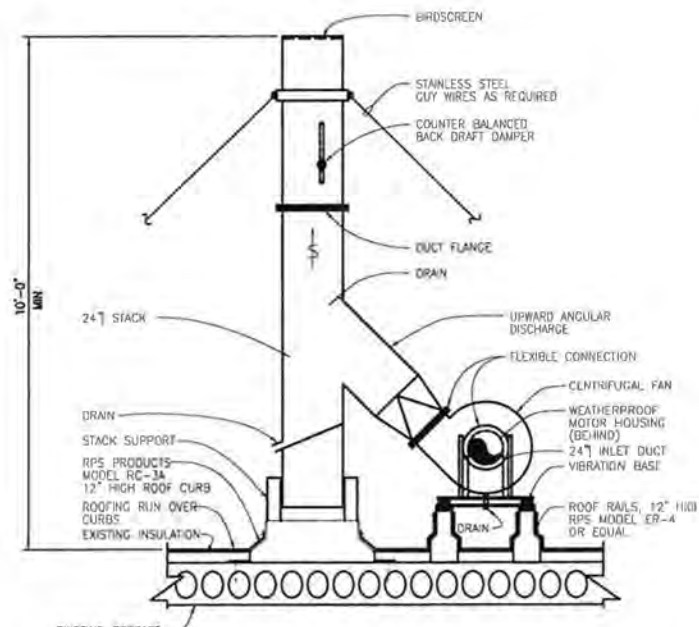
SHREDDER CHUTE EXHAUST HOOD

DETAIL 2  
SCALE 3/4\"/>



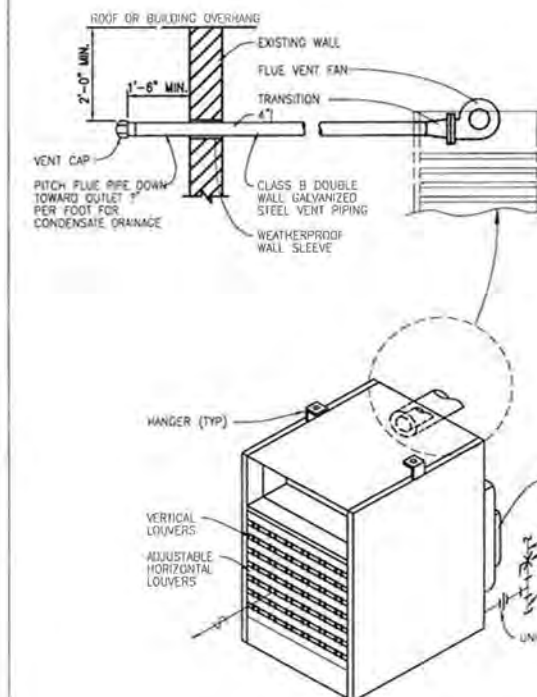
DRUM TIPPING STATION SLOT HOOD ENCLOSURE

DETAIL 4  
SCALE 3/4\"/>



EF-1 EXHAUST FAN AND STACK

DETAIL 7  
NOT TO SCALE 411



UH-1 GAS-FIRED UNIT HEATER

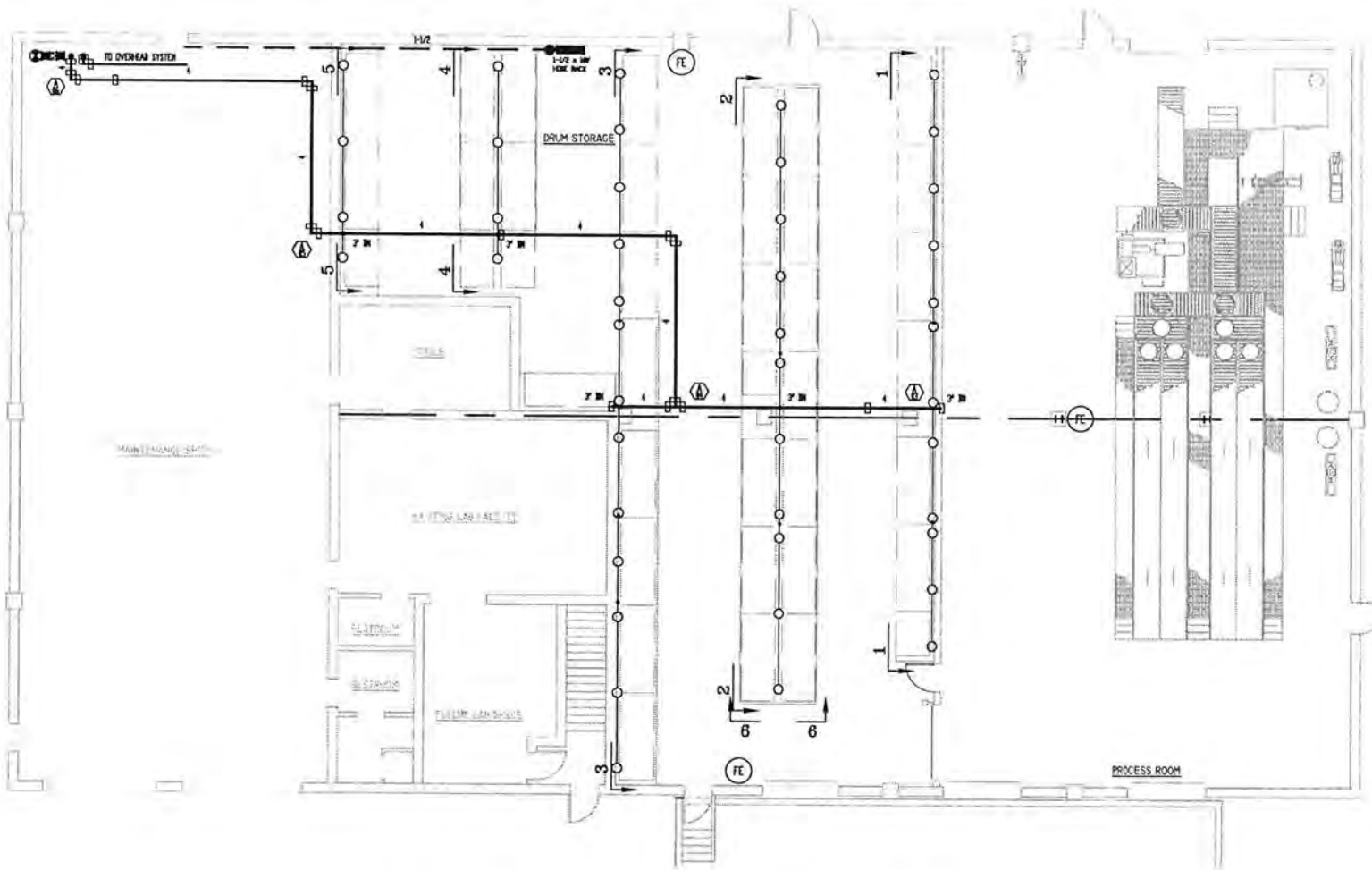
DETAIL 8  
NOT TO SCALE 411

VERIFY SCALE	DSGN	S. PRUSINSKI		
BAR IS ONE INCH ON ORIGINAL DRAWING.	DR	D.J. SCHUTTEN		
0	CHK	T.C. BACHMAN		
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	APVD	S. PRUSINSKI	8/30/93	REVISED DETAILS 1 & 4, AND ADDED DETAIL 8
	NO.		DATE	REVISION

**TE** TRIAD ENGINEERING INCORPORATED  
 325 East Chicago Street  
 Milwaukee, Wisconsin 53202  
 (414)-261-8840  
 FAX 291-8841

MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION  
 HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS  
 HEATING AND VENTILATING DETAILS

SHEET NO.	13
PROJ. NO.	10597-412
DATE	8/30/93
PROJ. NO.	10597

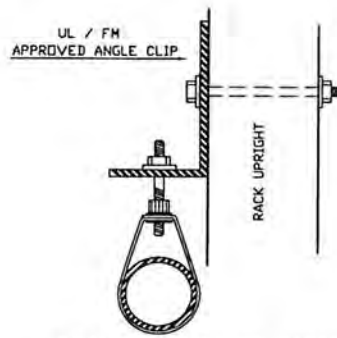


### RACK FIRE PROTECTION

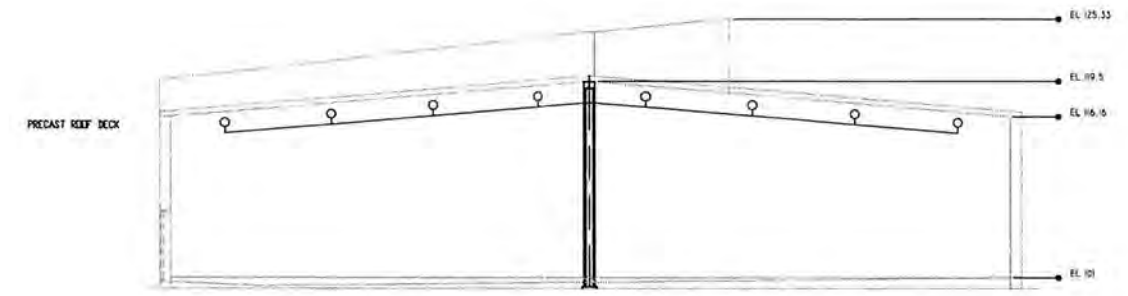
SCALE: 1/8" = 1'-0" North

Rack Sprinklers to be 165 Deg. F. 1/2" Orifice Brass Upright Sprinkler Head with Shield

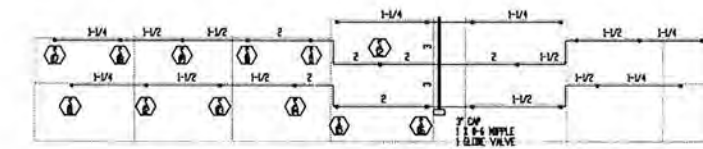
FE IDENTIFIES FIRE EXTINGUISHER  
EXTINGUISHER TO BE A MINIMUM OF  
20B DRY CHEMICAL FIRE EXTINGUISHER



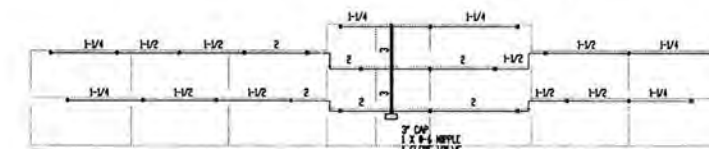
TYPICAL RACK HANGER  
NOT TO SCALE



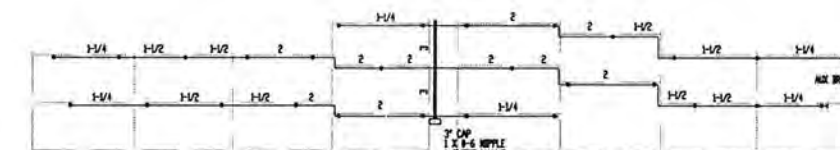
BUILDING CROSS SECTION  
SCALE: 1/8" = 1'-0"



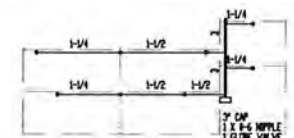
RACK 1 CROSS SECTION  
SCALE: 1/8" = 1'-0"



RACK 2 CROSS SECTION  
SCALE: 1/8" = 1'-0"



RACK 3 CROSS SECTION  
SCALE: 1/8" = 1'-0"



RACK 4&5 CROSS SECTION  
SCALE: 1/8" = 1'-0"

#### PIPE MATERIALS

All pipe to be black steel, with black cast/ductile iron fittings with joints as per NFPA.  
Pipe shall be as per the following schedule - (unless noted otherwise)  
Line Piping - Schedule 40 Standard wall  
X-Main Piping - Schedule 10 Thinwall  
Bulk Main Piping - Schedule 10 Thinwall  
Riser Piping - Schedule 10 Thinwall

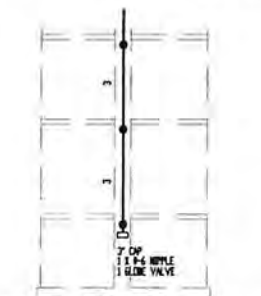
#### SYSTEM DESIGN

##### RACK SYSTEM

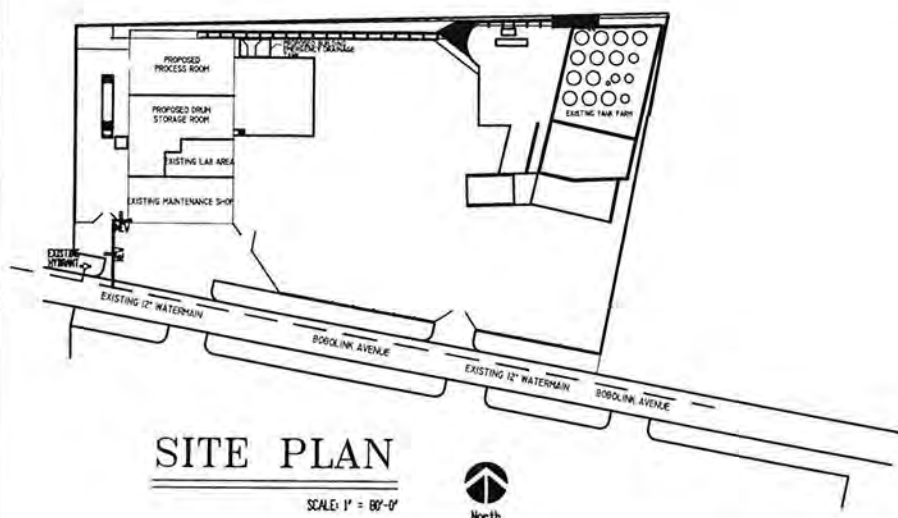
Sprinkler system to be wet and hydraulically calculated.  
Piping is sized as per NFPA 30 Flammable Liquids with an end head pressure of 30 psi  
Sprinkler heads to be spaced at 8'-0" max. horizontally  
One line of sprinklers above each tier of storage  
Sprinklers located in longitudinal flue space, staggered vertically  
Shields required with multi-levels  
Total combined inside and outside hose demands of 750 GPM has been allowed for in hyd. calculations.  
Rack system is balanced with Overhead system

##### WATER SUPPLY

Static 76 psi  
Residual 56 psi  
Flow 2930 gpm  
Location Hydrant in front of building



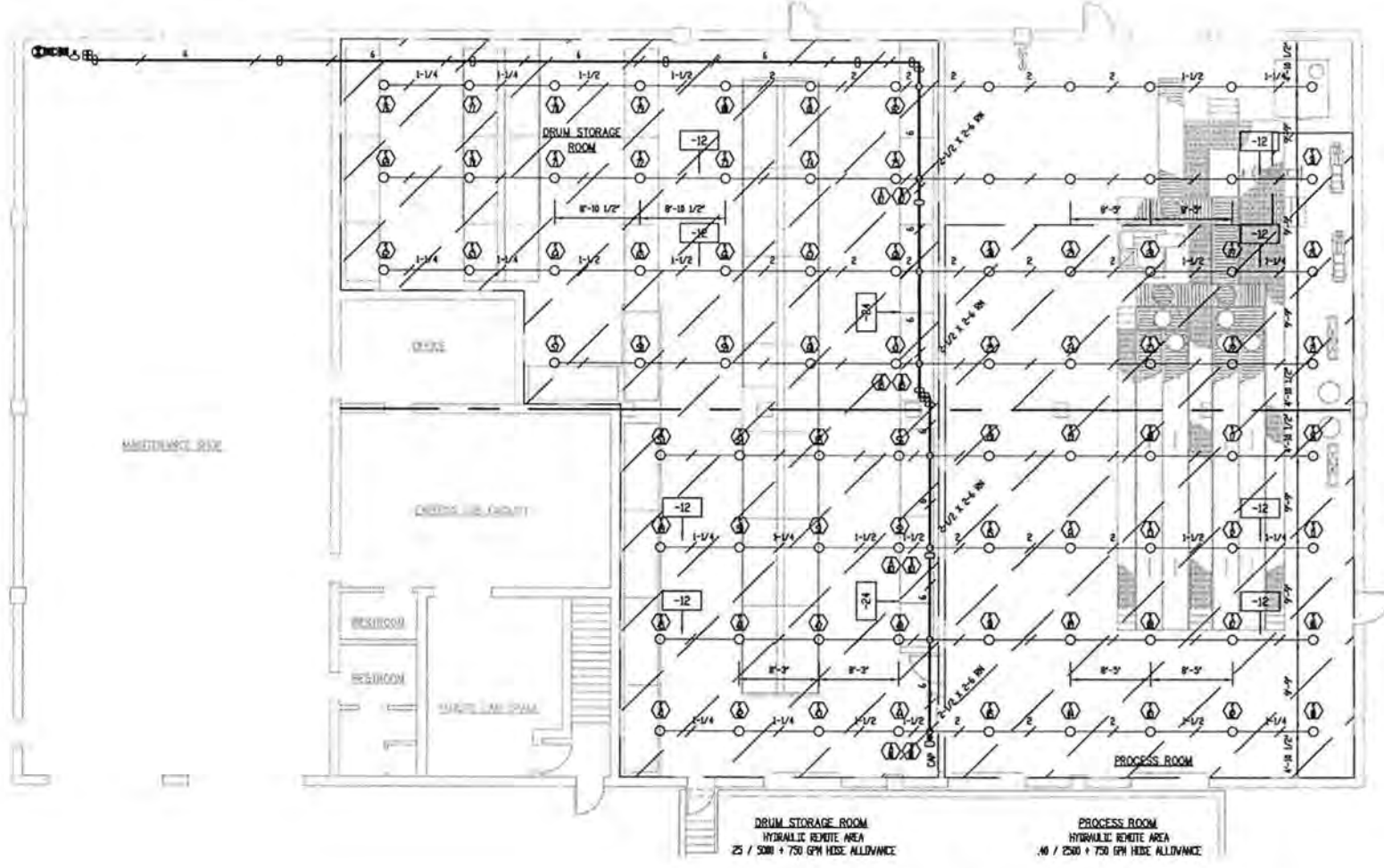
RACK CROSS SECTION 6  
SCALE: 1/4" = 1'-0"



### SITE PLAN

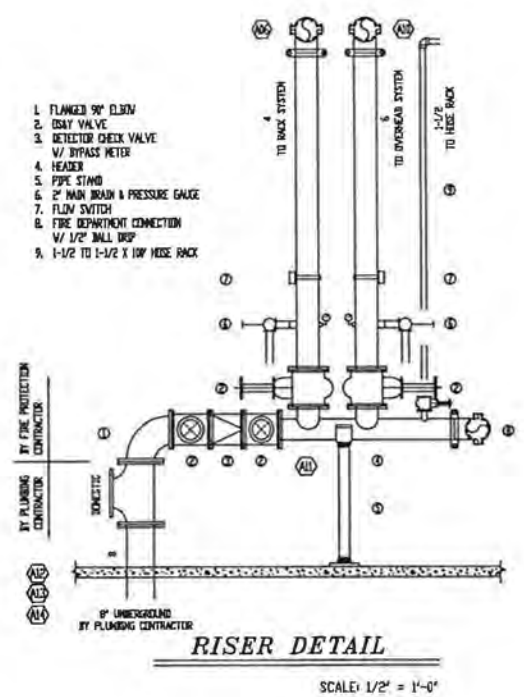
SCALE: 1" = 80'-0" North

UNITED STATES FIRE PROTECTION WISCONSIN, INC. 414/782-3311	VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	DSGN J.PRANGE DR J.PRANGE CHR L.A.HANSON APVD L.A.HANSON	NO. DATE REVISION BY APVD	TRIAD ENGINEERING INCORPORATED 325 EAST CHICAGO STREET MILWAUKEE, WISCONSIN 53202 (414)-291-8840 FAX 291-8841	MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS RACK FIRE PROTECTION & NOTES	SHEET NO. 14 DWG NO. 10597-420 DATE 12/18/92 PROJ NO. 10597
	© 1992 Triad Corporation					



### OVERHEAD FIRE PROTECTION

SCALE: 1/8" = 1'-0" North



**PIPE MATERIALS**

All pipe to be black steel, with black cast/malleable iron fittings with joints as per NFPA. Pipe shall be as per the following schedule- (unless noted otherwise)

- Line Piping - Schedule 40 Standard wall
- X-Main Piping - Schedule 10 Thinwall
- Bulk Main Piping - Schedule 10 Thinwall
- Riser Piping - Schedule 10 Thinwall

### GENERAL NOTES & SYMBOLS

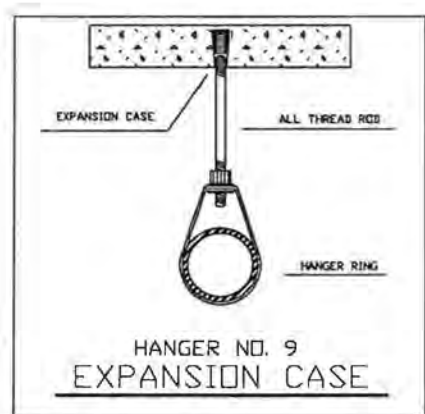
SYMBOL	DESCRIPTION
○	204 Deg. F. 17/32" Drifco Brass Upright Sprinkler Head
-	Approximate Hanger Location
0-0	Elevation from Floor to Centerline of Pipe
-0	Elevation down from Deck to Centerline of Pipe
①	Hydraulic Reference Point

#### SYSTEM DESIGN

**DRUM STORAGE ROOM**  
 Sprinkler system to be wet and hydraulically calculated. Piping is sized as per NFPA 30 Flammable Liquids / Bulk Storage. Class II Liquid maximum height of 19.5 ft. The design density is .25 / 5000. Total combined inside and outside hose demands of 750 GPM has been allowed for in hyd. calculations. Maximum sprinkler head spacing - 100 Square Ft.

**PROCESS ROOM**  
 Sprinkler system to be wet and hydraulically calculated. Piping is sized as per NFPA 13 Extra Hazard II. The design density is .40 / 2500. Total combined inside and outside hose demands of 750 GPM has been allowed for in hyd. calculations. Maximum sprinkler head spacing - 100 Square Ft.

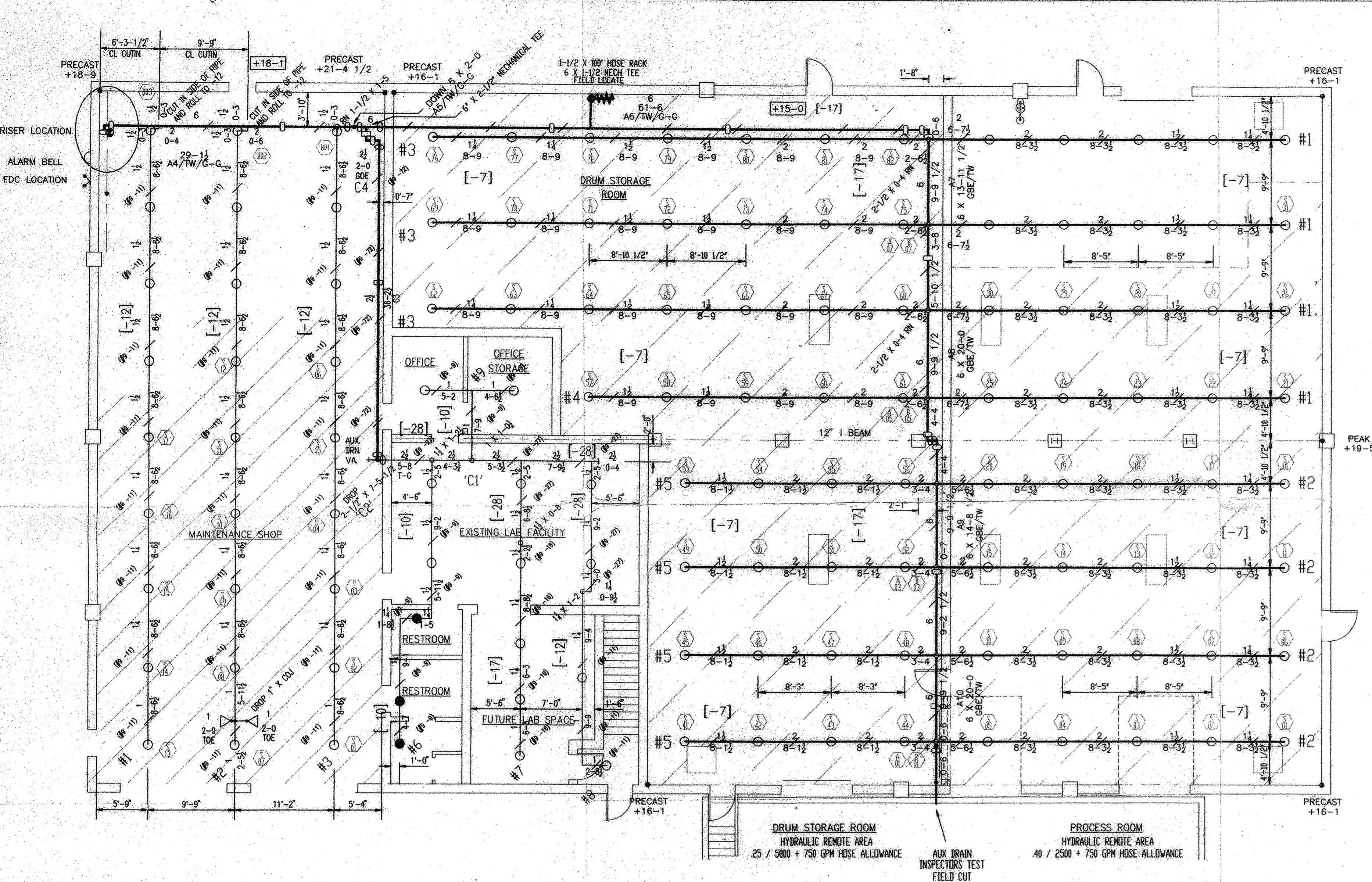
**WATER SUPPLY**  
 STATIC 76 PSI  
 RESIDUAL 56 PSI  
 FLOW 2930 GPM  
 LOCATION HYDRANT IN FRONT OF BUILDING



Pipe hangers shall be installed as required by NFPA for supporting sprinkler piping. No other piping and/or devices are to be attached to the sprinkler pipe hanger system unless the hanger has been specifically designed for the additional loading. THIS CONTRACT DOES NOT INCLUDE ANY MATERIAL OR DEVICE TO IMPROVE THE STRUCTURAL STRENGTH OF THE BUILDING TO ENABLE IT TO CARRY THE LOAD OF THE FIRE PROTECTION SYSTEM.

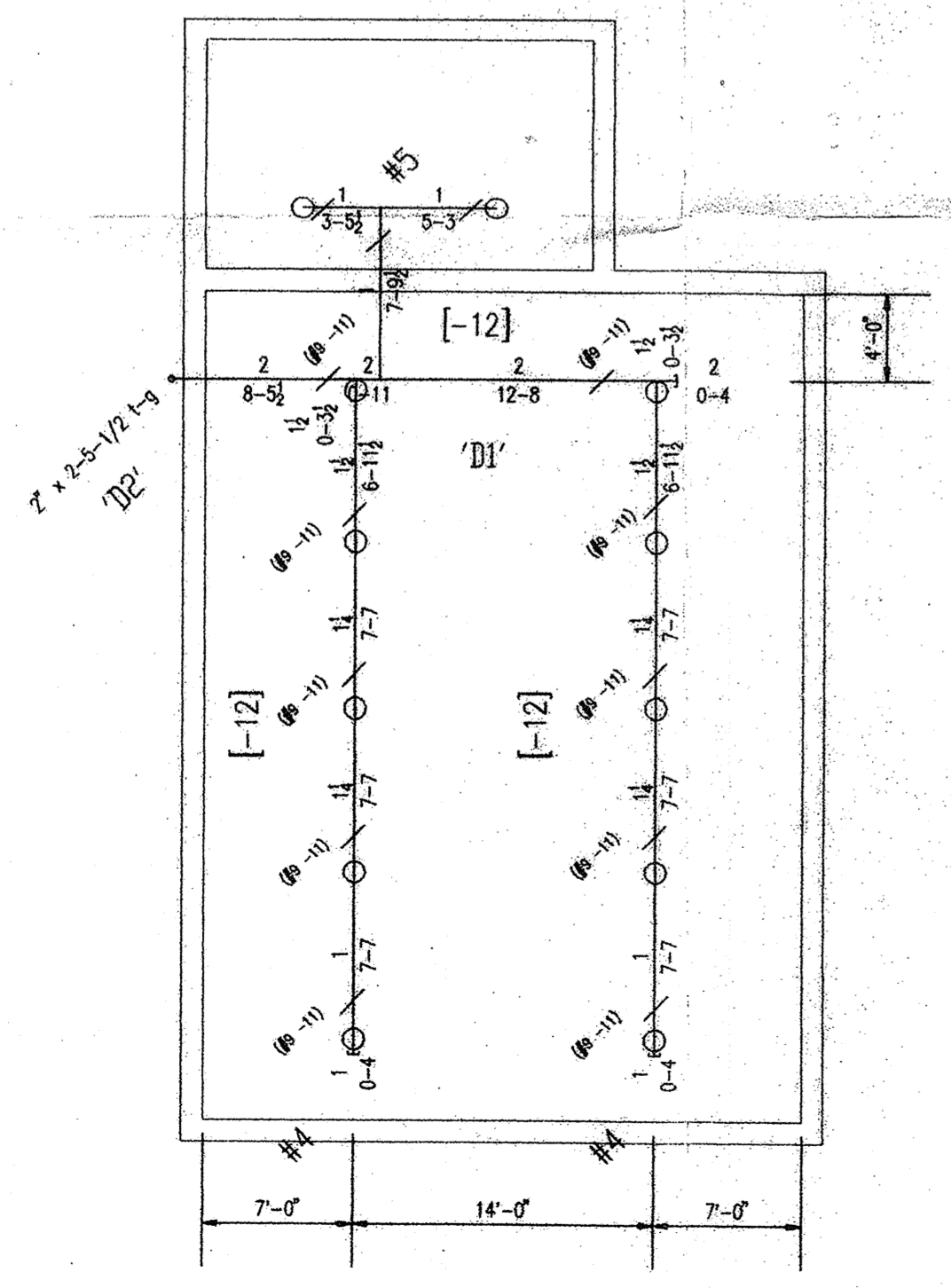
UNITED STATES FIRE PROTECTION WISCONSIN, INC. 414/782-3311	VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	DSGN J.PRANGE DR J.PRANGE CHK L.A.HANSON APVD L.A.HANSON	NO. DATE REVISION BY APVD	TRIAD ENGINEERING INCORPORATED 325 East Chicago Street Milwaukee, Wisconsin 53202 (414)-291-8840 FAX 291-8841	MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS FIRE PROTECTION PLAN	SHEET NO. 15 DWG NO. 10597-421 DATE 12/18/92 PROJ NO. 10597
	© 1992 Triad Engineering					





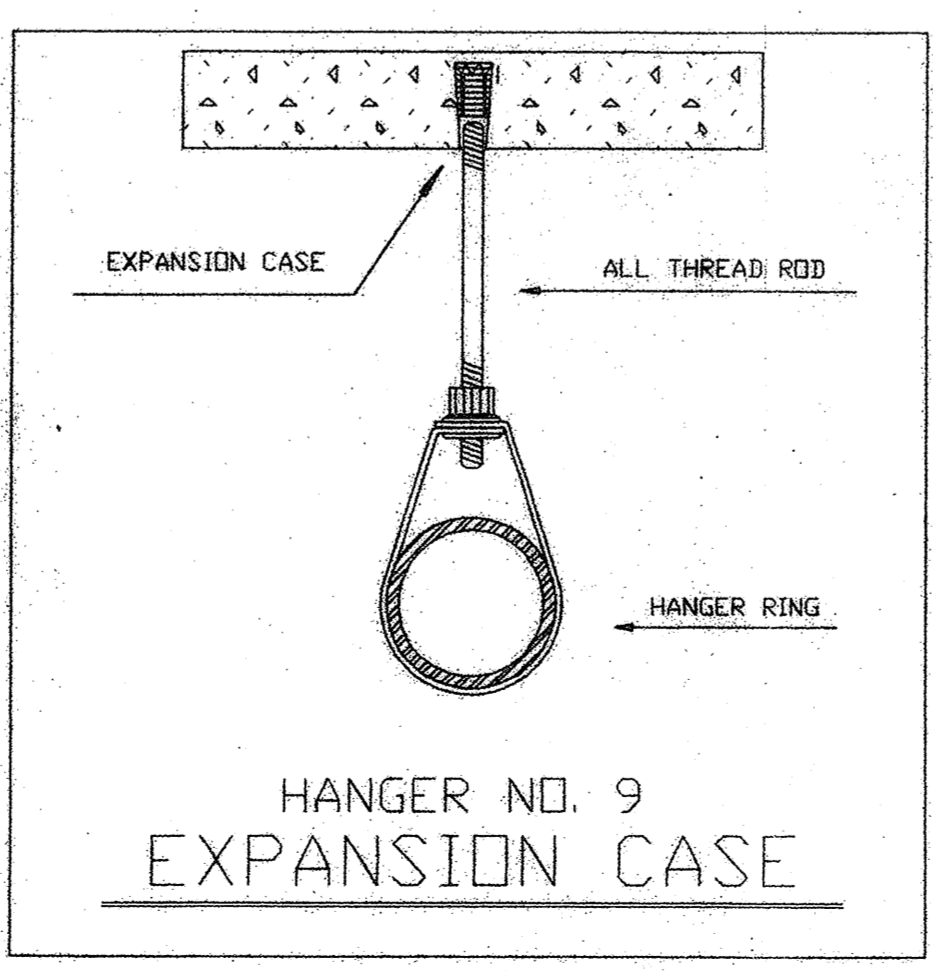
### OVERHEAD FIRE PROTECTION

SCALE: 1/8" = 1'-0" North

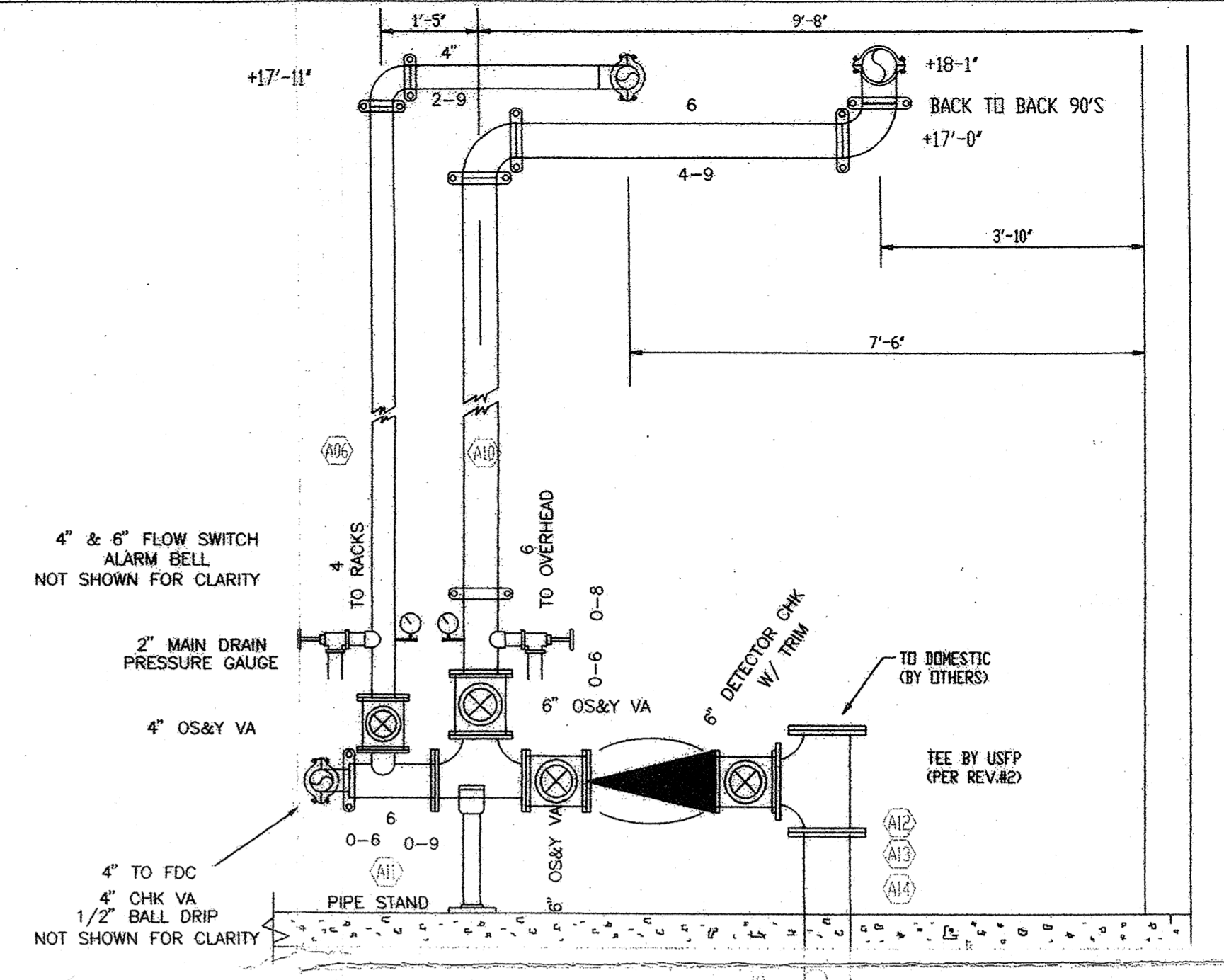


### MEZZANINE PLAN

1/8" = 1'-0" North



Pipe hangers shall be installed as required by NFPA for supporting sprinkler piping. No other piping and/or devices are to be attached to the sprinkler pipe hanger system unless the hanger has been specifically designed for the additional loading. THIS CONTRACT DOES NOT INCLUDE ANY MATERIAL OR DEVICE TO IMPROVE THE STRUCTURAL STRENGTH OF THE BUILDING TO ENABLE IT TO CARRY THE LOAD OF THE FIRE PROTECTION SYSTEM.



### RISER DETAIL

SCALE: 1/2" = 1'-0"

**PIPE MATERIALS**  
 All pipe to be black steel, with black cast/malleable iron fittings with joints as per NFPA. Pipe shall be as per the following schedule- (unless noted otherwise)  
 Line Piping - Schedule 40 Standard wall  
 X-Main Piping - Schedule 10 Thinwall  
 Bulk Main Piping - Schedule 10 Thinwall  
 Riser Piping - Schedule 10 Thinwall

### GENERAL NOTES & SYMBOLS

- SYMBOL DESCRIPTION**
- 286 Deg. F. 17/32" Orifice Brass Upright Sprinkler Head
  - Approximate Hanger Location
  - +0-0 Elevation from Floor to Centerline of Pipe
  - 0 Elevation down from Deck to Centerline of Pipe
  - ① Hydraulic Reference Point

#### SYSTEM DESIGN

##### DRUM STORAGE ROOM

Sprinkler system to be wet and hydraulically calculated. Piping is sized as per NFPA 30 Flammable Liquids / Rack Storage. Class IB Liquid maximum height of 19.5 Ft. The design density is 25 / 5000. Total combined inside and outside hose demands of 750 GPM has been allowed for in hyd. calculations. Maximum sprinkler head spacing - 100 Square Ft.

##### PROCESS ROOM

Sprinkler system to be wet and hydraulically calculated. Piping is sized as per NFPA 13 Extra Hazard II. The design density is 40 / 2500. Total combined inside and outside hose demands of 750 GPM has been allowed for in hyd. calculations. Maximum sprinkler head spacing - 100 Square Ft.

##### WATER SUPPLY

STATIC 76 PSI  
 RESIDUAL 56 PSI  
 FLOW 2930 GPM  
 LOCATION HYDRANT IN FRONT OF BUILDING

REVISIONS	SYMBOL	SIZE	MODEL	MAKE	FINISH	STYLE	TEMP	K-FACTOR	TOTAL
3	○	17/32"	CENTRAL	GB	BRASS	UPRIGHT	286	8.0	82
2	○	1/2"	CENTRAL	GB	BRASS	UPRIGHT	286	5.6	52
1	●	1/2"	CENTRAL	GB	BRASS	HSW	286	5.6	2
2	○	1/2"	CENTRAL	GB	CHROME	PENDENT	165	5.6	3

TOTAL SPRINKLERS SHOWN ON THIS SHEET  
 TOTAL SPRINKLERS REQUIRED ON THIS CONTRACT

### OVERHEAD FIRE PROTECTION

PROJECT  
 THE MILSOLV COMPANIES  
 N59W14765 BOBOLINK AVE  
 MENOMONEE FALLS, WISCONSIN

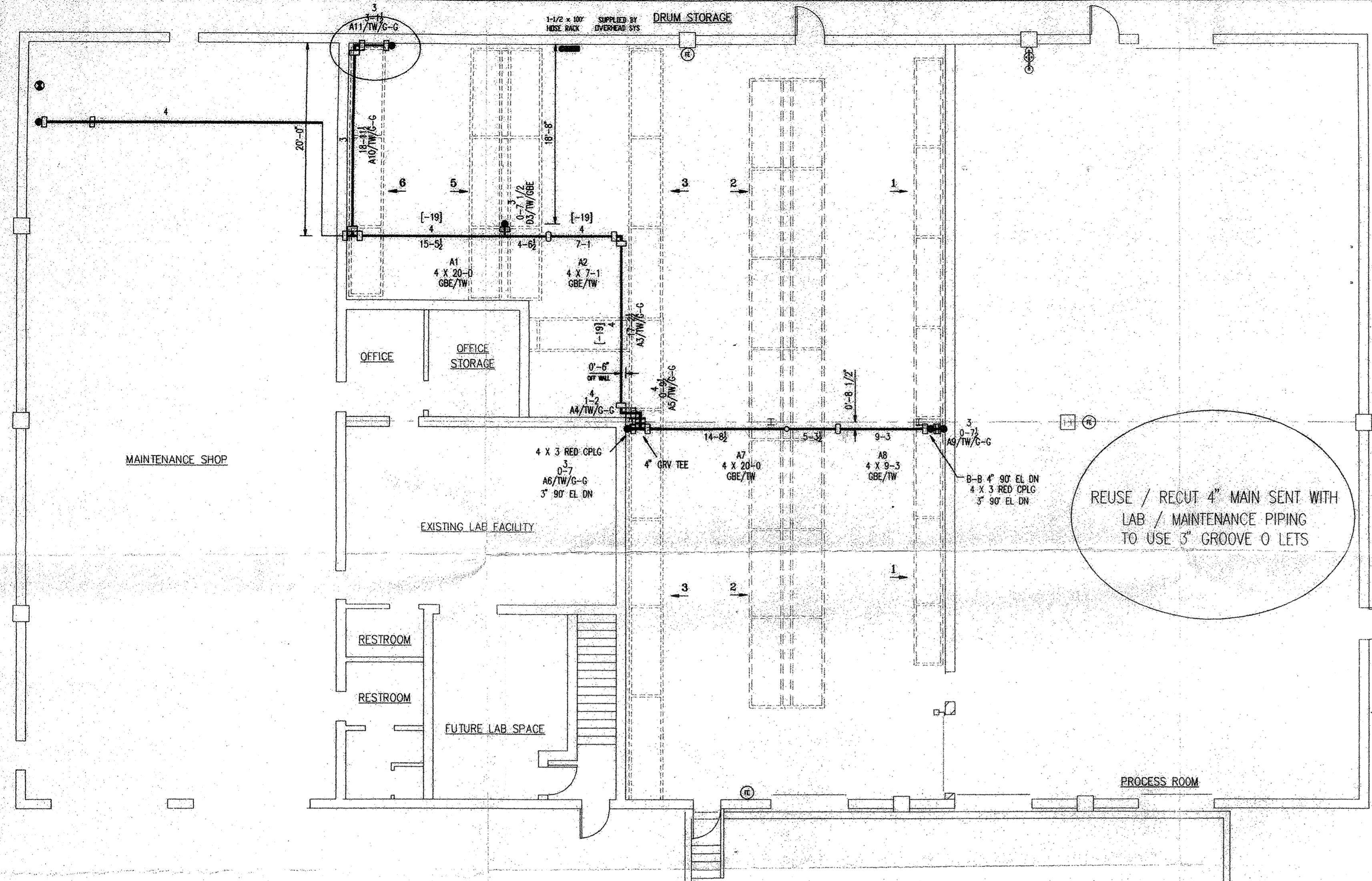
### UNITED STATES FIRE PROTECTION

1750 W LIBERTY LA NEW BRUN. WI 53146

Review Agency:  
 Date: 09-22-1993  
 Scale: 1/8" = 1'-0"  
 Job No. 7152  
 Drawn By JJP  
 Sheet No. 1 OF 2







### RACK FIRE PROTECTION

SCALE: 1/8" = 1'-0" North

Rack Sprinklers to be 165 Deg. F. 1/2" Orifice Brass Pendent Sprinkler Head with Shield

FE DENOTES FIRE EXTINGUISHER  
EXTINGUISHER TO BE A MINIMUM OF  
20B DRY CHEMICAL FIRE EXTINGUISHER

#### PIPE MATERIALS

All pipe to be black steel with black cast/malleable iron fittings with joints as per NFPA.  
Pipe shall be as per the following schedule- (unless noted otherwise)  
Line Piping - Schedule 40 Standard wall  
X-Main Piping - Schedule 10 Thinwall  
Bulk Main Piping - Schedule 10 Thinwall  
Riser Piping - Schedule 10 Thinwall

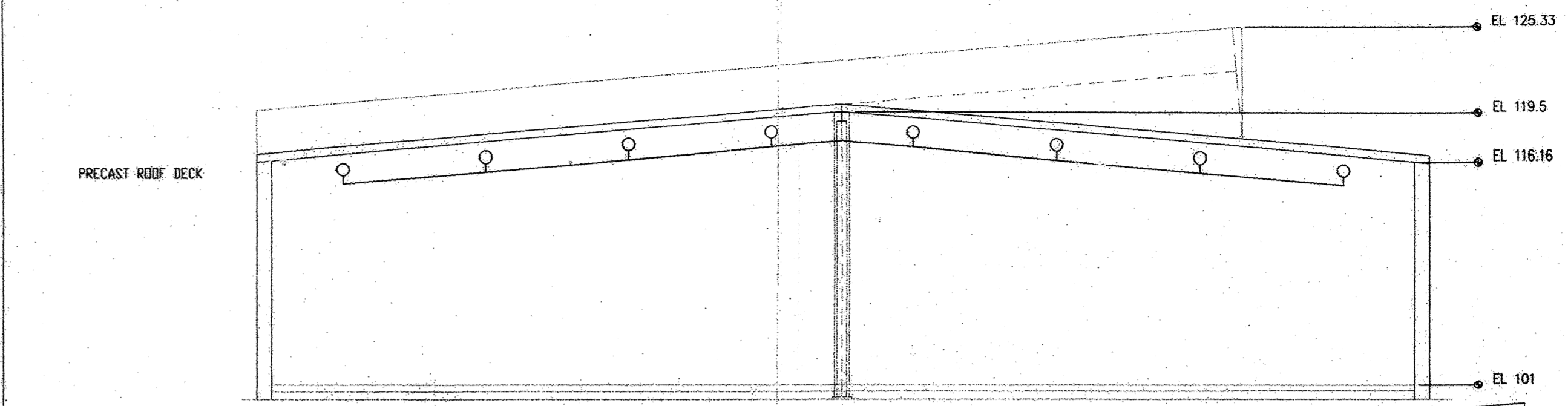
#### SYSTEM DESIGN

##### RACK SYSTEM

Sprinkler system to be wet and hydraulically calculated.  
Piping is sized as per NFPA 30 Flammable Liquids with an end head pressure of 30 psi  
Sprinkler heads to be spaced at 8'-0" max. horizontally  
One line of sprinklers above each tier of storage  
Sprinklers located in longitudinal flue space, staggered vertically  
Shields required with multi-levels  
Total combined inside and outside hose demands of 750 GPM has been allowed for in hyd. calculations.  
Rack system is balanced with Overhead system

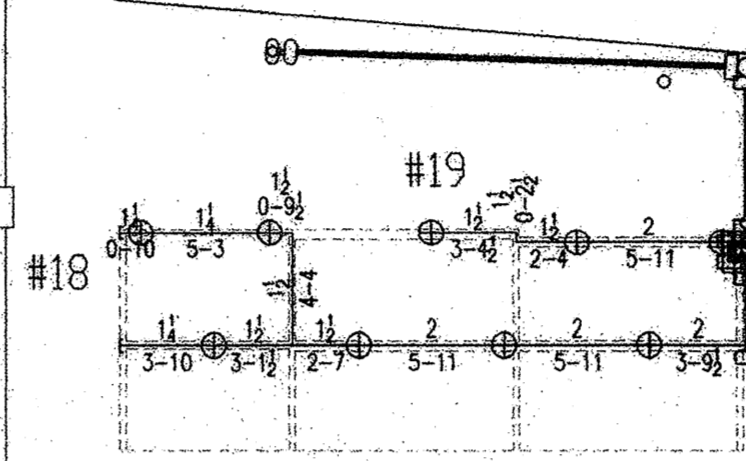
##### WATER SUPPLY

Static 76 psi  
Residual 56 psi  
Flow 2930 gpm  
Location Hydrant in front of building



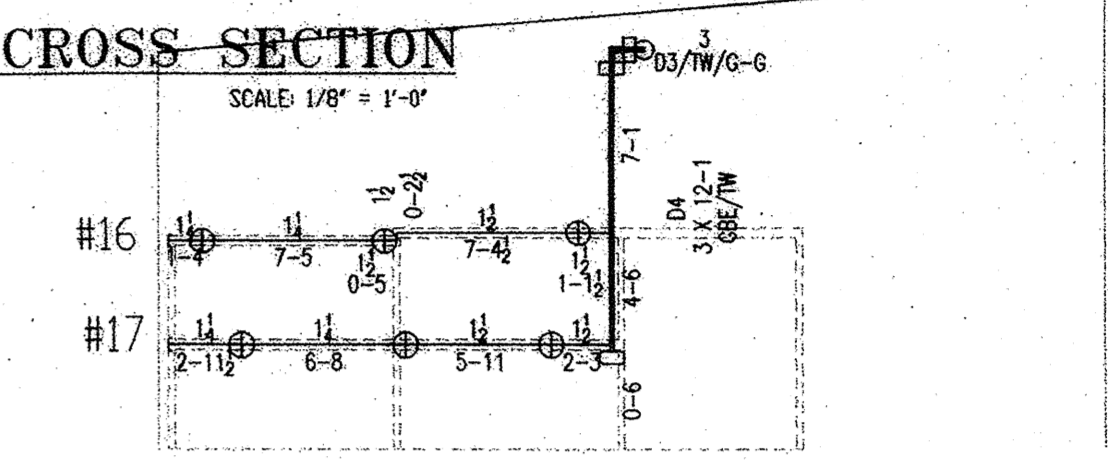
#### BUILDING CROSS SECTION

SCALE: 1/8" = 1'-0"



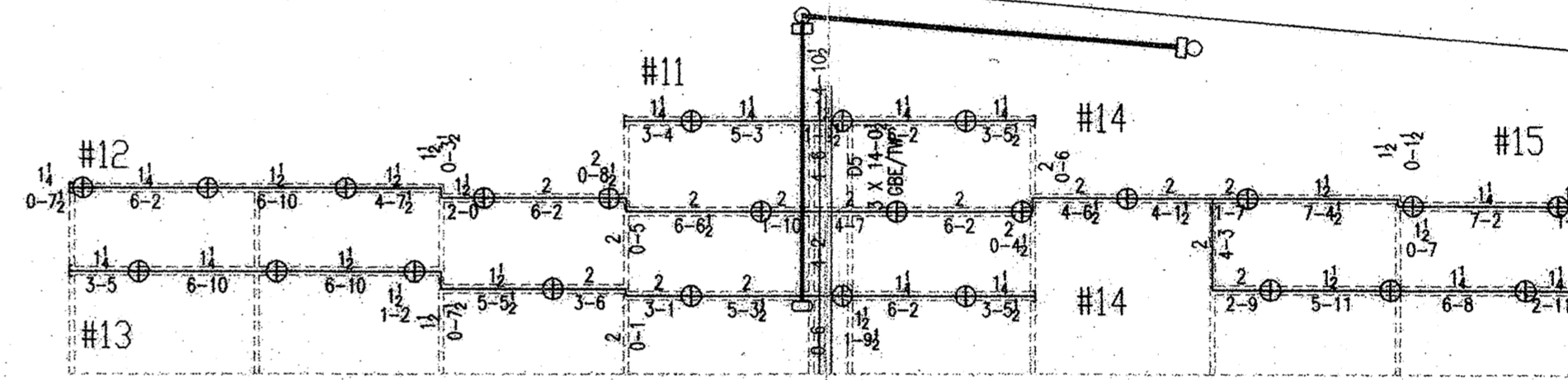
#### RACK 6 CROSS SECTION

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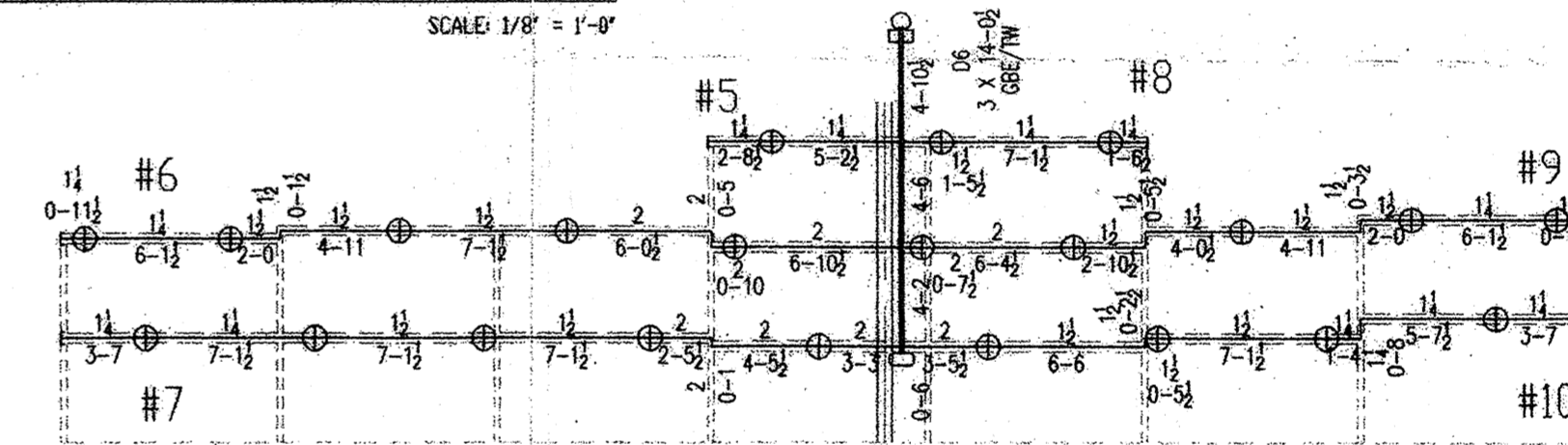
#### RACK 5 CROSS SECTION

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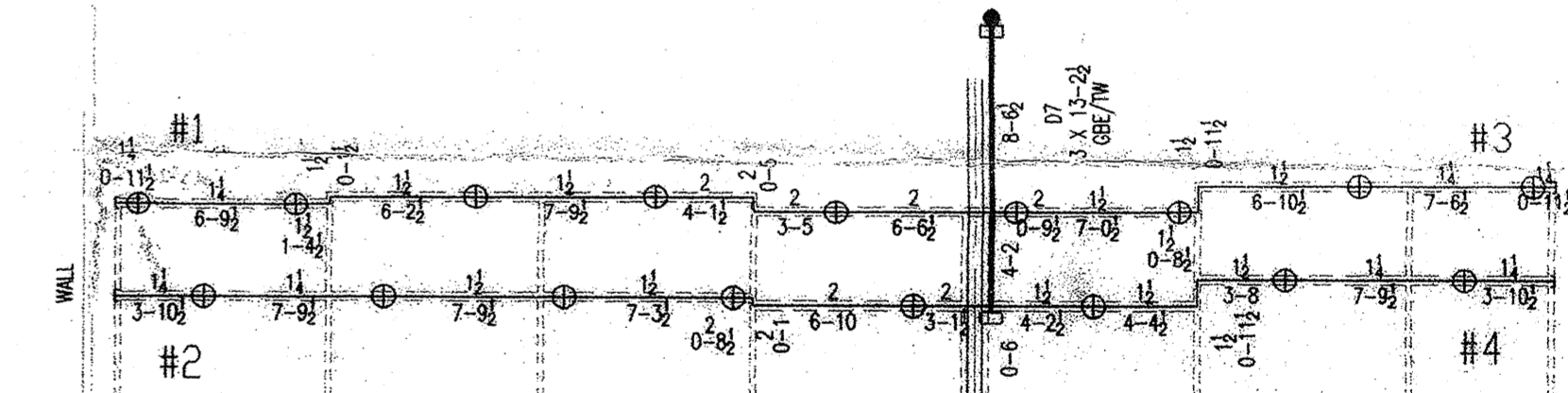
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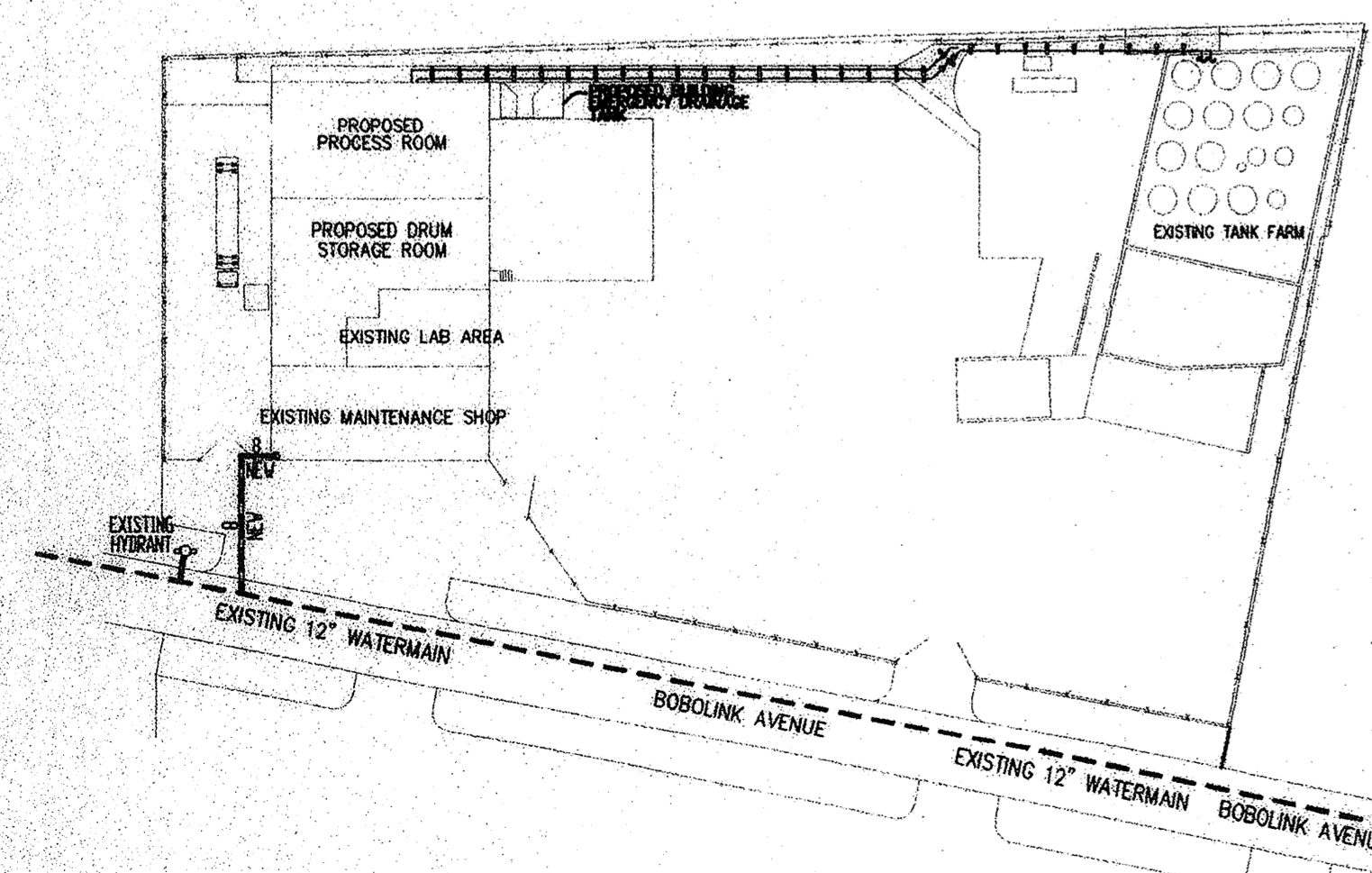
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SCALE: 1/8" = 1'-0"



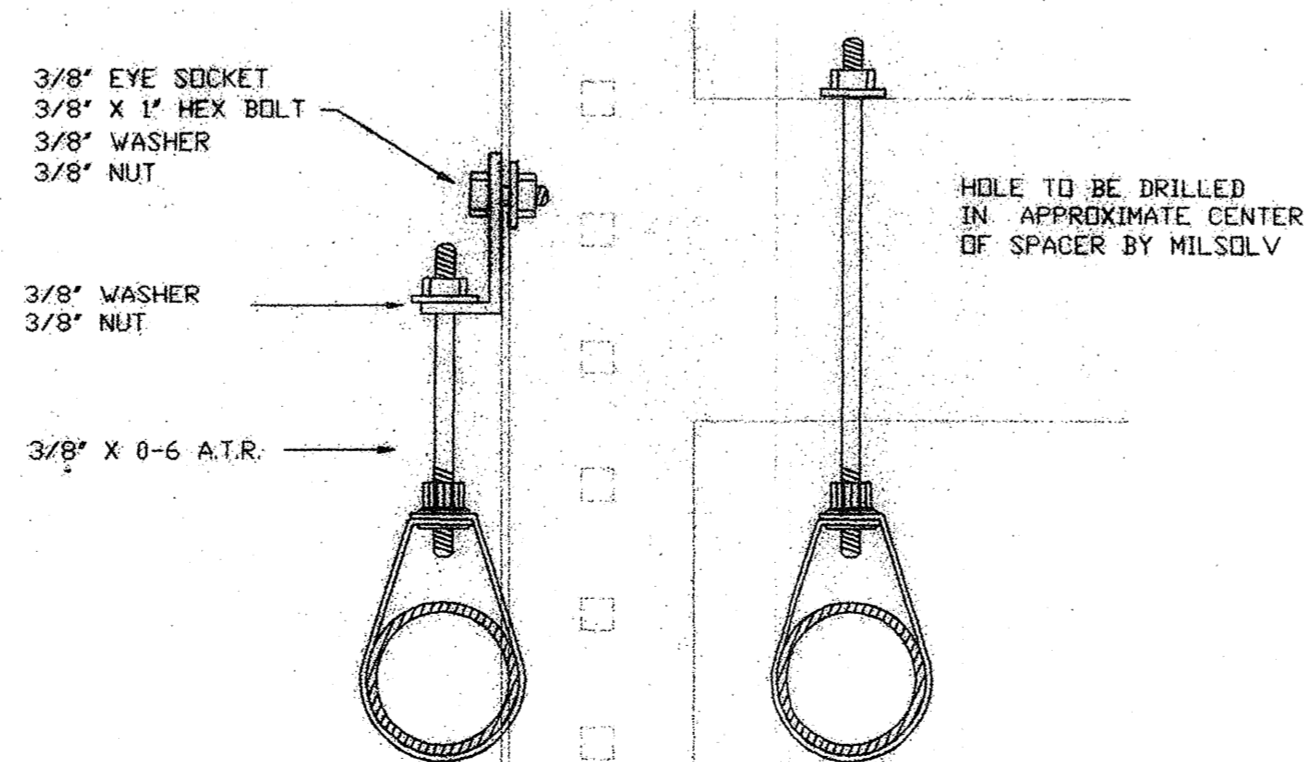
#### RACK 1 CROSS SECTION

SCALE: 1/8" = 1'-0"



### SITE PLAN

SCALE: 1" = 80'-0"



REVISIONS		SPRINKLER SYMBOL DESCRIPTION								
		SYMBOL	SIZE	MODEL	MAKE	FINISH	STYLE	TEMP	K-FACTOR	TOTAL
2	STOCKLIST RACKS 12-29-93	○	1/2	CENTRAL	RACK	BRASS	PENDENT	165	5.6	79
1	SPRINKLER LAB AREA 12-7-93									
TOTAL SPRINKLERS SHOWN ON THIS SHEET										79
TOTAL SPRINKLERS REQUIRED ON THIS CONTRACT										216

### RACK FIRE PROTECTION GENERAL NOTES & DETAILS

PROJECT  
THE MILSOLV COMPANIES  
N59 W14765 BOBOLINK AVE  
MEMONOE FALLS, WISCONSIN

UNITED STATES FIRE PROTECTION  
17750 W. LIBERTY LA. NEW BERLIN, WI 53146  
(414) 782-3311

Review Agency:  
Date: 09-22-1993  
Scale: 1/8" = 1'-0"  
Job No. 7152  
Drawn By JP  
Sheet No. FP-2 OF 2





1. SCOPE

- 1.1 FURNISH ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND SUPERVISION TO PERFORM ALL OPERATIONS NECESSARY FOR ELECTRICAL WORK, ELECTRICAL EQUIPMENT, GUIDEWAYS, AND ELECTRICAL HEAT TRACING WORK SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN, SUBJECT TO THE REQUIREMENTS OF THE BIDDING AND CONTRACT DOCUMENTS. THE LABOR NECESSARY TO ASSIST IN PUTTING ANY PIECE OF EQUIPMENT IN OPERATION SHALL BE INCLUDED AS PART OF THE WORK.
- 1.2 WHERE ELECTRICAL CONNECTIONS ARE REQUIRED FOR ITEMS OF PROCESS EQUIPMENT, THEY SHALL BE PROVIDED UNDER THIS SPECIFICATION. IN SOME INSTANCES, EQUIPMENT WILL BE PROVIDED BY OTHERS WITH CERTAIN PORTIONS OF THE ELECTRICAL CONNECTIONS COMPLETED BY THIS CONTRACTOR. ASSEMBLE AND/OR INSTALL ALL COMPONENT PARTS REQUIRED TO MAKE THE EQUIPMENT A COMPLETE AND OPERABLE UNIT.
- 1.3 PERFORM ALL NECESSARY TESTS AND MAKE ALL REQUIRED ADJUSTMENTS TO ASSURE PROPER OPERATION OF ALL EQUIPMENT INSTALLED UNDER THIS SPECIFICATION.
- 1.4 IT IS INTENDED THAT THESE SPECIFICATIONS AND DRAWINGS INCLUDE EVERYTHING REQUISITE AND NECESSARY TO COMPLETE THE ENTIRE WORK PROPERLY, NOTWITHSTANDING THE FACT THAT EVERY ITEM INVOLVED MAY NOT BE SPECIFICALLY MENTIONED.

2. GENERAL REQUIREMENTS

- 2.1 THE INSTALLATION SHALL COMPLY WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT, THE WISCONSIN BUILDING CODE, THE NATIONAL ELECTRICAL SAFETY CODE, AND THE NATIONAL ELECTRICAL CODE.
- 2.2 ALL EQUIPMENT AND MATERIALS SHALL BE NEW, UNLESS, AND MANUFACTURED IN ACCORDANCE WITH THE FOLLOWING STANDARDS, WHERE APPLICABLE:  
 INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)  
 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)  
 NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)  
 INSULATED POWER CABLE ENGINEERS ASSOCIATION (IPCEA)  
 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)  
 NATIONAL ELECTRIC CODE (NEC)
- 2.3 ALL EQUIPMENT AND MATERIAL IF OF THE TYPE TESTED BY THE UNDERWRITER'S LABORATORIES AND/OR ELECTRICAL TESTING LABORATORIES, INC. SHALL BEAR THEIR LABEL AND SHALL BE USED OR INSTALLED IN ACCORDANCE WITH ANY INSTRUCTIONS INCLUDED IN THE LISTINGS BY THE LABORATORY.
- 2.4 ALL EQUIPMENT, DEVICES, MATERIAL, ETC. OF A GIVEN KIND OR TYPE SHALL BE OF THE SAME MANUFACTURER, AND IF NOT SPECIFIED EITHER IN THE SPECIFICATIONS OR ON THE DRAWINGS, MUST BE REVIEWED BY THE ENGINEER BEFORE ITS USE.
- 2.5 NO CHANGES IN CONTROL CIRCUITS, PANEL ARRANGEMENTS, OR EQUIPMENT LOCATION SHALL BE MADE WITHOUT PRIOR WRITTEN CONSENT OF THE ENGINEER.
- 2.6 THE CONTRACTOR'S REPRESENTATIVE SHALL VISIT THE JOB-SITE ACCOMPANIED BY THE ENGINEER IN ORDER TO THOROUGHLY FAMILIARIZE HIMSELF WITH THE CONDITIONS UNDER WHICH INSTALLATION OF EQUIPMENT AND WIRING ARE TO BE MADE.
- 2.7 ALL WORK SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER. ANY CUTTING OF CONSTRUCTION AND REPAIR OF SAME SHALL BE INCLUDED AS WORK IN THIS SECTION AND SHALL BE ACCOMPLISHED BY THE PROPER TRADE. NO STRUCTURAL SUPPORTING MEMBERS SHALL BE CUT OR DRILLED WITHOUT APPROVAL OF THE ENGINEER. HOLES SHALL BE MADE IN STEEL PLATES OR MEMBERS WITH A CUTTING TORCH. HOLES THROUGH CONCRETE AND MASONRY SHALL BE DRILLED WITH A CORE DRILLING MACHINE WHICH CUTS A SMOOTH ROUND HOLE OVERCUT SHALL BE CAULKED OR GROUTED.
- 2.8 ANCHOR BOLTS, FLOOR CHANNELS, INSERTS, SLEEVES AND THE LIKE, WHICH ARE REQUIRED FOR INSTALLATION OF ELECTRICAL EQUIPMENT OR MATERIAL AND WHICH MUST BE BUILT INTO OR INSTALLED INTO CONCRETE OR MASONRY, SHALL BE SUPPLIED. LOCATION OF THESE DEVICES SHALL BE FIELD VERIFIED AND SUCH VERIFICATION SHALL BE INCLUDED AS WORK UNDER THIS SPECIFICATION. ALL NECESSARY BRACKETS, RODS, HANGERS AND THE LIKE, SHALL BE FURNISHED AND INSTALLED AS PART OF THIS WORK. PENETRATIONS OF BUILDING ELEMENTS FOR ELECTRICAL WORK SHALL BE INCLUDED AND SHALL BE IN ACCORDANCE WITH THE APPLICABLE CODES. ANY AUXILIARY STEEL NECESSARY TO EXTEND OR BRIDGE BETWEEN COMPONENTS OF THE BUILDING STRUCTURE SHALL ALSO BE PROVIDED UNDER THIS SPECIFICATION.
- 2.9 STORAGE OF MATERIALS AND EQUIPMENT  
 2.9.1 MATERIALS AND EQUIPMENT SHALL BE DELIVERED TO THE SITE AND STORED IN THE ORIGINAL SHIPPING CARTONS AT PRE-ARRANGED LOCATIONS. THEY SHALL BE SHELTERED FROM THE ELEMENTS AND COVERED FOR PROTECTION AGAINST ABUSE, ACCIDENTAL DAMAGE, VANDALISM, AND THEFT. STORED MATERIALS AND EQUIPMENT SHALL BE READILY ACCESSIBLE FOR INSPECTION.  
 2.9.2 ADDITIONALLY, TAKE SPECIAL PRECAUTIONS TO PROTECT STORED AND INSTALLED MATERIALS SUBJECT TO MOISTURE DAMAGE. SUCH EQUIPMENT SHALL BE STORED IN HEATED AND VENTILATED LOCATIONS OR ARRANGED TO BE KEPT AT ELEVATED TEMPERATURES.  
 2.9.3 THE ELECTRICAL CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR EQUIPMENT JUDGED UNACCEPTABLE DUE TO HIS FAILURE TO COMPLY WITH THESE REQUIREMENTS.
- 2.10 CLEANING AND PAINTING  
 2.10.1 UPON COMPLETION OF THE WORK, ALL ELECTRICAL APPARATUS SHALL BE CLEANED OF DUST AND DEBRIS SUCH THAT THE FINAL CONDITION SHALL BE ACCEPTABLE TO THE ENGINEER AND OWNER.  
 2.10.2 WHERE PAINTED SURFACES OF THE EQUIPMENT HAVE BEEN ABUSED OR RUINED DURING CONSTRUCTION, THE ELECTRICAL OR SURROUNDING FINISH.

3. CONTRACT DRAWINGS

- 3.1 THE WORK SHALL BE IN ACCORDANCE WITH THE DRAWINGS AS NECESSARY TO OBTAIN A COMPLETELY SATISFACTORY AND OPERABLE INSTALLATION. DRAWINGS PERTAINING TO OTHER TRADES SHALL BE REVIEWED AND WORK SHALL BE COORDINATED TO PREVENT PHYSICAL INTERFERENCES.

4. SYSTEM VOLTAGES

THE VOLTAGES OF THE VARIOUS PORTIONS OF THE ELECTRICAL SYSTEM ARE AS FOLLOWS:  
 POWER UTILIZATION: 480-VOLT, THREE-PHASE, THREE WIRE, 60-HERTZ  
 CONVENIENCE RECEPTACLES AND LIGHTING: 200/120-VOLT, THREE-PHASE, FOUR-WIRE  
 GROUND CONTROL CIRCUITS: 120-VOLT, A.C., ONE PHASE

5. SHOP DRAWINGS

SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL LIGHTING FIXTURES, RECEPTACLES, WIRING DEVICES, AND SPECIALLY FABRICATED JUNCTION BOXES AND PULL BOXES. SHOP DRAWINGS SHALL BE SUBMITTED ON ALL EQUIPMENT FURNISHED UNDER THE ELECTRICAL EQUIPMENT LIST AND SHALL INCLUDE COMPLETE WIRING DIAGRAMS OF THE CONTROL PANELS AND SPECIALLY-FABRICATED ELECTRICAL EQUIPMENT.  
 DEMOLITION: IN THE AREAS OF THE EXISTING BUILDING WHICH WILL BE CLASSIFIED CLASS 1 OR CLASS 2 HAZARDOUS LOCATIONS, ALL ELECTRICAL EQUIPMENT NOT MEETING THE NEC HAZARDOUS LOCATION REQUIREMENTS, SHALL BE RELOCATED TO A NON-HAZARDOUS AREA OR SHALL BE DISCONNECTED AND REMOVED FROM SERVICE. ELECTRICAL EQUIPMENT SHALL INCLUDE WIRE AND CONDUIT SWITCHES, RECEPTACLES, CONTROL PANELS, MOTOR STARTERS, POWER AND LIGHTING DISTRIBUTION PANELS, LIGHTING FIXTURES WHICH INCLUDE EXIT LIGHTS, EMERGENCY LIGHTS AND PORTABLE LIGHTS AND ANY OTHER EQUIPMENT WHICH CAN GENERATE SUFFICIENT SURFACE TEM OR A SPARK OF SUFFICIENT ENERGY TO IGNITE FLAMMABLE VAPORS AND DUSTS. CAUTION: TELEPHONE CABLES LOCATED AT THE EAST EXIT AREA ARE NOT TO BE DISTURBED OR REMOVED. THIS IS THE RESPONSIBILITY OF MISLEAD TELEPHONE PERSONNEL.

6. SUBSTITUTION

SEE GENERAL CONDITION OF CONTRACT DOCUMENTS FOR PROCEDURE FOR SUBSTITUTION OF MATERIAL, EQUIPMENT, AND DEVICES WHICH ARE MANUFACTURED BY A COMPANY OTHER THAN THAT INDICATED ON THE DRAWINGS OR IN THE SPECIFICATIONS, INCLUDING ITEMS IN THE 'ELECTRICAL EQUIPMENT LIST'. ALL BID PRICES SHALL BE BASED ON ELECTRICAL EQUIPMENT AS SPECIFIED IN THE ELECTRICAL EQUIPMENT LIST.

7. HAZARDOUS AREAS

THE DRAWINGS DO NOT SHOW 'SEALING FITTINGS' OR OTHER 'CODE REQUIREMENTS FOR ELECTRICAL INSTALLATION' IN HAZARDOUS AREAS. ALL MATERIAL AND EQUIPMENT SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF NEC.

8. MOTORS

ALL MOTORS WILL BE FURNISHED WITH THE EQUIPMENT BEING DRIVEN, COMPLETE WITH MOUNTING BASES, SHAFT COUPLINGS, PULLEYS, ETC. MOTORS SHALL BE SET AND ALIGNED, OR ASSISTANCE SHALL BE GIVEN IN SETTING AND ALIGNING, AS REQUIRED. ROTATION OF ALL MOTORS SHALL BE CHECKED AND CORRECTED. ROTATION CHECK OF ALL MOTORS SHALL BE WITNESSED BY THE ENGINEER. OBTAIN SIGNATURE OF WITNESSING ENGINEER. MOTOR ROTATION SHALL BE CHECKED WITH COUPLING REMOVED AND

10. CONDUIT WORK

- 10.1 ALL CONDUIT SHALL BE HOT-DIPPED GALVANIZED OR SPHEROIDIZED STEEL, SIZES SHOWN ON DRAWINGS. WHERE SIZE IS NOT SHOWN, CONDUITS SHALL BE SIZED FOR 30% OR LESS FULL RIGID HEAVY WALL OR INTERMEDIATE GRADE CONDUIT SHALL BE USED IN ALL CLASS 1 HAZARDOUS LOCATIONS. CONDUIT SHALL BE MANUFACTURED BY REPUBLIC STEEL, NATIONAL ELECTRIC PRODUCTS, YOUNGSTOWN, TRIANGLE, OR ALLED.
- 10.2 CONDUIT FITTINGS SHALL BE GUB TYPE WITH THREADED NUTS, AND SOLID DIE RESISTANT SYNTHETIC RUBBER GASKETS. NO HOLES SHALL BE DRILLED IN THE CONDUIT FITTINGS FOR MOUNTING PURPOSES. ALL CONDUIT FITTINGS SHALL BE INSTALLED WITH THE OPENING AT THE BOTTOM WHERE POSSIBLE. CONDUIT FITTINGS SHALL NOT BE INSTALLED WITH THE OPENING ON TOP. FITTINGS SHALL BE MANUFACTURED BY APPLETON OR CROUSE-HINDS. PULLING ELBOWS SHALL NOT BE USED IN NON-HAZARDOUS AREAS. ALL TYPE FD AND FS BOXES SHALL HAVE EXTERNAL MOUNTING LUGS. ELECTRICAL METALLIC TUBING INSTALLATIONS SHALL UTILIZE COMPRESSION TYPE FITTINGS. SET-SCREW TYPE FITTINGS SHALL NOT BE USED.
- 10.3 FOR FLEXIBLE CONNECTIONS IN HAZARDOUS AREAS, USE TYPE ECLX FLEXIBLE CONDUIT.
- 10.4 CONDUIT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE AND THE FOLLOWING:  
 10.4.1 CONDUIT SHALL BE PROPERLY SECURED IN PLACE WITH APPROVED FASTENERS. WOODEN PLUGS INSERTED IN MASONRY OR CONCRETE SHALL NOT BE USED AS A BASE TO SECURE CONDUIT. CONDUIT FASTENERS SHALL BE SECURED BY TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHELDS IN CONCRETE OR BRICK, MACHINE SCREWS AND NUTS ON METAL SURFACES, AND WOOD SCREWS ON WOOD CONSTRUCTION. GALVANIZED ONE HOLE MALLEABLE IRON CONDUIT SHALL BE CLAMPS WITH BACKS SHALL BE USED FOR ALL CONTACT WITH BUILDING SURFACE. ANGLE IRON BACKS OR APPROVED EQUAL SHALL BE PROVIDED FOR ALL MULTIPLE CONDUIT RUNS. THE RACKS SHALL BE OF WELDED CONSTRUCTION AND SHALL UTILIZE ANGLE IRON SUPPORTS OR EQUIVALENT (AND ROSS PERMITTED) SECURELY ANCHORED TO THE BUILDING STRUCTURE OR WELDED TO BUILDING STEEL. WELDS TO BUILDING STEEL SHALL BE PARALLEL TO THE WEB. IF USED, ANGLE IRON SHALL BE SIZED AS REQUIRED, 2 X 2 X 3/16 MINIMUM. RACKS SHALL PROVIDE A MINIMUM OF 2 PERCENT SPARE CAPACITY FOR FUTURE CONDUITS. CONDUITS INSTALLED ON RACKS SHALL BE ANCHORED WITH CONDUIT CLAMPS. RACKS SHALL BE PAINTED WITH A PRIMER COAT BEFORE CONDUITS ARE INSTALLED.  
 10.4.2 ALL HORIZONTAL EXPOSED CONDUIT RUNS SHALL BE LEVEL, STRAIGHT, AND PARALLEL TO WALLS AND FLOORS. ALL VERTICAL CONDUIT RUNS SHALL BE PLUMB. OPEN CONDUIT SHALL BE SEALED WITH CONDUIT CLOSURES DURING COURSE OF CONSTRUCTION. ALL FIELD CUT THREADS ON CONDUIT TO BE INSTALLED OUTDOORS, UNDERGROUND, OR IN WASHDOWN AREAS SHALL BE GIVEN A COAT OF THOMAS AND BETTS NYR-9 SHIELD BEFORE ASSEMBLY.  
 10.4.3 WHERE CONDUIT PASSES BETWEEN AREAS SUBJECT TO DIFFERENT TEMPERATURES, THE CONDUIT SHALL BE SEALED TO PREVENT INTERFERENCE OF AIR AND THE FORMATION OF CONDENSATION. THIS SHALL BE DONE BY USE OF A CONDUIT FITTING AND GASKET OR OTHER APPROVED REMOVABLE MASTIC MATERIAL.  
 10.4.4 CONDUIT TERMINATIONS SHALL BE MADE WITH TWO LOCKNUTS AND A BUSHING. ALL BUSHINGS SHALL BE BUCHANAN 'BUSHHEAD' OR OZ TYPE B INSULATED METALLIC CONDUIT BUSHINGS.  
 10.4.5 ALL CONDUIT CONNECTIONS TO NEMA 12 OR OIL-TIGHT ENCLOSURES AND MOTOR CONTROL CENTERS SHALL BE MADE USING MYERS OR RED DOT HUBS.  
 10.4.6 CONDUITS SHALL NOT BE SECURED TO OR COME IN CONTACT WITH PIPES. PIPE FLANGE BOLTS AND EQUIPMENT BOLTS SHALL NOT BE USED TO ANCHOR CONDUITS OR CONDUIT SUPPORTS. CONDUITS SHALL NOT BE SUPPORTED BY PIPING OR OTHER CONDUITS. CONDUITS SHALL CLEAR HEATED SURFACES, HEATED PIPES, AND INSULATION BY AT LEAST SIX INCHES.  
 10.4.7 EXPANSION FITTINGS SHALL BE INSTALLED ACROSS EXPANSION JOINTS IN STRUCTURES AND CONCRETE CONSTRUCTION WHERE SUCH JOINTS ARE SHOWN ON THE ARCHITECTURAL AND STRUCTURAL DRAWINGS, OR AS REVIEWED BY THE ENGINEER.  
 10.4.8 SPARE CONDUITS OR THOSE INDICATED FOR 'FUTURE' USE SHALL BE CLOSED BY THREADED PLUGS OR CAPS.  
 10.4.9 ALL RACEWAY SYSTEMS SHALL BE CLEANED OF DEBRIS AND MOISTURE PRIOR TO INSTALLING ELECTRICAL CONDUCTORS.

11. BOXES AND ENCLOSURES

- 11.1 JUNCTION BOXES, PULL BOXES, AND TERMINAL BOXES SHALL BE PROVIDED WHERE INDICATED ON THE DRAWINGS. BOX SIZES SHALL BE AS INDICATED ON THE DRAWINGS. ALL BOXES SHALL CONFORM TO THE NEMA TYPE DESIGNATION FOR THE AREA IN WHICH THEY ARE INSTALLED. BOXES SHALL BE ACCURATELY SET AND SECURELY HELD IN PLACE. CONSENT OF THE ENGINEER MUST BE SECURED BEFORE PLACING ANY BOXES NOT SHOWN ON THE DRAWINGS.
- 11.2 IN NEMA TYPE 12 DESIGNATED AREAS, BOXES 10" X 10" X 6" AND SMALLER SHALL BE STEEL JIC OIL-TIGHT DUSTPROOF ENCLOSURES WITH LIFT-OFF HINGED COVER AND CHAIN. LARGER BOXES SHALL BE STEEL NEMA TYPE 12 ENCLOSURES. BOXES SHALL BE HOFFMAN BULLETH A-12 OR BULLETH A-SI TYPE LP, OR AMFCO, B-LINE, BOSS OR COLUMBIA EQUIVALENTS.
- 11.3 IN HAZARDOUS AREAS REQUIRING INSTALLATION COMPLIANCE WITH CLASS 1, DIVISION 2 REQUIREMENTS, BOXES SHALL BE CROUSE-HINDS OR APPLETON ELECTRIC COMPANY TYPE GUB OR EUG.
- 11.4 CAST BOXES SHALL BE MALLEABLE OR GRAY IRON, CAST BODY AND COVER WITHOUT HUB BUT WITH BOSS FOR DRILLING, GASKETED COVER AND EXTERNAL MOUNTING LUGS, MANUFACTURED BY APPLETON OR CROUSE-HINDS. ALL BOXES TO BE DRILLED AND TAPPED, AS NECESSARY, IN THE FIELD PER CODE REQUIREMENTS.

12. RACK AND SUPPORTS

- 12.1 RACKS AND SUPPORTS FOR CONTROL PANELS, STARTERS, CONTROL STATIONS, ETC. SHALL BE FURNISHED AND INSTALLED AND SHALL BE CONSTRUCTED OF ANGLE IRON. ALL WALL-MOUNTED EQUIPMENT SHALL BE SUPPORTED BY STRUCTURAL CHANNEL, MOUNTED VERTICALLY, TO PROVIDE TWO-INCH MINIMUM SPACE BETWEEN THE EQUIPMENT AND THE WALL. 'SHUT-TYPE CHANNEL SHALL NOT BE INSTALLED UNLESS SPECIFICALLY SPECIFIED ON THE DRAWINGS. RACKS, EXCEPT THOSE CONSTRUCTED OF STAINLESS STEEL, SHALL BE PAINTED WITH A PRIMER COAT BEFORE EQUIPMENT IS MOUNTED. ANY SUBSEQUENT FIELD WELDS SHALL BE CLEANED AND PRIMED.

13. WIRE AND CABLE

- 13.1 WIRE AND CABLE SHALL BE FURNISHED AND INSTALLED UNDER THIS SPECIFICATION. CONDUCTORS SHALL BE STRANDED COPPER.  
 13.2 100-VOLT POWER WIRE AND CABLE  
 13.2.1 POWER WIRE AND CABLE FOR FEEDERS TO PANELS AND MOTOR CONTROL CENTERS SHALL BE 600-VOLT, TYPE THHN/THWN UNLESS SPECIFIED OTHERWISE.  
 13.2.2 WIRE WITHIN THREE INCHES OF AND WITHIN THE SAME ENCLOSURE AS A LIGHTING FIXTURE BALLAST SHALL BE TYPE E90.  
 13.2.3 WIRE FOR 208/120-VOLT CIRCUITS SHALL BE COLOR-CODED BLACK, RED, DARK BLUE, AND WHITE FOR PHASE A, B, C, AND NEUTRAL, RESPECTIVELY.  
 13.2.4 600-VOLT POWER WIRE AND CABLE SHALL BE AS MANUFACTURED BY OKONITE CO., GENERAL ELECTRIC COMPANY, SOUTHWIRE, OR ANACONDA CO.  
 13.3 CONTROL WIRE  
 13.3.1 CONTROL WIRE SHALL BE 600-VOLT TYPE THHN/THWN COLOR-CODED SEVEN STRAND MINIMUM, SINGLE CONDUCTOR AS INDICATED ON THE DRAWINGS. HOT WIRE: RED, FOREIGN VOLTAGE: YELLOW, NEUTRAL: WHITE WITH A RED STRIPE. DC-LIGHT BLUE.  
 13.3.2 THE MINIMUM BENDING RADIUS AND MAXIMUM PULLING PRESSURES AND TENSIONS OF LOW LEVEL, THE MULTICONDUCTOR SHIELDED OR UNSHIELDED CABLE SHALL NOT BE EXCEEDED.  
 13.3.3 THE CONTROL WIRE SHALL BE MANUFACTURED BY OKONITE CO., GENERAL ELECTRIC CO., SOUTHWIRE, OR ANACONDA CO. SHIELDED AND UNSHIELDED BY BELDEN OR EQUIVALENT.  
 13.4 SPLICES AND TERMINATIONS  
 13.4.1 POWER WIRE SHALL BE SPLICED AND TERMINATED USING TERMINAL LUGS, BRASS NUTS, BOLTS, AND WASHERS WITH FIVE LAYERS OF MINNESOTA MINING SCOTCH #88 INSULATING TAPE APPLIED. WIRE NUTS, SCOTCHLOCKS, AND SIMILAR DEVICES SHALL NOT BE USED. TERMINAL LUGS SHALL BE THOMAS & BETTS STA-RON OR AMP CRIMP-ON TYPE. MOTOR T LEADS SHALL BE BLACK.  
 13.4.2 CONTROL WIRE SHALL NOT BE SPLICED UNLESS A COMMON WIRE IS USED FOR SEVERAL SOLENOID, PRESSURE SWITCHES, ETC. THESE SPLICES SHALL BE MADE IN AN APPROPRIATE 'O' BOX.  
 13.5 MOTOR CONNECTIONS: TO ALL MOTORS, THE CONDUIT SHALL TERMINATE IN A CROUSE-HINDS OR APPLETON GUB SERIES CONDUIT FROM THERE TO THE MOTOR A DRIP LOOP SHALL BE FORMED WITH FLEXIBLE CONDUIT TYPE ECLX.  
 13.6 FIELD EQUIPMENT CONNECTIONS: FINAL CONNECTIONS OF FIELD EQUIPMENT HAVING LEADS (E.G. SOL ENOID COILS) SHALL BE MADE IN THE FOLLOWING MANNER: THE CONDUIT SHALL TERMINATE IN A GUB BOX. AN ECLX FLEXIBLE METAL SEALING FITTING CONDUIT SHALL JOIN THE GUB TO THE DEVICE. THE DEVICE LEADS SHALL BE SPLICED TO THE CONTROL WIRING IN AN OET BOX. THE RACEWAY LENGTH BETWEEN THE DEVICE AND THE OET BOX SHALL BE MADE SUFFICIENTLY SHORT TO ENSURE PROPER LEAD LENGTHS IN THE OET BOX FOR SPLICING. UNUSED HOLES SHALL BE CLOSED WITH PLUG FITTING. SPLICES IN SEALING FITTINGS ARE UNACCEPTABLE.  
 13.7 EACH END OF EACH CONDUCTOR SHALL BE MARKED WITH EITHER THE WIRE NUMBER OR TERMINAL NUMBER, AS SPECIFICALLY DESIGNATED ON THE DRAWINGS. PULL NUMBERS ARE NOT ACCEPTABLE. BRADY WIRE MARKERS SHALL BE USED.
- 13.8 WIRE AND CABLE TESTING  
 13.8.1 THE INSULATION RESISTANCE OF ALL FEEDERS FROM POWER, LIGHTING, AND CONTROL WIRING SHALL BE PROOF-TESTED BY DIRECT CURRENT OVERPOTENTIAL TESTING AFTER INSTALLATION AND BEFORE BEING ENERGIZED. TEST VOLTAGE AND PERIODS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.  
 13.8.2 A RECORD OF TESTS SHALL BE MAINTAINED AND PRESENTED TO THE ENGINEER UPON COMPLETION. ALL TESTS SHALL BE WITNESSED BY THE ENGINEER.

14. MOTOR CONTROL CENTERS

- 14.1 FURNISH AND INSTALL 600-VOLT MOTOR CONTROL CENTERS
- 14.2 THE MOTOR CONTROL CENTER SHALL BE FURNISHED AS SPECIFIED IN THE ELECTRICAL EQUIPMENT LIST AND THE ASSOCIATED 'ARRANGEMENT' DRAWINGS. UNIT WIRING SEQUENCE AND TERMINAL IDENTIFICATION SHALL CONFORM TO THE DRAWINGS.
- 14.3 INSTALLATION SHALL BE MADE IN ACCORDANCE WITH THE DRAWINGS, APPLICABLE CODES, AND THE MANUFACTURER'S INSTRUCTIONS.
- 14.4 MOTOR OVERLOAD HEATER ELEMENTS SHALL BE SIZED BASED ON ACTUAL INSTALLED MOTOR NAMEPLATE RIAL LOAD CURRENT AND MANUFACTURERS TABLES AND INSTRUCTIONS.

15. NAMEPLATES

- 15.1 ENGRAVED NAMEPLATES SHALL BE FURNISHED FOR ALL ITEMS SUCH AS MOTOR STARTERS, CONTROL PANELS, AND LIGHTING PANELS. NAMEPLATES SHALL BE THREE-PLY PHENOLIC OR WHITE MATERIAL WITH WHITE SURFACE AND BLACK INK. NAMEPLATES SHALL BE ATTACHED WITH FOUR DRIVE SCREWS, SECURING WITH ADHESIVES IS NOT ACCEPTABLE. WHERE APPLICABLE MOTOR STARTERS IN THE MCC, ALARM PMS & HVAC PMS WILL HAVE THE FOLLOWING CAUTION TAG AFFIXED TO 'CAUTION: YELLOW WIRES REPRESENT FOREIGN VOLTAGE PRESENT IN THIS PANEL.' THIS TAG IS TO BE MADE WITH YELLOW GRANOPLY WITH 1/8 IN. HIGH BLACK LETTERS.
- 15.2 IDENTIFICATION OF ITEMS SUCH AS CONTROL RELAYS, ETC., MOUNTED IN AN ENCLOSURE, SHALL BE KEY LETTERING TAPE OR EQUIVALENT.
- 15.3 IF NAMEPLATE DESIGNATIONS ARE NOT GIVEN ON THE DRAWINGS OR IN A NAMEPLATE SCHEDULE, THE CONTRACTOR SHALL SECURE FINAL DESIGNATIONS FROM THE ENGINEER.
- 15.4 ALL POWER AND CONTROL WIRES SHALL BE TAGGED AT THE SOURCE AND TERMINATION OF SAME WIRE. TAGS SHALL BE BRADY-TYPE COMPATIBLE WITH WIRE INSULATION.
- 15.5 IF ANY POWER OR CONTROL DEVICE IS PLACED IN SERVICE BEFORE THE PERMANENT NAMEPLATE IS ATTACHED, A TEMPORARY IDENTIFYING CARD SHALL BE AFFIXED TO THE DEVICE.

16. CONTROLS AND INSTRUMENTS

THE CONTRACTOR SHALL FURNISH AND/OR INSTALL ALL CONTROLS AND INSTRUMENTS IN ACCORDANCE WITH THE DRAWINGS. ADJUSTMENT, SETTING, AND CALIBRATION SHALL BE MADE AS DIRECTED BY THE ENGINEER.

17. TEST

MAKE TESTS OR FURNISH PERSONNEL TO ASSIST IN MAKING TESTS TO ASSURE ALL EQUIPMENT, ITS CONTROL AND SEQUENCE OF OPERATION IS IN ACCORDANCE WITH THE DRAWINGS AND/OR MANUFACTURER'S INSTRUCTIONS. ALL TESTS SHALL BE WITNESSED BY THE ENGINEER.

18. LIGHTING AND GENERAL UTILITY POWER

- 18.1 PROVIDE COMPLETE LIGHTING AND GENERAL UTILITY POWER SERVICES AS SHOWN ON THE DRAWINGS. LIGHTING FIXTURES, RECEPTACLES, AND WIRING DEVICES SHALL BE FURNISHED IN ACCORDANCE WITH THE FIXTURE SCHEDULE, AND AS IDENTIFIED ON THE ELECTRICAL DRAWINGS. LIGHTING IN CLASS 1, DIV. 1 AND 2 SHALL BE INSTALLED PER NEC REQUIREMENTS.  
 18.2 LIGHTING FIXTURES  
 18.2.1 LIGHTING FIXTURES SHALL BE OF THE TYPE SPECIFIED IN THE FIXTURE SCHEDULE. FIXTURES USED SHALL BE OF THE MANUFACTURER FOR EACH TYPE. FIXTURES SHALL BE CLEAN AND OPERATIONAL PRIOR TO OWNER ACCEPTANCE.  
 18.2.2 FURNISH, INSTALL, AND CONNECT ALL LIGHTING FIXTURES SPECIFIED COMPLETE WITH LAMP'S, SUPPORTS, ACCESSORIES. LAMPS SHALL BE GENERAL ELECTRIC, SYLVANIA, OR WESTINGHOUSE. LAMPS USED SHALL BE ALL OF ONE MANUFACTURER.  
 18.2.3 FLUORESCENT BALLASTS SHALL BE HIGH-POWER-FACTOR, CLASS F PREMIUM-TYPE, RESTARTABLE. BALLAST MANUFACTURER SHALL BE AS SPECIFIED IN THE FIXTURE SCHEDULE.  
 18.2.4 METAL HALIDE BALLASTS SHALL BE HIGH-POWER-FACTOR, CONSTANT-WATTAGE-TYPE. BALLAST MANUFACTURER SHALL BE AS SPECIFIED IN THE FIXTURE SCHEDULE.  
 18.2.5 ALL BALLASTS SHALL MEET CERTIFIED BALLAST MANUFACTURER (CBM) AND NATIONAL ELECTRICAL CODE REQUIREMENTS.

19. INDIVIDUAL TRANSFORMERS

- 19.1 INDIVIDUAL TRANSFORMERS SHALL BE INDOOR DRY TYPE VENTILATED WITH THE FOLLOWING REQUIREMENTS: 15% RISE 480-VOLT PRIMARY AND 200/120-VOLT FOUR-WIRE SECONDARY.
- 19.2 INCLUDE (2) 2-1/2% FULL CAPACITY TAPS ABOVE AND (2) 2-1/2% FULL CAPACITY TAPS BELOW NORMAL.
- 19.3 TRANSFORMER CASE SHALL HAVE SUFFICIENT SPACE FOR LINE AND LOAD CONNECTIONS. TRANSFORMERS SHALL BE FLOOR MOUNTED.

20. HEAT TRACING

HEAT TRACING SHALL BE INSTALLED ON THE FOUR SOLVENT PIPES BETWEEN TANK FARM AND THE PROCESS AREA IN ACCORDANCE WITH MANUFACTURER RECOMMENDATION. SEE CONTRACT DRAWINGS FOR SPECIFICATIONS AND INSTALLATION DETAILS.

21. GROUNDING

- 21.1 PROVIDE A BUILDING GROUNDING SYSTEM PER NEC.
- 21.2 GROUND THE FOLLOWING ITEMS TO GROUNDING SYSTEM:  
 21.2.1 ALL EQUIPMENT AS LISTED ON DRAWING 10597-902  
 21.2.2 CONVEYOR SYSTEM  
 21.2.3 STORAGE RACK SYSTEM  
 21.2.4 PIPING SYSTEM  
 21.2.5 HEATING & VENTILATION SUPPLY AND DISCHARGE DUCT WORK

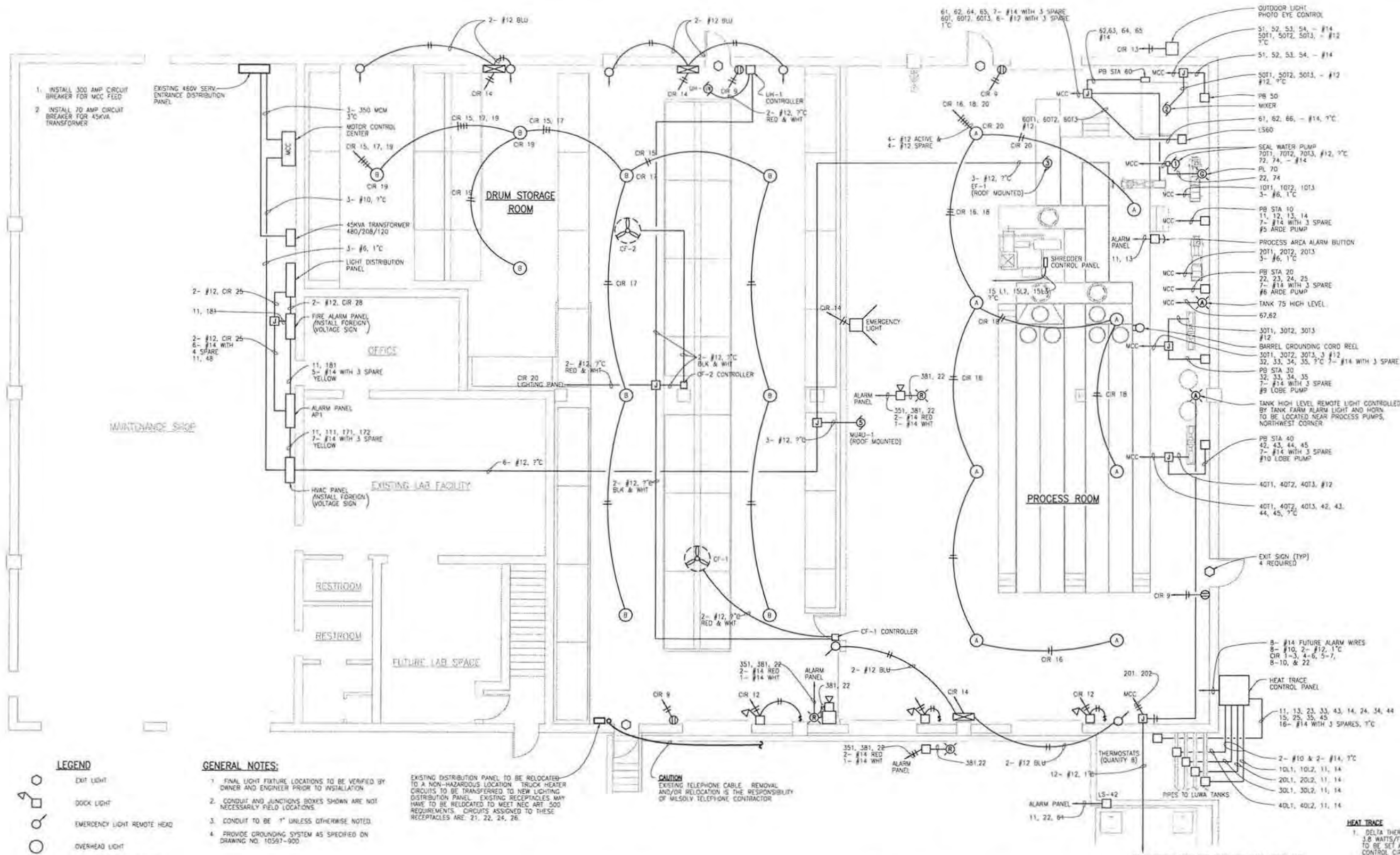
VERIFY SCALE	DRGN	H.W.WENTEN
BAR IS ONE INCH ON ORIGINAL DRAWING.	DR	T.C.PETRICK
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	CHK	H.W.WENTEN
	APVD	F.MOHSENIAN

NO	DATE	REVISION	BY	APVD

**TE TRIAD ENGINEERING INCORPORATED**  
 325 EAST CHICAGO STREET  
 MILWAUKEE, WISCONSIN 53202  
 (414)-291-8840  
 FAX 291-8841

MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION  
 HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS  
 ELECTRICAL SPECIFICATIONS

SHEET NO.	16
DWG NO.	10597-900
DATE	12/18/92
PROJ NO.	10597



- LEGEND**
- EXIT LIGHT
  - DOCK LIGHT
  - EMERGENCY LIGHT REMOTE HEAD
  - OVERHEAD LIGHT
  - EMERGENCY LIGHTS REMOTE POWER SUPPLY
  - JUNCTION BOX
  - LIGHTING CIRCUITS PHASE WIRES
  - NEUTRAL WIRES

- GENERAL NOTES:**
1. FINAL LIGHT FIXTURE LOCATIONS TO BE VERIFIED BY OWNER AND ENGINEER PRIOR TO INSTALLATION.
  2. CONDUIT AND JUNCTION BOXES SHOWN ARE NOT NECESSARILY FIELD LOCATIONS.
  3. CONDUIT TO BE 1" UNLESS OTHERWISE NOTED.
  4. PROVIDE GROUNDING SYSTEM AS SPECIFIED ON DRAWING NO. 10597-900.

EXISTING DISTRIBUTION PANEL TO BE RELOCATED TO A NON-HAZARDOUS LOCATION. TRUCK HEATER CIRCUITS TO BE TRANSFERRED TO NEW LIGHTING DISTRIBUTION PANEL. EXISTING RECEPTACLES MAY HAVE TO BE RELOCATED TO MEET NEC ART. 500 REQUIREMENTS. CIRCUITS ASSIGNED TO THESE RECEPTACLES ARE: 21, 22, 24, 26.

**CAUTION**  
EXISTING TELEPHONE CABLE. REMOVAL AND/OR RELOCATION IS THE RESPONSIBILITY OF MILESOLV TELEPHONE CONTRACTOR.

**FLOOR PLAN**  
SCALE: 3/8"=1'-0"

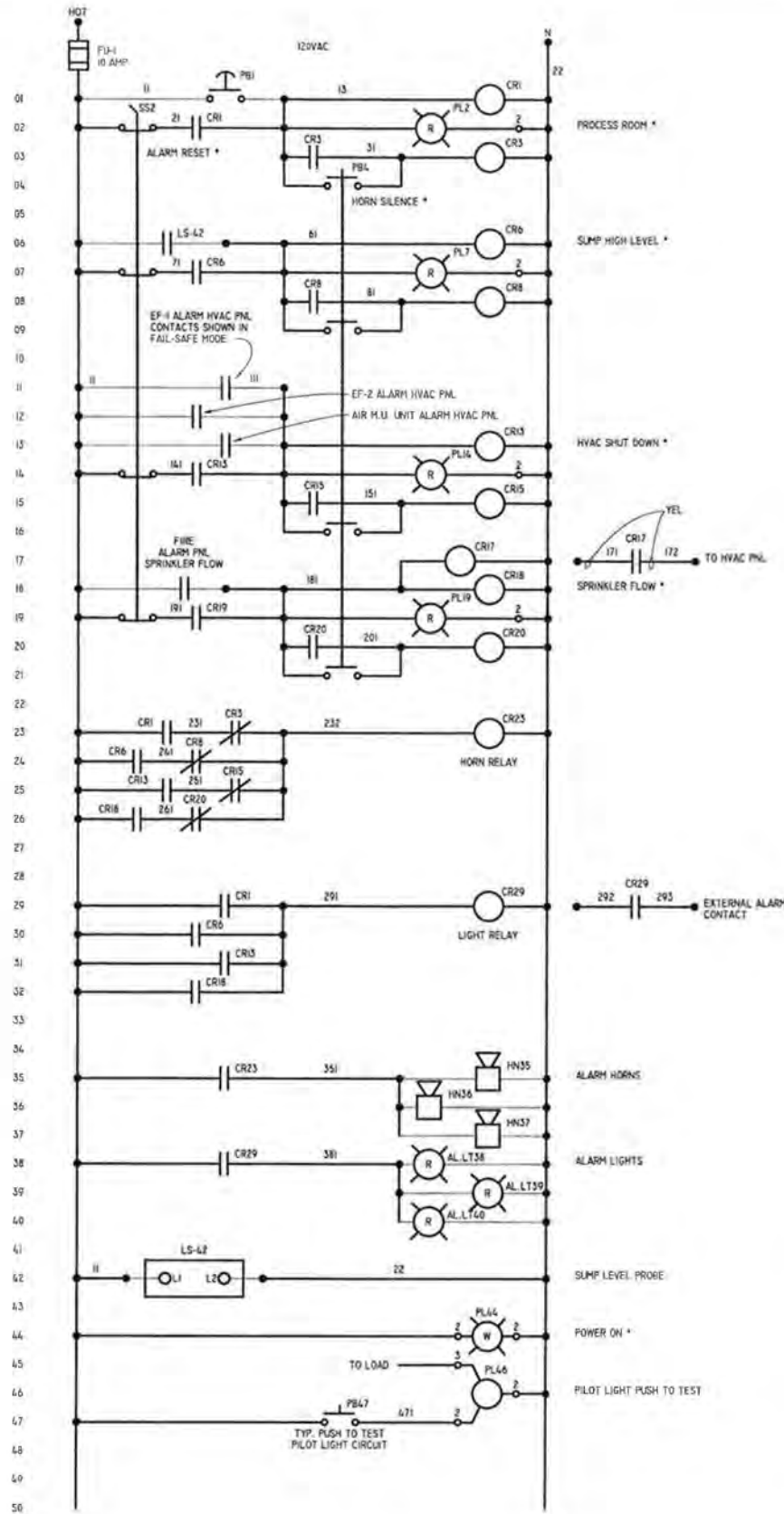


TO ELECTRICAL ROOM AND TANK HIGH LEVEL HORN AND LIGHT. HIGH TANK LEVEL ALARM WIRES TO BE ASSIGNED 201 FOR THE HOT WIRE AND 202 FOR THE NEUTRAL WIRE. 201 TO BE YELLOW AND 202 TO BE WHITE. THESE WIRES WILL CONTROL RELAY'S CR20, 30 AND 40, LOCATED IN THE MCC STARTER BUCKETS. REMAINDER OF THE WIRES TO BE RED AND WHITE.

- HEAT TRACE**
1. DELTA THERMOSTAT CABLE #N240-5-CBF-M2 3.8 WATTS/FT AT 208V AT 50° F. THERMOSTAT TO BE SET AT 50° F. EACH CABLE HAS ITS OWN CONTROL CIRCUITRY.
  2. THERMOSTAT P/N A8-AUC-3, QUANTITY 8.
  3. CONTROL WIRES RED, POWER WIRES BLACK.
  4. CONTROL PANEL #CP-3185.

<p>VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.</p>	<p>DESIGN: H.W.WENTEN DRAWN: L.M.JILES CHECKED: H.W.WENTEN APPROVED: APVD</p>	<p>DATE: 8/30/93 REVISION: CHANGED BUILDING CLASSIFICATIONS FOR DRUM STORAGE ROOM AND REVISED LIGHTING, FIXTURE SCHEDULE AND HVAC WIRING.</p>	<p>MILESOLV SP BY: APVD</p>	<p>325 East Chicago Street Milwaukee, Wisconsin 53202 (414)-291-8840 FAX 291-8841</p>	<p>MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS ELECTRICAL POWER WIRING AND LIGHTING LAYOUT</p>	<p>SHEET NO. 17 DRAWING NO. 10597-901 DATE 8/30/93 PROJECT NO. 10597</p>
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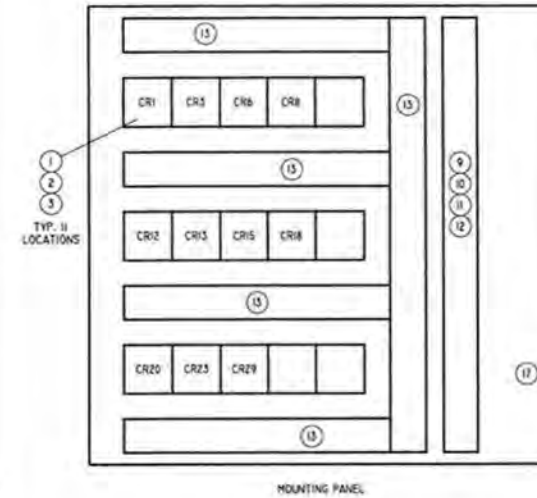
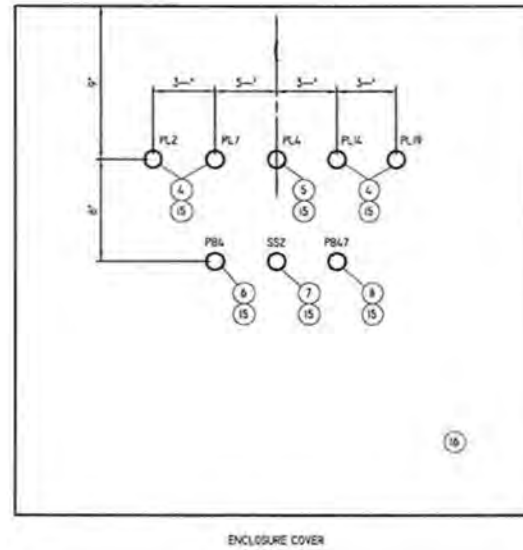


\* = LEGEND PLATE WORKING  
 ——— DENDTES FIELD WIRING

VERIFY SCALE	DSGN
BAR IS ONE INCH ON ORIGINAL DRAWING	H.W.WENTEN
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	T.C.PETRICK
	H.W.WENTEN
	F.MOHSENIAN

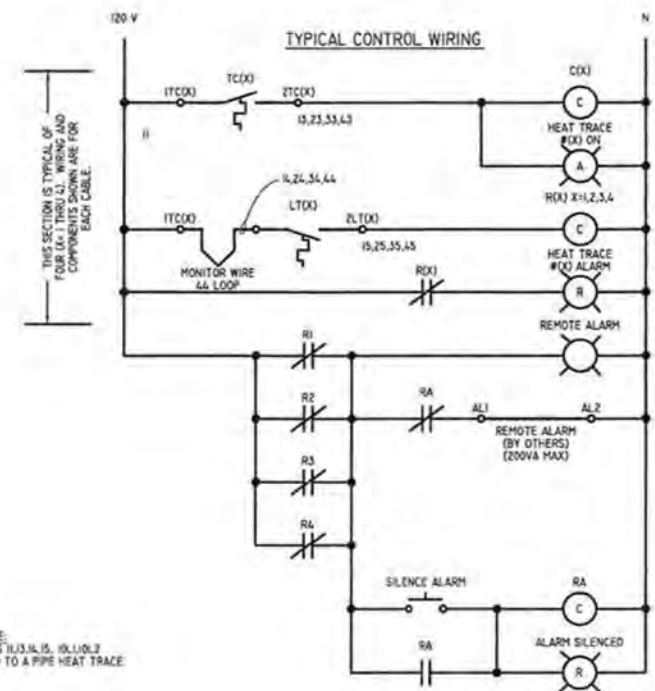
NO.	DATE	REVISION	BY	APVD

NOTE EXAMPLE:  
 WIRE NUMBERS 11,13,15, 10,11,10,2  
 ARE ASSIGNED TO A PIPE HEAT TRACE CIRCUITRY.

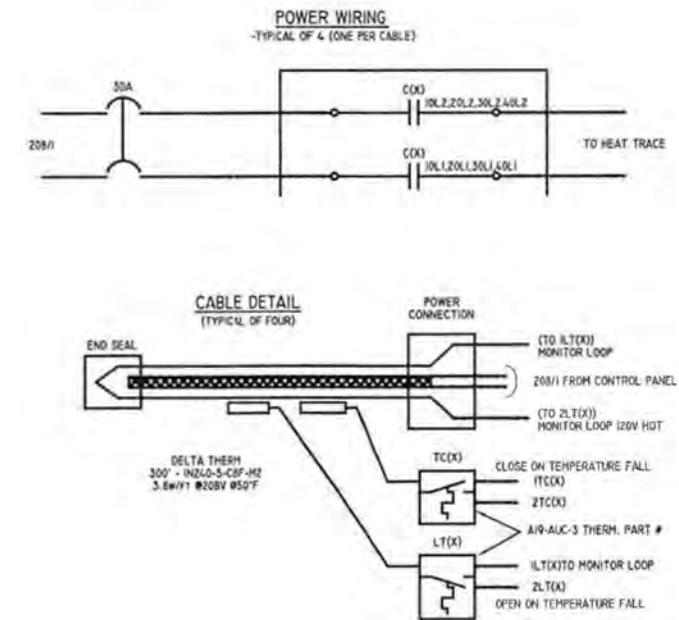


ALARM PANEL W/ BILL OF MATERIALS  
 SCALE: NTS

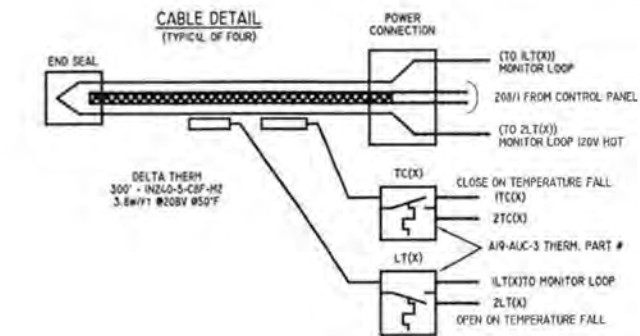
ITEM	QTY	DESCRIPTION
1	14	RELAY SPOT, 115VAC COIL W/LIGHT POTTER & BRUMFIELD KRPA-11AH
2	14	RELAY SOCKET, 11 PIN OCTAL CURTIS #CUS 11
3	56"	RELAY TRACK
4	5	PILOT LIGHT, DUAL DIODE, A-B #800T-PD 16R (RED)(PL2,PL7,PL14,PL19)
5	1	PILOT LIGHT, DUAL DIODE, A-B #800T-PD 16W (WHITE)(PL14)
6	1	PUSH BUTTON, AHO-4MC, A-B #800T-A2C (PB4)
7	1	2 POSITION SELECTOR SWITCH, CYLINDER LOCK OPERATOR, SPRING RETURN FROM RIGHT, 1NO-4NC, A-B #800T-44BC (SS2)
8	1	PUSH BUTTON, GREEN, 1NO-1NC, A-B #800T-A2A (PBL7) PILOT LIGHT TEST
9	56	TERMINAL BLOCKS, A-B #1492-H
10	56"	MOUNTING CHANNEL A-B #1492-H4
11	1	FUSE SWITCH A-B #1492-H4
12	5	FUSES "X" 1" 10A, NORMAL DELAY
13	AS REQ'D	WIRE WAY, 2" X 2"
14	1	END BARRIER, TERMINAL BLOCK A-B #1492-N36
15	8	LEGO PLATES, JUMBO A-B #800T-K559 J (GRAY)(SEE SCHEMATIC)
16	1	ENCLOSURE 30" X 50" X 8" NEAM 12, HOFFMAN #363008LP
17	1	MOUNTING PANEL, HOFFMAN #A-30P30



HEAT TRACE SCHEMATIC & DETAILS



POWER WIRING  
 -TYPICAL OF 4 (ONE PER CABLE)

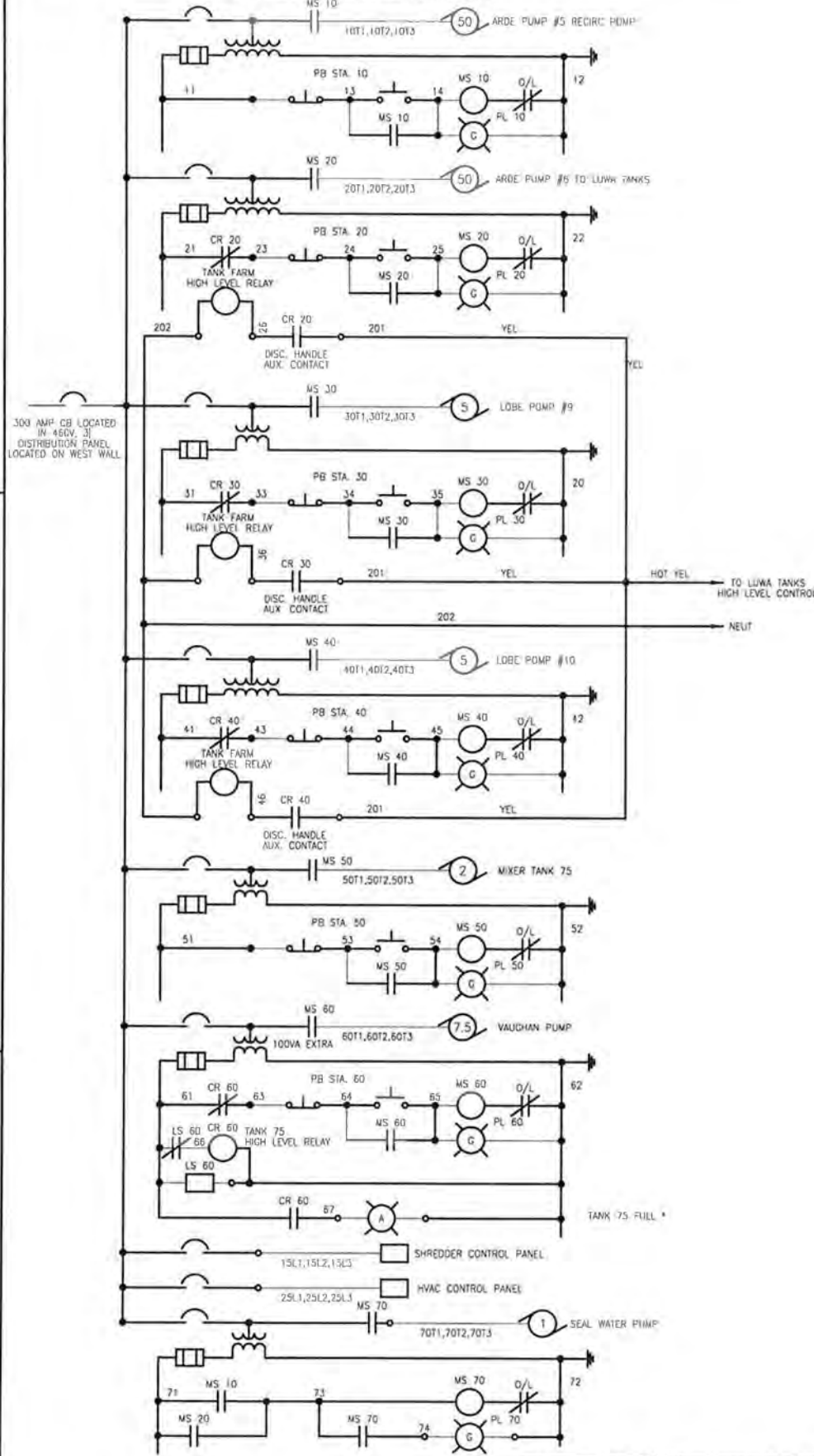


325 EAST CHICAGO STREET  
 MILWAUKEE, WISCONSIN 53202  
 (414)-291-8840  
 FAX 291-8841

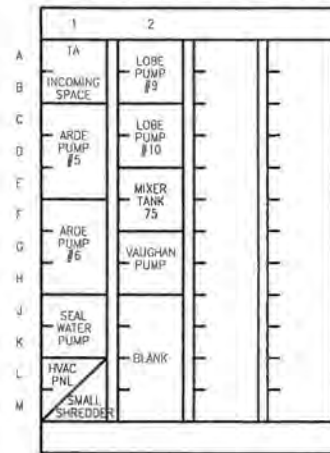
MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION  
 HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS  
 EMERGENCY ALARM PANEL AND HEAT TRACE

SHEET NO.	18
DWG NO.	10597-902
DATE	12/18/92
PROJ NO.	10597

MOTOR CONTROL CENTER SCHEMATIC



MOTOR CONTROL CENTER LAYOUT



VERTICAL SECTION DETAILS

WIRING: CLASS 1 NEMA TYPE 1B  
 ENCLOSURE: NEMA TYPE I, W/CASKET & BOTTOM PLATES, STANDARD PAINT  
 INCOMING SUPPLY: 3 PHASE, 60 HERTZ, 480 VOLTS  
 CONNECTIONS: LUGS ONLY, 600 AMPS  
 TOP ENTRY  
 BUSS WORK: MAIN BUS 600 AMPS, COPPER WITH TIN PLATING  
 BUSS BRACING: 65000 AMPS

MOTOR CONTROL CENTER

LOCATION IN MCC	QTY	DESCRIPTION
1A		INCOMING SECTION
1L1, 1L2	1	2153F-AJC-3132-CB DUAL CIRCUIT BREAKER HVAC AND SHREDDER
1C, 1F	2	2113B-DD-B-45CA-90B AROE PUMPS
2A, 2C	2	2113B-BD-B-39-90B LOBE PUMPS
2E, 1A	2	2113-BD-B-37 MIXER AND SEAL WATER PUMP
3G	1	2113B-BD-B-40-90B-6XS VAUGHAN PUMP
	4	RELAYS AB#700-HF32A1
	4	SOCKET AB#700-HH116
		PROTECTIVE CAPS FOR UNUSED PLUG IN STAB OPENINGS

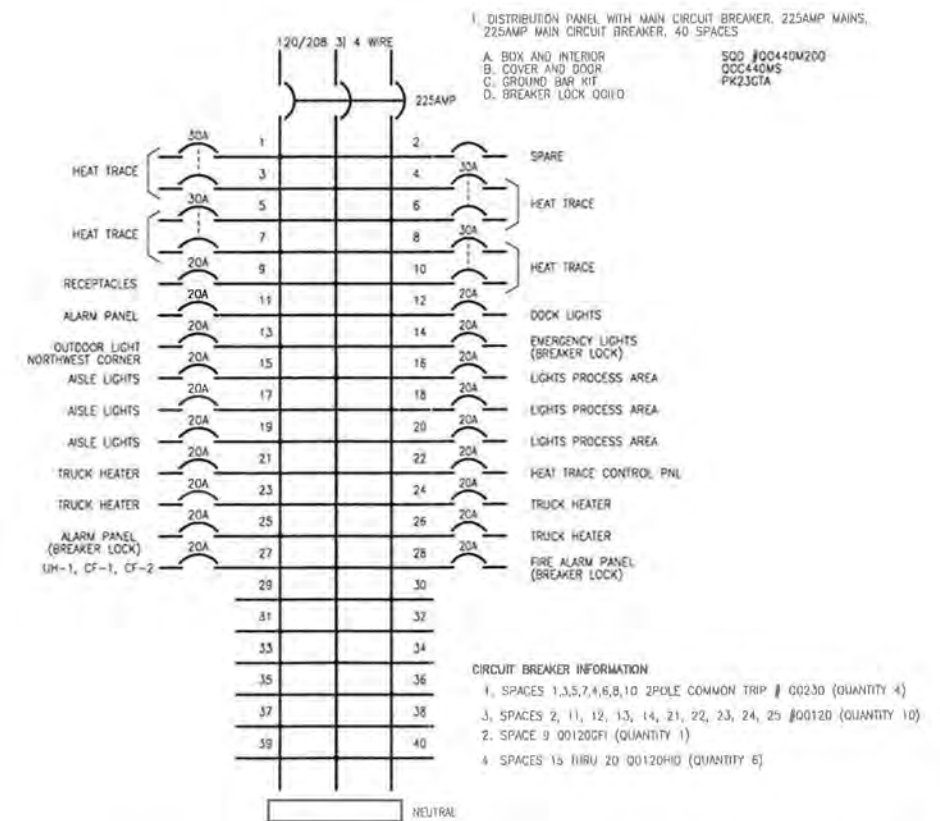
NOTE

- HIGH LEVEL RELAYS NORMALLY OPEN CONTACTS ARE SHOWN IN THE CLOSED POSITION. CR 20, 30, AND 40 ARE CONTROLLED BY LUWA TANK AREA HIGH LEVEL CONTROLS.
- CR 60 TANK 75 LEVEL CONTROL RELAY. RELAYS TO BE MOUNTED IN THE INDIVIDUAL STARTER BUCKETS.

ELECTRICAL EQUIPMENT LIST

ITEM	QTY	DESCRIPTION
1	1	MOTOR CONTROL CENTER SEE DETAIL, THIS DRAWING
2	8	○ LIGHTING FIXTURE CROUSE-HINDS #WVM3C100RD4-120WAC
3	5	RECEPTACLES, SINGLE PHASE, 20AMP, 125-250WAC 60/117 WIRE 3 POLE, CROUSE-HINDS #CPS 152-111
4	4	EXIT SIGN-TOMIC STATE APPROVED
5	3	ALARM LIGHTS CROUSE-HINDS #EVC510R 120WAC
6	3	ALARM HORN CROUSE-HINDS #ETH 281J 120WAC
7	2	EMERGENCY PUSH BUTTON STATION PROCESS AREA CONSISTS OF: COVER #B#600-HP30, SINGLE GANG BASE-DEEP #B#600-HY07M1, AND JUMBO RED MUSHROOM HEAD PUSH BUTTON UNIT NO. A5#600H-0P001 (FBI)
8		EMERGENCY LIGHT UNITS: CROUSE-HINDS
9	3	56 WATT POWER SUPPLY #N2LPS6420
10	1	56 WATT POWER SUPPLY WITH LIGHT FIXTURES #N2LPS6422
11	6	5 WATT REMOTE HEAD #N2RF61 FED FROM POWER SUPPLIES
12	1	ALARM PANEL SEE DRAWING NO.
13	3	DOCK LIGHTS, HUBBELL DL308-D80 (EXISTING)
14	1	OUTDOOR LIGHT HPS PHOTO CONTROLLED LUMARK HPS #HPGP-150-120-LL-U
15	1	HEAT TRACE CONTROL PANEL
16	1	TRANSFORMER 45KVA 3 480/208/120 SQD #4STJH151M
17	1	LIGHTING DISTRIBUTION PANEL SEE DETAIL, THIS DRAWING
18	2	ALARM LIGHT WALL MOUNT AMBER, HIGH TANK LEVEL: CROUSE-HINDS #EVB510A 120WAC
19	6	NEMA 7 AND 9 PUSH BUTTON STATION WITH GREEN PILOT LIGHT AB#800H-2HAD010C7M
20	1	SEAL PUMP RUN LIGHT PL70, CONSISTS OF AB#800H-HY07M1, BOX 800H-WP30 COVER 800-PP10C PILOT LIGHT
21	1	AS REQ'D BARREL GROUNDING CORD REEL, 50 FT., MCMASTER-CARR #7346K15
22	9	○ HUBBELL SWD 400HASP-120V

LIGHTING DISTRIBUTION PANEL FED FROM 45KVA 30 120/208 4 WIRE XFMR



\* = LEGEND PLATE WORDING  
 — DENOTES FIELD WIRING

VERIFY SCALE  
 BAR IS ONE INCH ON ORIGINAL DRAWING.  
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DSGN H.W.WENTEN  
 DR L.M.JILES  
 CHK H.W.WENTEN  
 APVD

8/30/93  
 REVISION  
 REVISED LIGHTING FIXTURE SCHEDULE

MALSOLV SP  
 BY APVD

TE TRIAD ENGINEERING INCORPORATED

325 East Chicago Street  
 Milwaukee, Wisconsin 53202  
 (414)-291-8840  
 FAX 291-8841

MILWAUKEE SOLVENTS AND CHEMICALS CORPORATION  
 HAZARDOUS MATERIAL DRUM STORAGE AND PROCESS  
 ELECTRICAL MOTOR CONTROL CENTERS AND SCHEMATICS

SHEET NO. 19  
 DWG NO. 10597-90.3  
 DATE 8/30/93  
 PROJ. NO. 10597



**APPENDIX V**

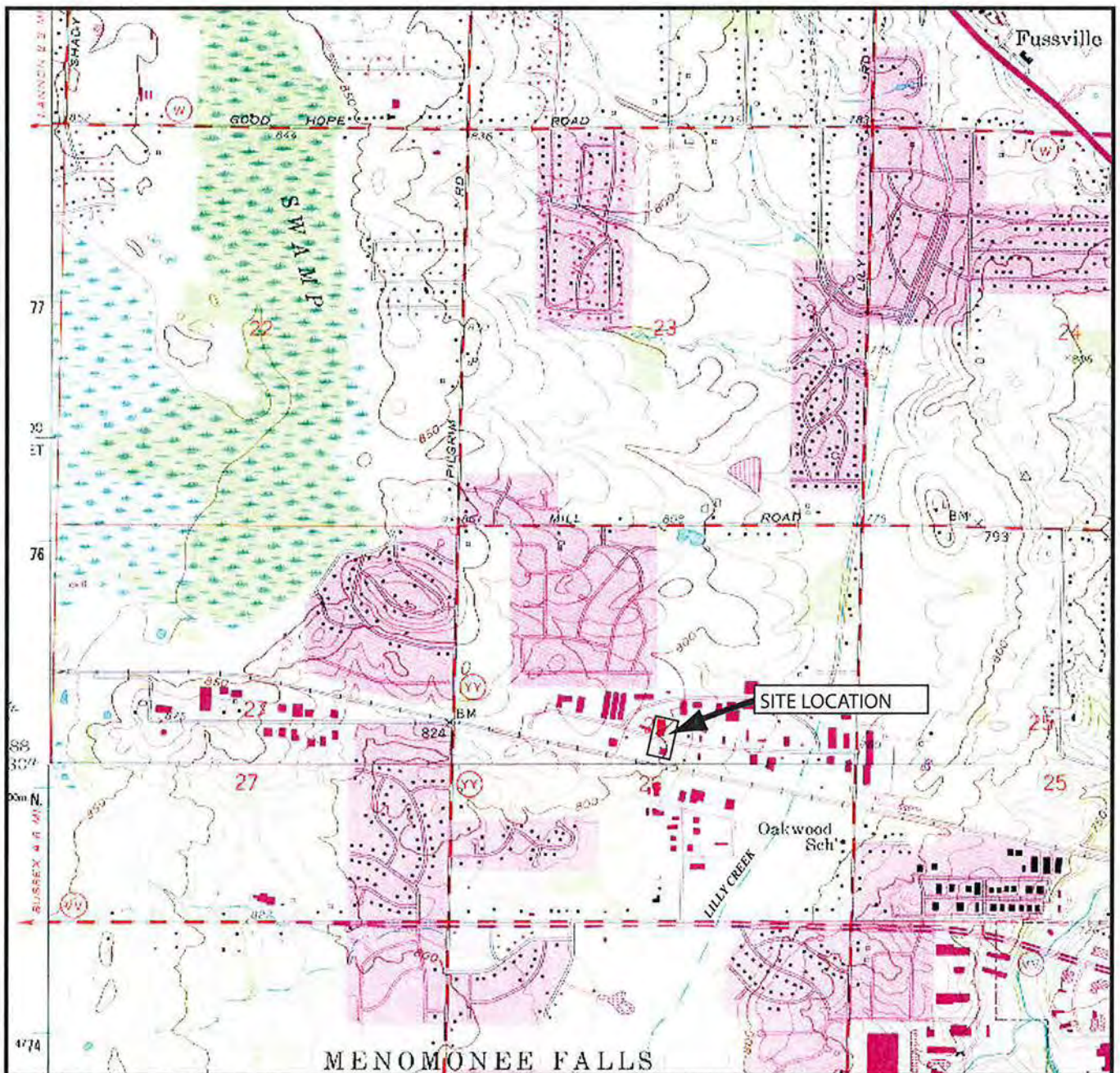
**NOT USED**

**APPENDIX W**  
**GEOLOGICAL AND HYDROGEOLOGICAL**  
**FIGURES**





**FIGURES**



SOURCE: Composite of USGS 7.5 Minute Topographic Maps, MENOMONEE FALLS (1994) and WAUWATOSA (1994), WISCONSIN Quadrangles



WISCONSIN



0 1000 2000 4000

SCALE IN FEET

BRENNTAG GREAT LAKES FACILITY  
MENOMONEE FALLS, WISCONSIN

SITE LOCATION



FIGURE

1





CITY: MILWAUKEE; DIV: GROUP/ENV/CAD; DB: G.STEINBERGER K. SINSABAUGH LD.; PIC: R.STUDEBAKER; P: MFE.BUC; T: M.T.SCHOEN; L: R.(C)ONLINE-OFF-PEE; G:\project\MILWAUKEE\South\load\Site Base\Site Base Sep 2010.dwg; LAYOUT: 3; SAVER: 7/12/2012 11:30 AM; ACADVER: 18.1; S: (LMS TECH); PAGES: 17; PLOT: 11X17; PLOTSTYLE: TABLE; BLACKGRAY-THIN; CTB; PLOTTED: 9/26/2012 1:45 PM; BY: ROBBENHOLT, REBECCA



BRENNTAG GREAT LAKES FACILITY MENOMONEE FALLS, WISCONSIN	
<b>LOCATIONS OF SOLID WASTE                  MANAGEMENT UNITS</b>	
	FIGURE <b>3</b>





24JAN11ENVIRONMENTEABLMB  
MILSOLVW06886CARBONIGRAPHICS\CONGLOM\_0111.A1

BRENTTAG GREAT LAKES FACILITY  
MENOMONEE FALLS, WISCONSIN

**MONITORING WELL AND  
BORING LOCATION PLAN**

**ARCADIS**

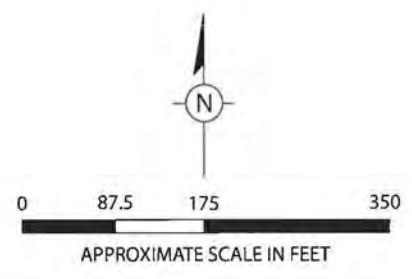
FIGURE  
**4**





**LEGEND**

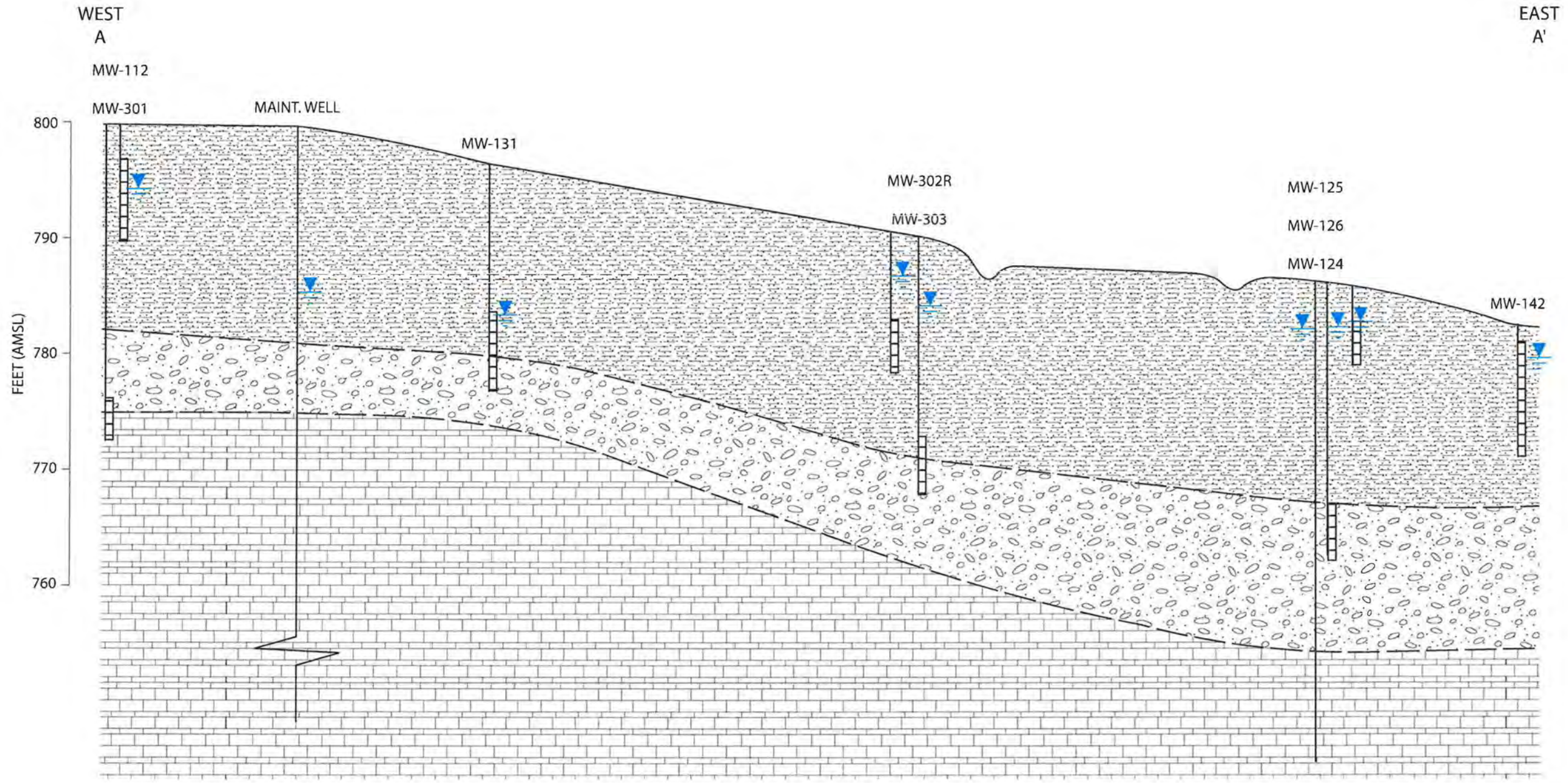
- PP • POWER POLE WITH TRANSFORMER
- CULVERT
- - - DRAINAGE DITCH
- - - FENCE
- ★ PRIVATE WATER WELL
- GROUNDWATER RECOVERY WELL
- MONITORING WELL - (Gravel Clay Stratum)
- MONITORING WELL - (Sand and Gravel Stratum)
- MONITORING WELL - (Dolomite Stratum)
- M MANHOLE



BRENNTAG GREAT LAKES FACILITY MENOMONEE FALLS, WISCONSIN	
<b>LOCATIONS OF GEOLOGIC                  CROSS SECTIONS A-A' AND B-B'</b>	
	FIGURE <b>5</b>

14DOCT10ENVIRONMENTALMB  
 MILSOLVW0686CARBONICGRAPHICS\GEOX\SEC\_A\_1010.A1

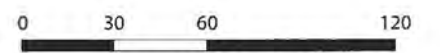




**LEGEND**

- MW-131 MONITORING WELL NUMBER
- SCREENED INTERVAL
- APPROXIMATE UNIT CONTACTS
- WATER TABLE (May 11, 2009)

- GRAVEL/CLAY
- SAND & GRAVEL
- FRACTURED DOLOMITE

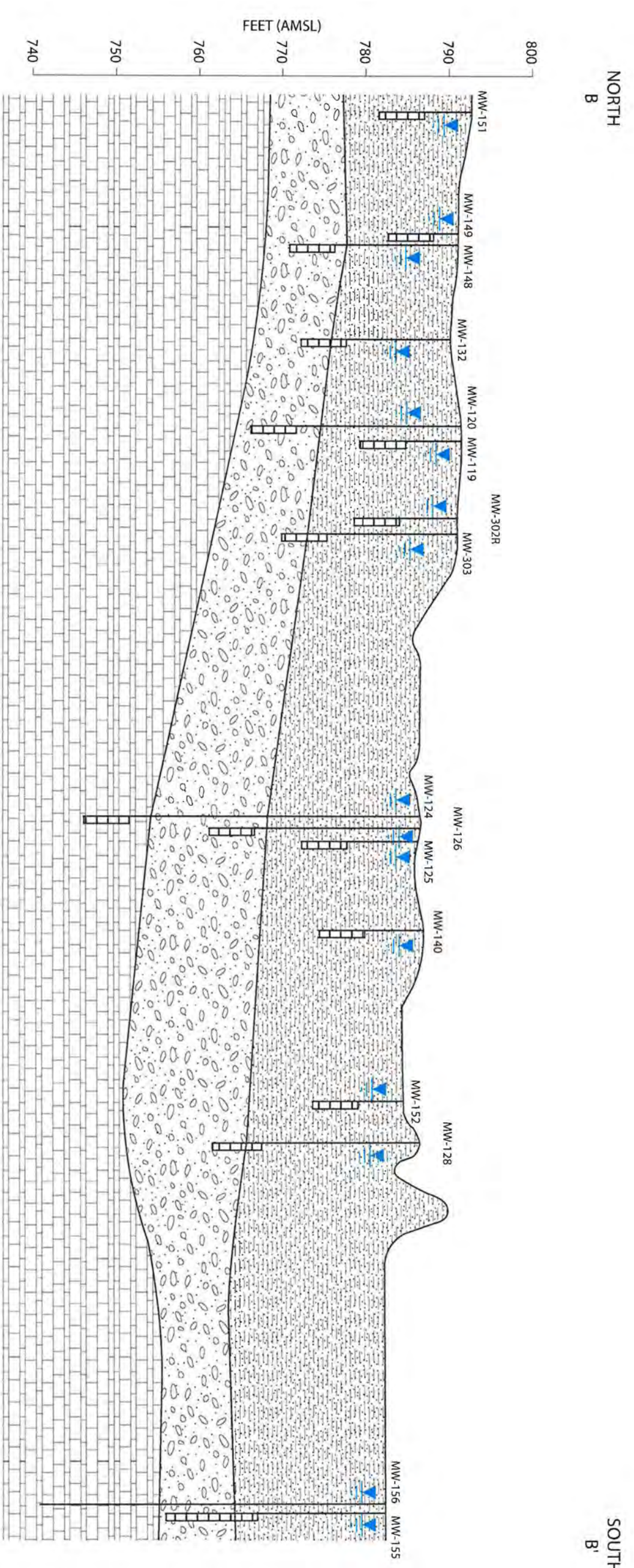


HORIZONTAL SCALE IN FEET  
VERTICAL EXAGGERATION = 6X

BRENNTAG GREAT LAKES FACILITY MENOMONEE FALLS, WISCONSIN	
<b>GEOLOGIC CROSS SECTION A-A'</b>	
	FIGURE <b>6</b>

02AUG11ENVIRONMENT\TSL\MB  
 M\SOLV\M080\CORP\_ACT\NIGRAPHICS\2009\XSEC\_AA.AI





**LEGEND**

MW-131 MONITORING WELL NUMBER

SCREENED INTERVAL

APPROXIMATE UNIT CONTACTS

WATER TABLE (May 11, 2009)

GRAVEL/CLAY

SAND & GRAVEL

FRACTURED DOLOMITE

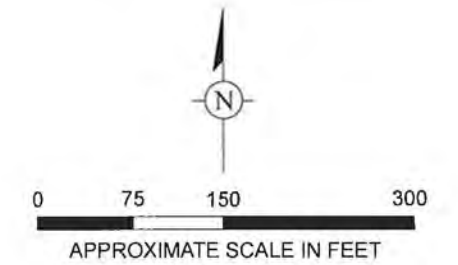
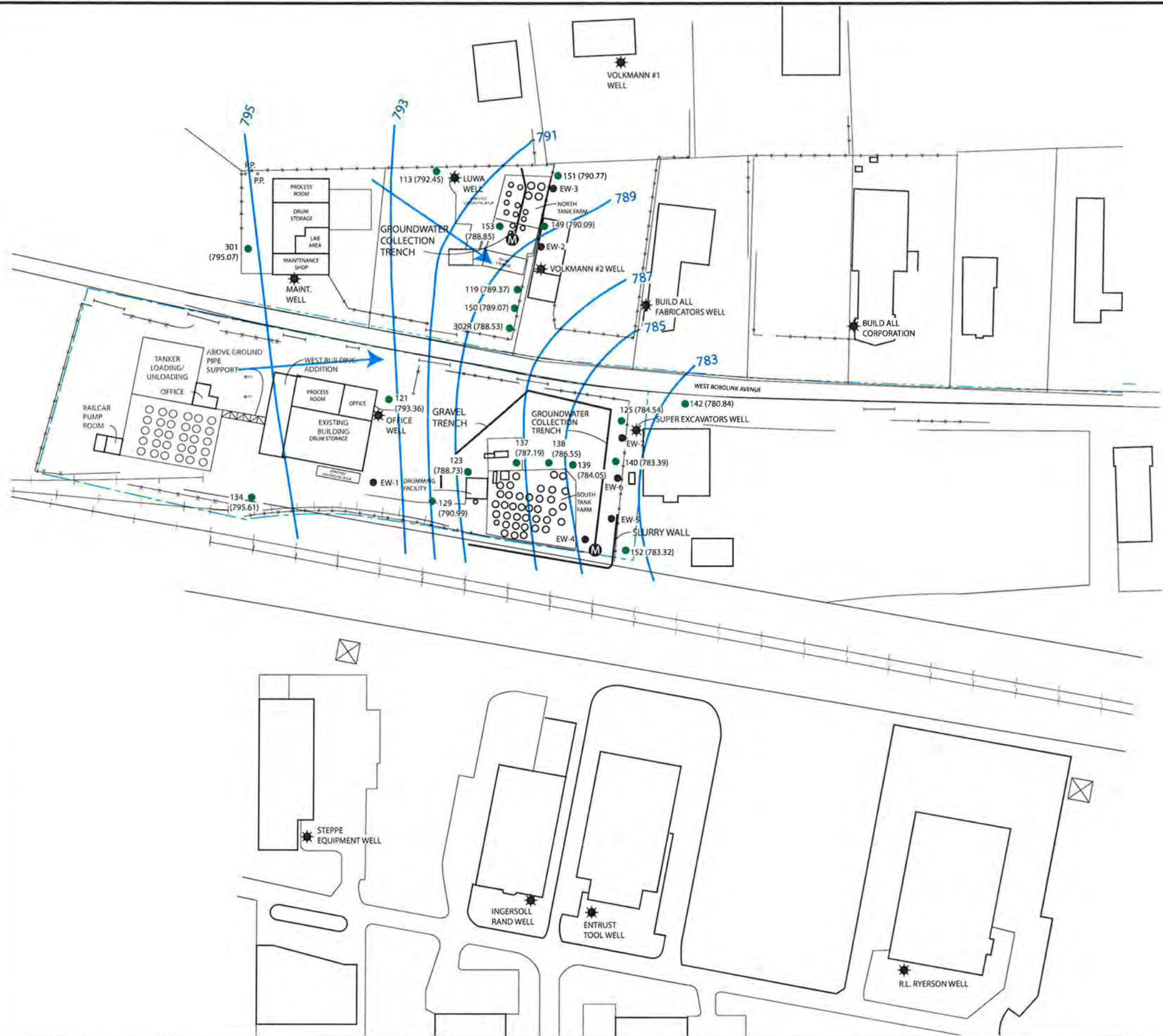
0 30 60 120  
HORIZONTAL SCALE IN FEET

**GEOLOGIC CROSS SECTION B-B'**

BRENNTAG GREAT LAKES FACILITY  
MENOMONEE FALLS, WISCONSIN





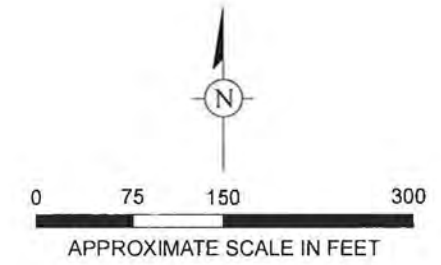
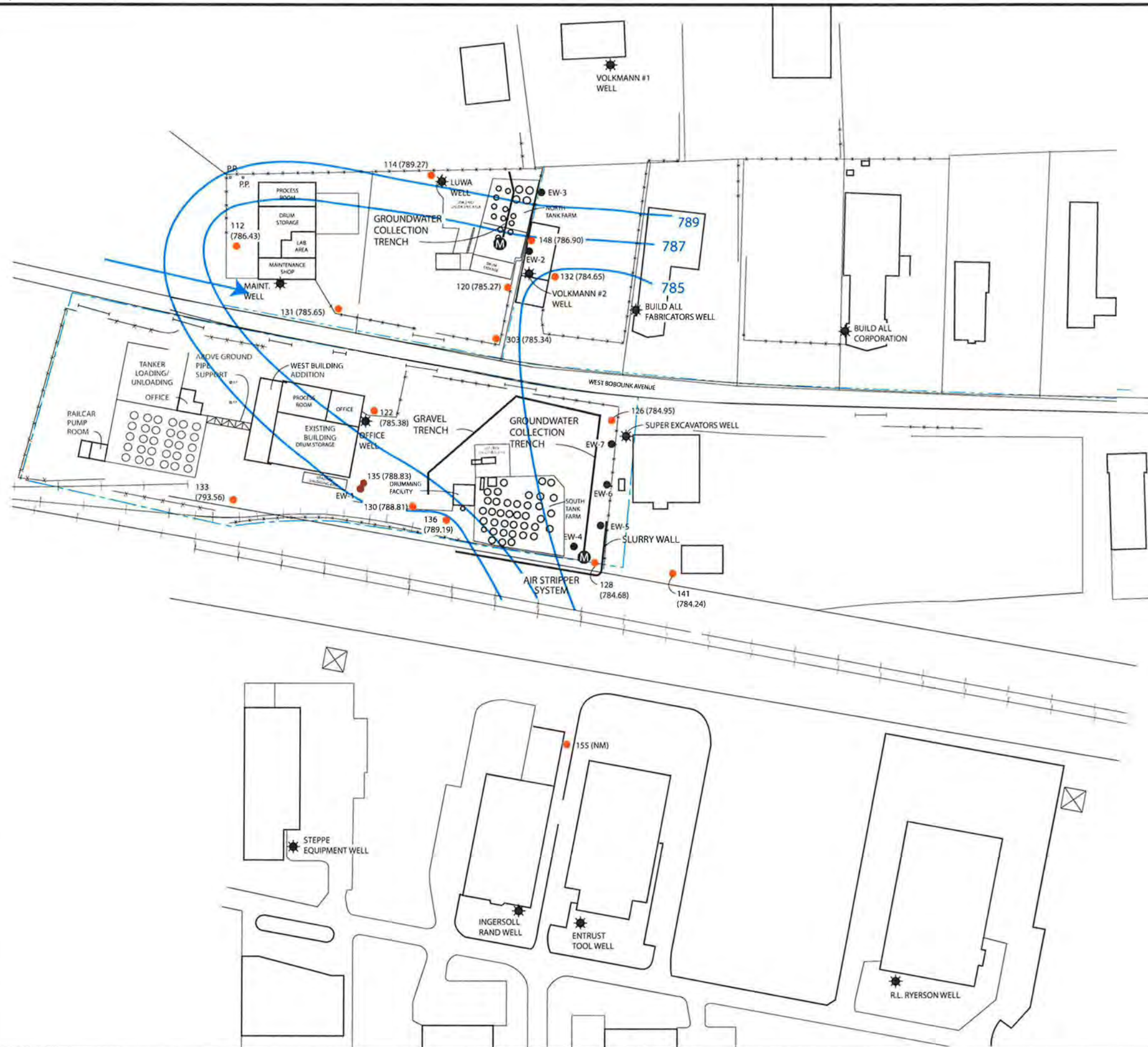


- LEGEND**
- PP. ◦ POWER POLE WITH TRANSFORMER
  - CULVERT
  - - - DRAINAGE DITCH
  - +— FENCE
  - ★ PRIVATE WATER WELL
  - GROUNDWATER RECOVERY WELL
  - MONITORING WELL - (Gravel/Clay Stratum)
  - Ⓜ MANHOLE
  - (787.84) GROUNDWATER ELEVATION
  - 790 — GROUNDWATER ELEVATION CONTOUR (feet above mean sea level) (dashed where inferred)
  - ➔ GENERALIZED GROUNDWATER FLOW DIRECTION
  - (NM) NOT MEASURED

BRENNTAG GREAT LAKES FACILITY MENOMONEE FALLS, WISCONSIN	
<b>POTENTIOMETRIC SURFACE                  GRAVEL/CLAY STRATUM                  MAY 11, 2009</b>	
	FIGURE <b>8</b>

25JAN11ENVIRONNMENTAL.MB  
 MILSOLV\W0680\COR\_ACT\NIGRAPH\HCS\2010\GRAVEL\_CLAY\_051109.A1



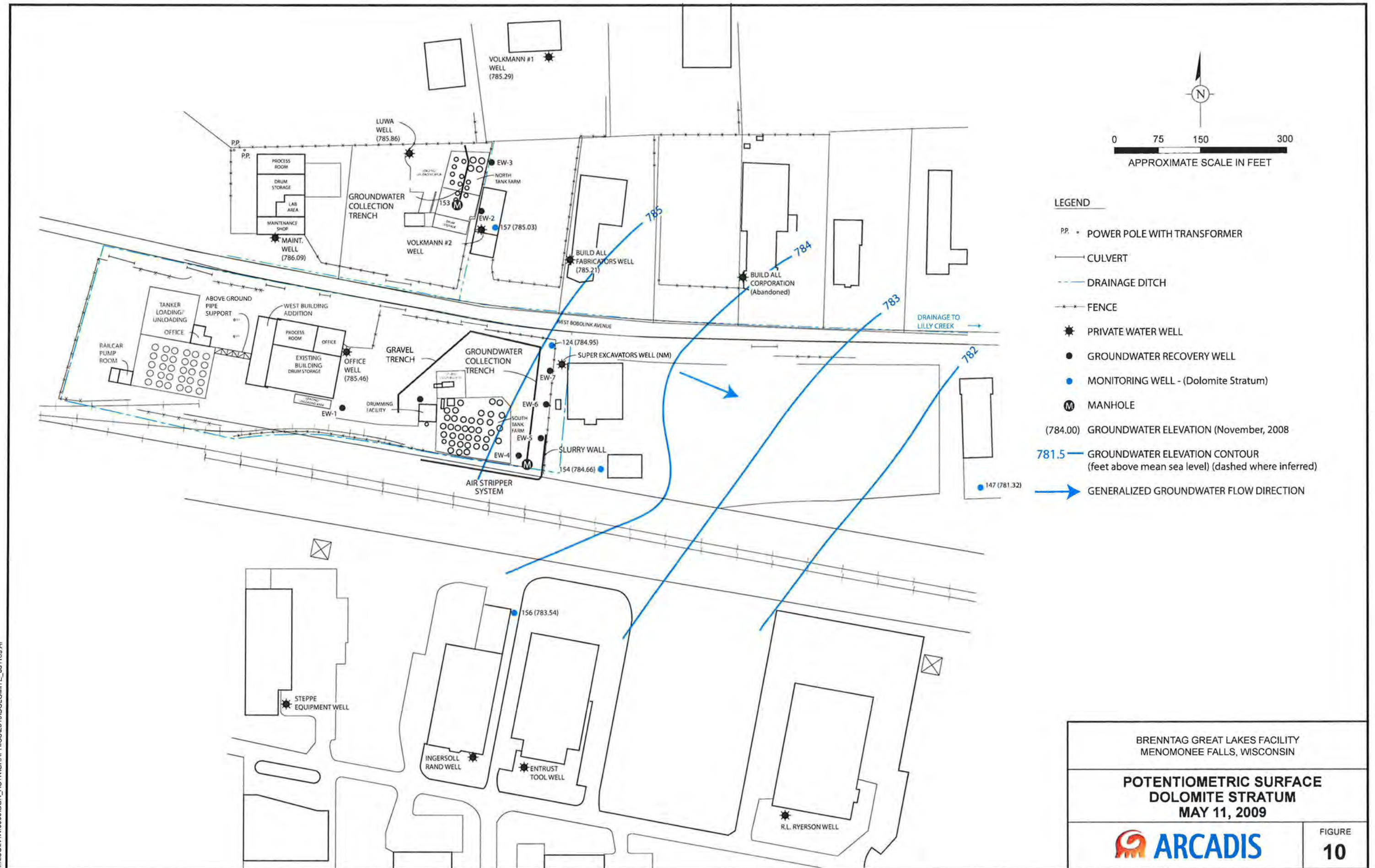


- LEGEND**
- PP. ◉ POWER POLE WITH TRANSFORMER
  - CULVERT
  - - - DRAINAGE DITCH
  - +—+— FENCE
  - ★ PRIVATE WATER WELL
  - GROUNDWATER RECOVERY WELL
  - MONITORING WELL - (Sand and Gravel Stratum)
  - Ⓜ MANHOLE
  - (786.79) GROUNDWATER ELEVATION
  - 788 — GROUNDWATER ELEVATION CONTOUR (feet above mean sea level) (dashed where inferred)
  - ➔ GENERALIZED GROUNDWATER FLOW DIRECTION
  - (NM) NOT MEASURED

BRENNTAG GREAT LAKES FACILITY MENOMONEE FALLS, WISCONSIN	
<b>POTENTIOMETRIC SURFACE SAND AND GRAVEL STRATUM MAY 11, 2009</b>	
	FIGURE <b>9</b>

25.JAN11ENVIRONMENTAL\MB MILSOL\W0680COR\_ACT\NIGRAPHICS\2010\SAND\_GRAVEL\_051109.A1



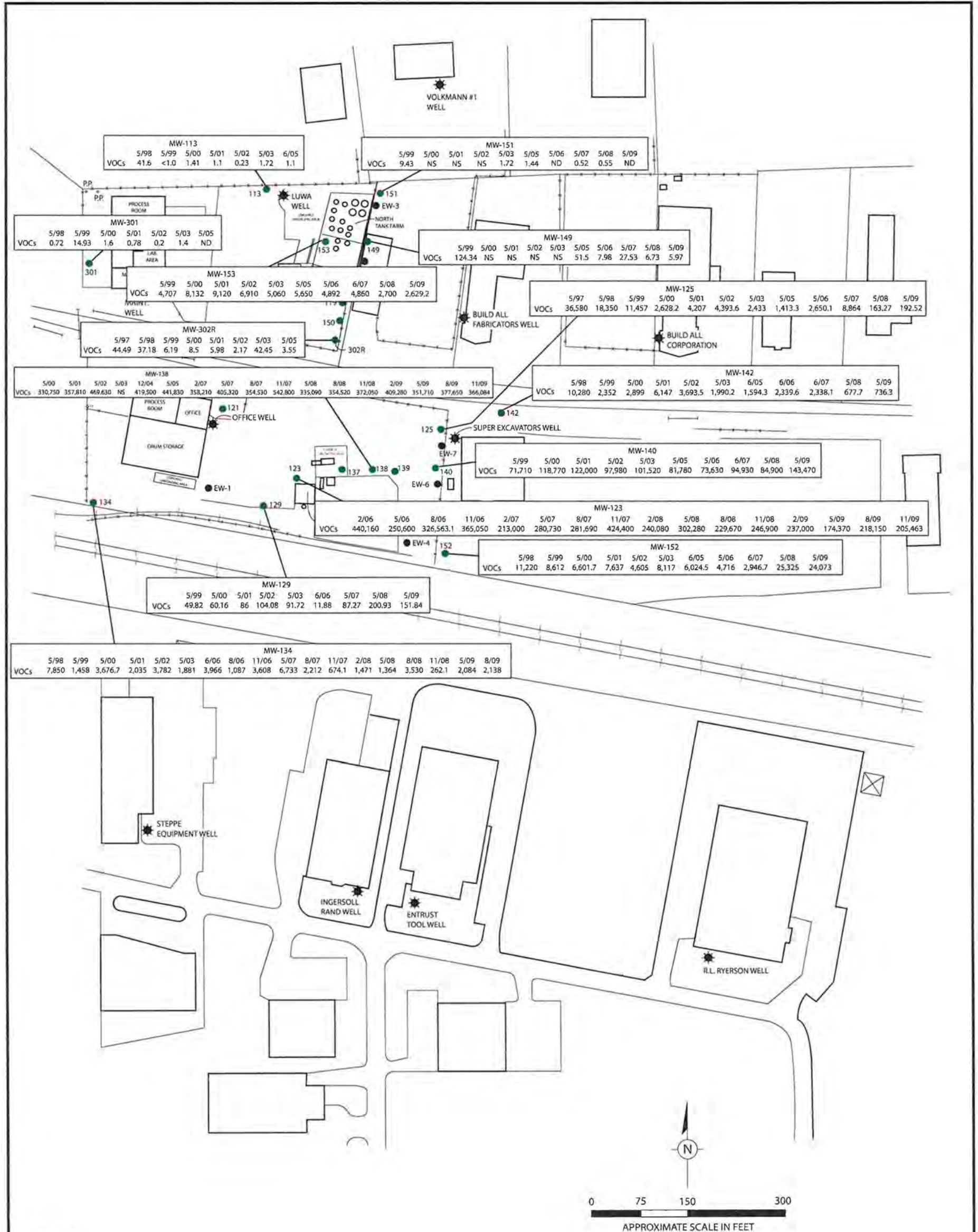


- LEGEND**
- PP • POWER POLE WITH TRANSFORMER
  - CULVERT
  - - - DRAINAGE DITCH
  - - - FENCE
  - ★ PRIVATE WATER WELL
  - GROUNDWATER RECOVERY WELL
  - MONITORING WELL - (Dolomite Stratum)
  - Ⓜ MANHOLE
  - (784.00) GROUNDWATER ELEVATION (November, 2008)
  - 781.5 — GROUNDWATER ELEVATION CONTOUR (feet above mean sea level) (dashed where inferred)
  - ➔ GENERALIZED GROUNDWATER FLOW DIRECTION


BRENNTAG GREAT LAKES FACILITY MENOMONEE FALLS, WISCONSIN	
<b>POTENTIOMETRIC SURFACE                  DOLOMITE STRATUM                  MAY 11, 2009</b>	
	FIGURE <b>10</b>

16AUG11ENVIRONMENTALSLMB  
 MILSOLVW0680COR\_ACTNIGRAPHICS\2010\DOLOMITE\_051109.AI





24JAN11ENVIRONMENTAL.MB MILLSOLVW0680COR\_ACTINGRAPHICS\2010ITREND\_CL\_09.A1

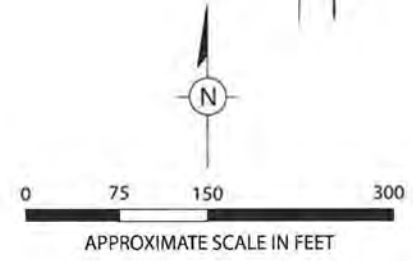
BRENNTAG GREAT LAKES FACILITY MEMONONEE FALLS, WISCONSIN	
<b>TRENDS IN TOTAL VOC CONCENTRATIONS GRAVEL/CLAY STRATUM</b>	
	FIGURE <b>11</b>





**LEGEND**

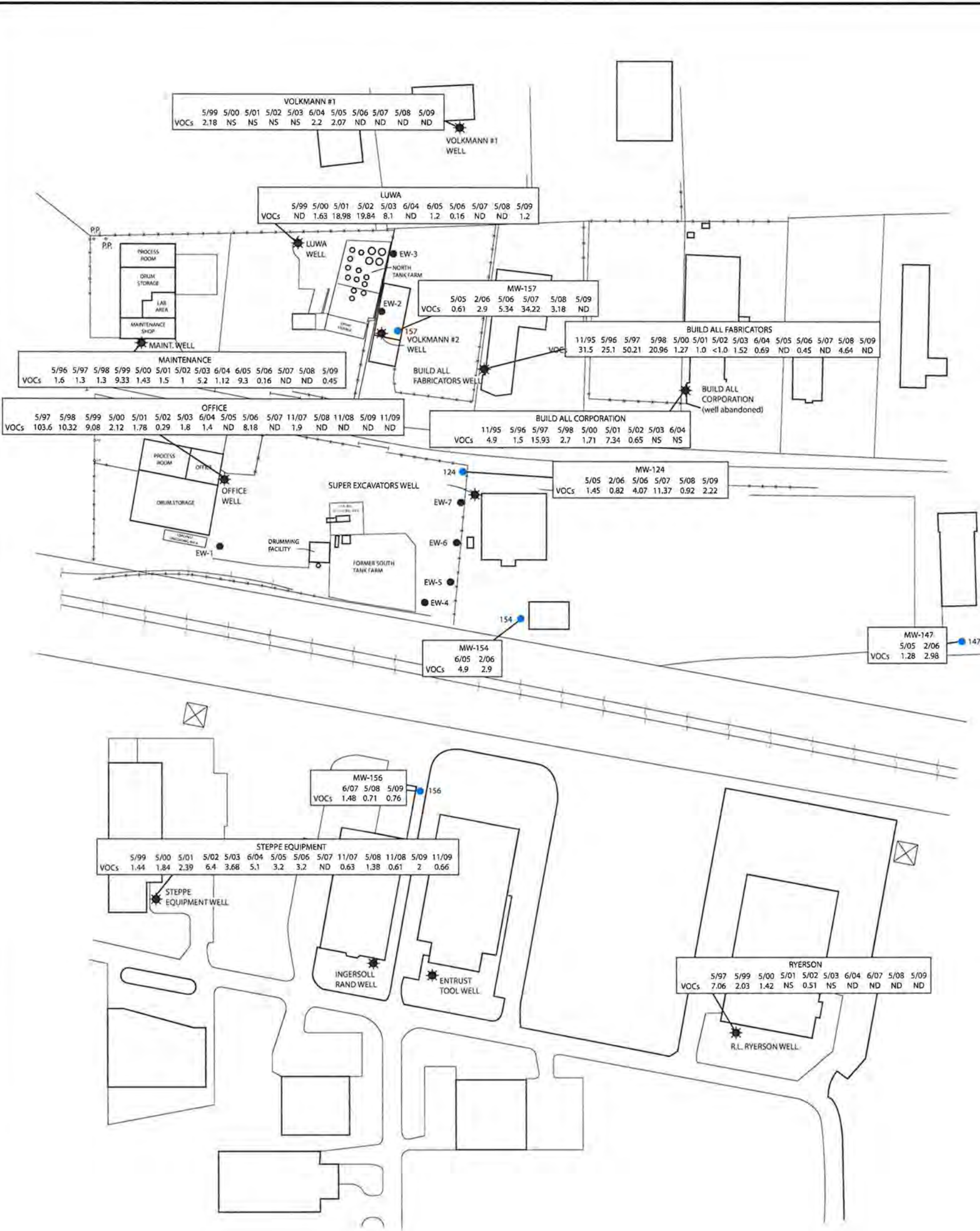
- PR • POWER POLE WITH TRANSFORMER
- CULVERT
- +— FENCE
- ★ PRIVATE WATER WELL
- GROUNDWATER RECOVERY WELL
- MONITORING WELL - (Sand and Gravel Stratum)
- INJECTION WELL
- VOCs TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATIONS (micrograms per liter)
- ND NO DETECTS



BRENNTAG GREAT LAKES FACILITY MENOMONEE FALLS, WISCONSIN	
<b>TRENDS IN TOTAL VOC CONCENTRATIONS SAND AND GRAVEL STRATUM</b>	
	FIGURE <b>12</b>

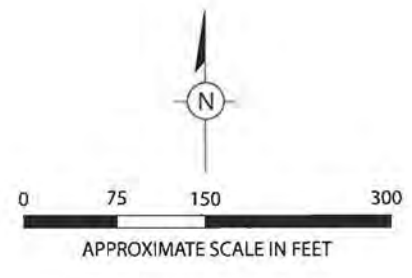
18FEB11ENVIRONMENTAL\MB\MILSOLV\M0660COR\_ACT\NIGRAPHICS\2010TRENDS\_GR\_09.A1





**LEGEND**

- PP • POWER POLE WITH TRANSFORMER
- CULVERT
- FENCE
- ★ PRIVATE WATER WELL
- GROUNDWATER RECOVERY WELL
- MONITORING WELL - (Dolomite Stratum)
- VOCs TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATIONS (micrograms per liter)
- NS NOT SAMPLED - (access denied by property owner)
- ND NO DETECTS



BRENNTAG GREAT LAKES FACILITY  
MENOMONEE FALLS, WISCONSIN

---

**TRENDS IN TOTAL VOC CONCENTRATIONS  
DOLOMITE STRATUM**

---

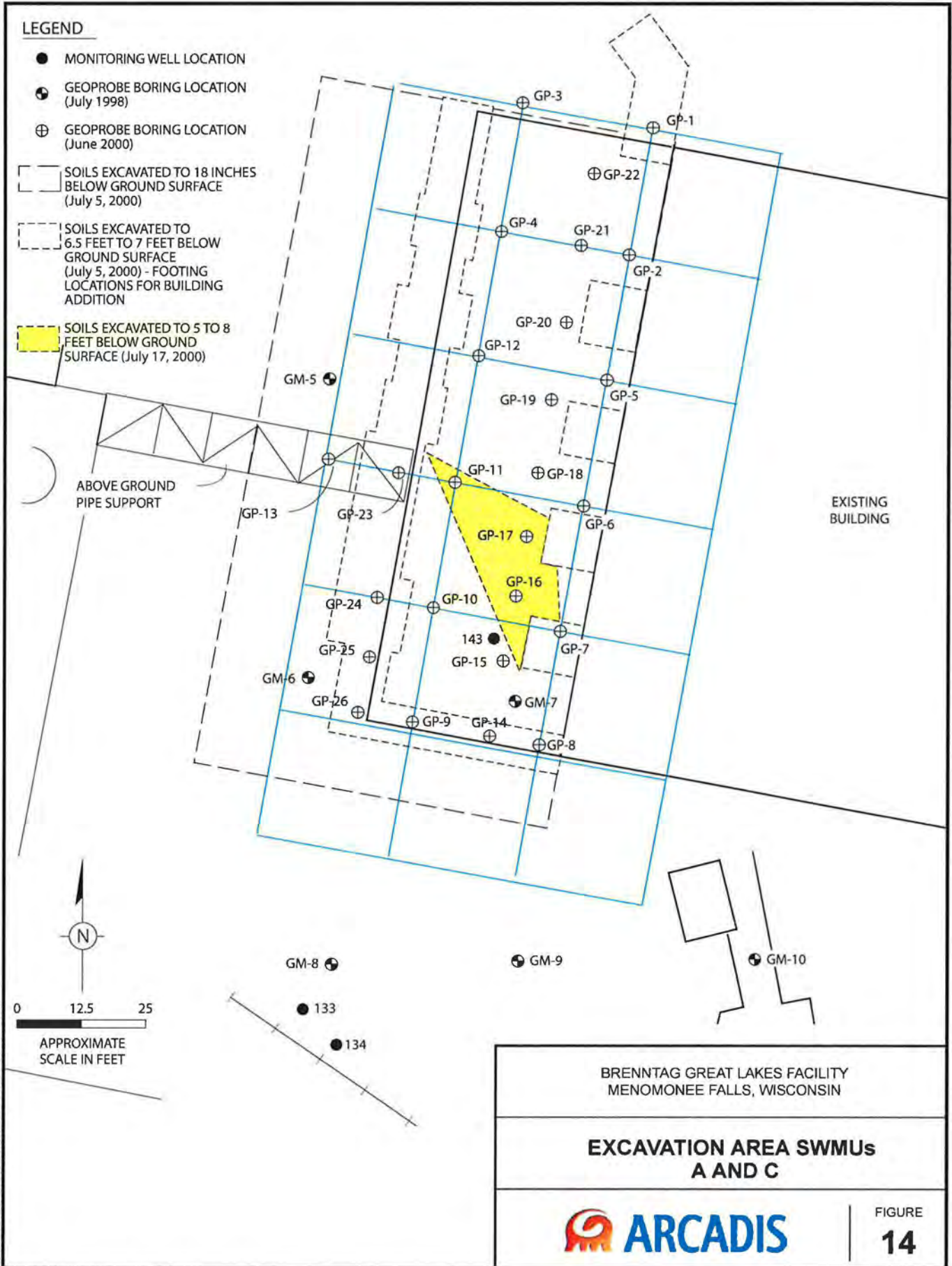
FIGURE  
**13**

10FEB10ENVIRONMNTAL/MB MIL/SOLV/0660COR\_ACT/INTEGRAPHICS/2010/DOLO\_08.A1



**LEGEND**

- MONITORING WELL LOCATION
- ⊕ GEOPROBE BORING LOCATION (July 1998)
- ⊕ GEOPROBE BORING LOCATION (June 2000)
- ▭ SOILS EXCAVATED TO 18 INCHES BELOW GROUND SURFACE (July 5, 2000)
- ▭ SOILS EXCAVATED TO 6.5 FEET TO 7 FEET BELOW GROUND SURFACE (July 5, 2000) - FOOTING LOCATIONS FOR BUILDING ADDITION
- ▭ SOILS EXCAVATED TO 5 TO 8 FEET BELOW GROUND SURFACE (July 17, 2000)



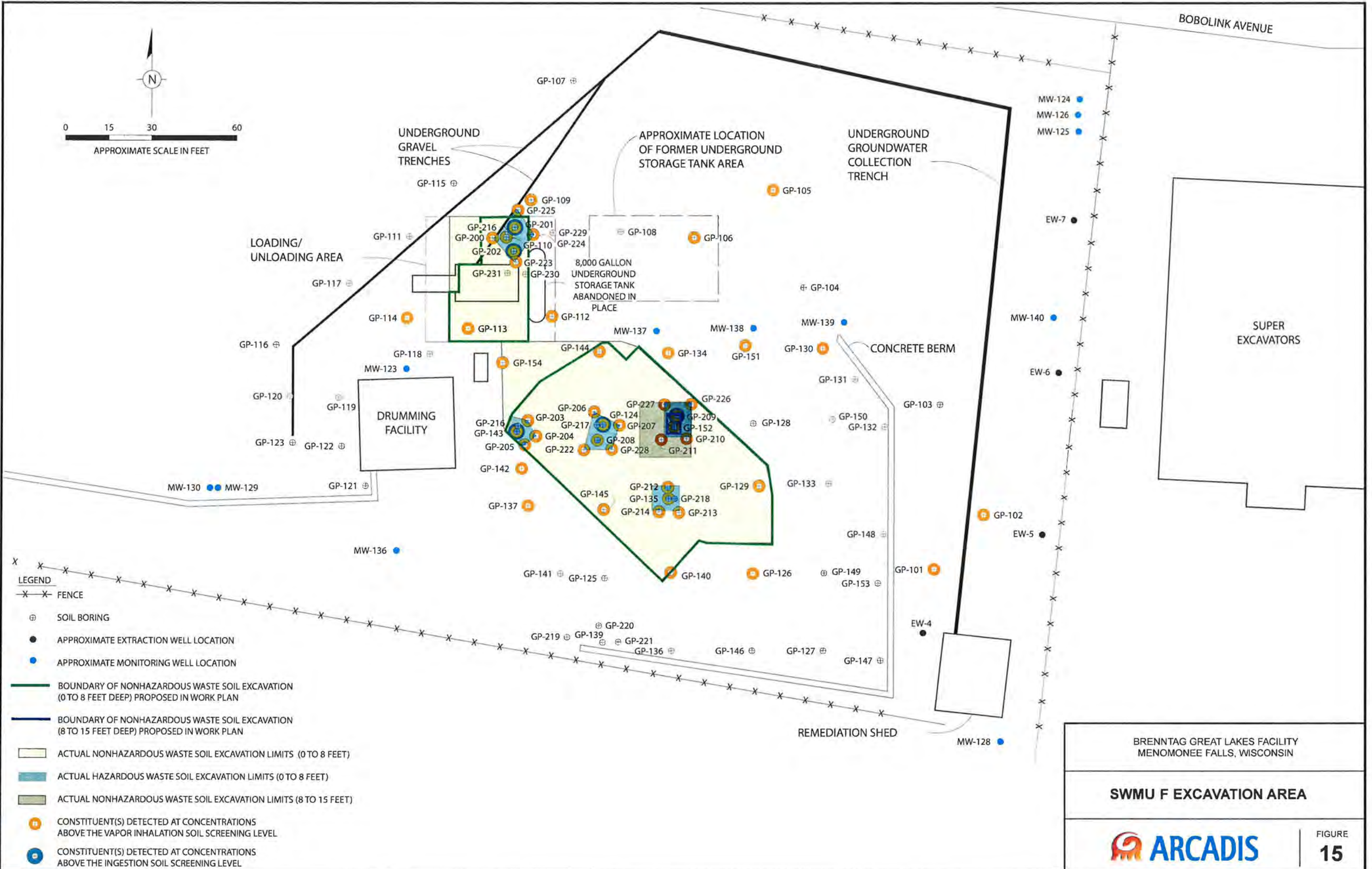
BRENNTAG GREAT LAKES FACILITY  
MENOMONEE FALLS, WISCONSIN

**EXCAVATION AREA SWMUs  
A AND C**



FIGURE  
**14**

26SEP12ENVIRONMENTEALMB  
MILSOLVW0886CARBONIGRAPHICSEXCAV 700.A1



27JUNE11ENVIRONMENTAL\MB  
MILSOLV\W0680\COR\_ACT\NIGRAPHICS\2011\EXCAVATION LIMIT\_0611.A1

BRENNTAG GREAT LAKES FACILITY  
MENOMONEE FALLS, WISCONSIN

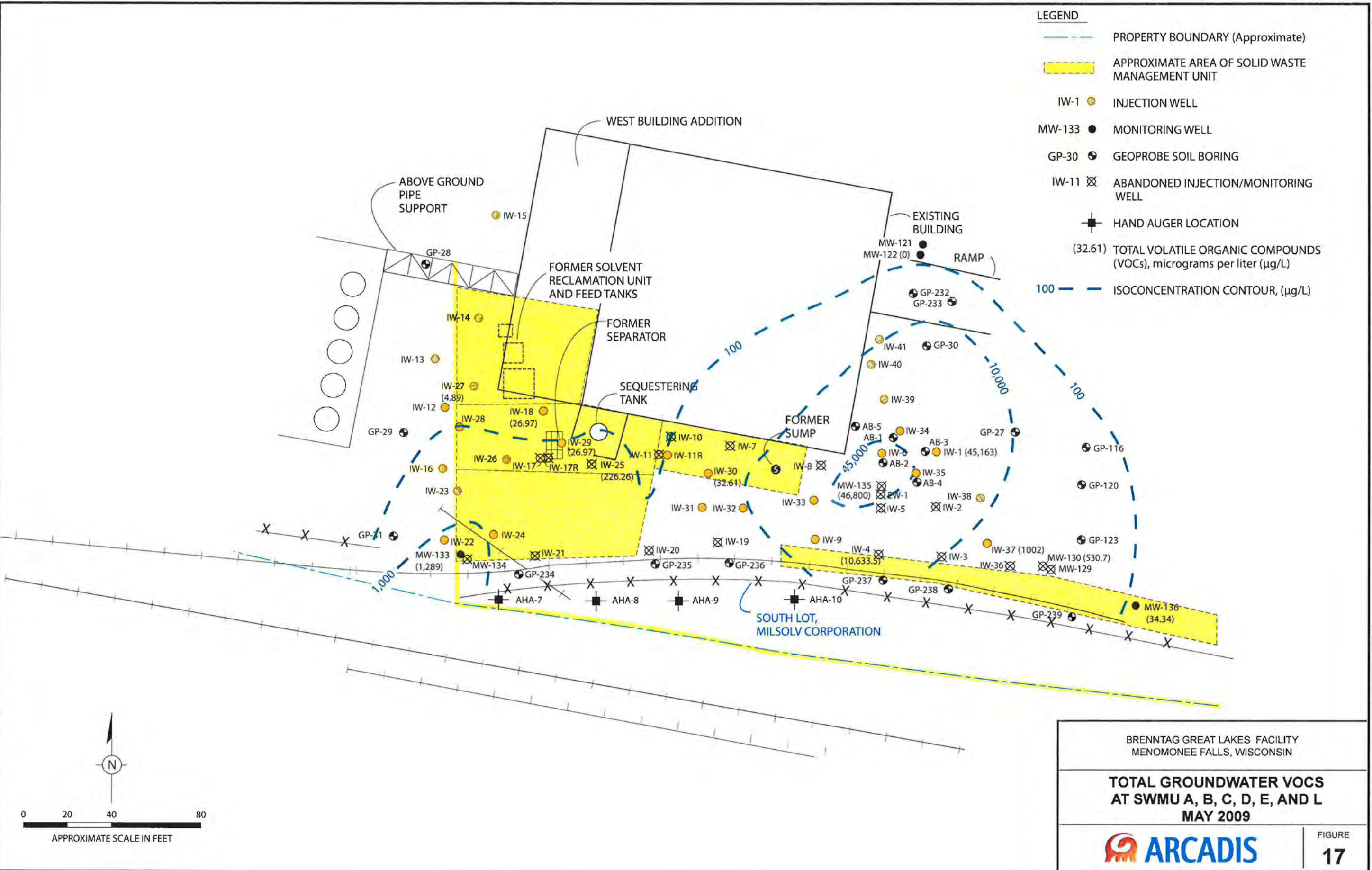
**SWMU F EXCAVATION AREA**

FIGURE  
**15**









01FEB11ENVIRONMENTAL/MB MILSOLV/06865CARBONICGRAPHISIGW\_VOCs 5-09 AI







**APPENDIX X**

**DNR RELICENSING REVIEW CHECKLIST**



**WISCONSIN DEPARTMENT OF NATURAL RESOURCES  
HAZARDOUS WASTE LICENSE APPLICATION (FPOR)  
COMPLETENESS AND TECHNICAL EVALUATION CHECKLIST  
GENERAL AND SPECIFIC REQUIREMENTS FOR  
CONTAINERS, TANKS AND MISCELLANEOUS UNITS**

Facility Name: Brenntag Great Lakes, LLC	Date Application Received:
FID #:	DNR Reviewer:
US EPA ID#: WID 023350192	Review Dates:

Use this checklist as a guide to determine if the Feasibility and Plan of Operation Report (FPOR) is complete and technically adequate for the storage or treatment of hazardous waste in containers, tanks, or miscellaneous units. The license applicant should indicate the location of the required information in the FPOR. The DNR license reviewer will review the information provided and determine if it is complete and technically adequate.

Note: More detailed information is given in the Wisconsin Administrative Code citation listed for each item. The inspection forms at <http://www.dnr.state.wi.us/org/aw/wm/publications/index.html> may also be used as a guide for AA/BB/CC requirements.

<b>PART I - GENERAL REQUIREMENTS</b>				
<b>Licensing Standard and Code Citation</b>	<b>Location In Report (Page, Section or N/A)</b>	<b>Complete? (Y/N/N/A)</b>	<b>Technically Adequate? (Y/N/N/A)</b>	<b>Comments</b>
<b>Section A. General Requirements NR 670.010 to NR 670.014</b>				
A.1. Two copies of license application submitted. NR 670.010(1)	Loose Copies, Pg. 1A-1, APP. A			
A.2. Appropriate plan review and license fees submitted. NR 670.010(12)	Pg. 1A-1			
A.3. Report signed by a president, secretary, treasurer or vice president of a corporation or other approved signatory. NR 670.011(1)	Pg. 1A-1			
A.4. Signature includes certification statement. NR 670.011(4)	Pg. 1A-1			
A.5. Claims of confidentiality are met. NR 670.012	Pg. 1A-1			
A.6. Summary of pre-application meeting, list of attendees/addresses and copies of written comments or materials submitted during meeting. NR 670.014(2)(v)	Pg. 1A-2			
A.7. Documentation showing compliance with local approval requirements. NR 670.014(2)(w)	Pg. 1A-2, APP. N			
A.8. Complete Part A application. NR 670.013	Pg. 1A-2, APP. A			
A.9. Technical data, such as design drawings and specifications and engineering studies are certified by WI registered PE. NR 670.014(1)	Pg. 1A-3			
A.10. General description of facility. NR 670.014(2)(a)	Pg. 1A-3			

A.11. Description of procedures, structures or equipment used to prevent hazards in unloading operations. NR 670.014(2)(h)1.	Pg. 1A-3			
<b>Licensing Standard and Code Citation</b>	<b>Location In Report (Page, Section or N/A)</b>	<b>Complete? (Y/N/N/A)</b>	<b>Technically Adequate? (Y/N/N/A)</b>	<b>Comments</b>
A.12. Description of procedures, structures or equipment used to prevent runoff from hazardous waste handling areas or to prevent flooding. NR 670.014(2)(h)2.	Pg. 1A-4			
A.13. Description of procedures, structures or equipment used to prevent contamination of water supplies. NR 670.014(2)(h)3.	Pg. 1A-4			
A.14. Description of procedures, structures or equipment used to mitigate effects of equipment failure or power outages. NR 670.014(2)(h)4.	Pg. 1A-4			
A.15. Description of procedures, structures or equipment used to prevent exposure of personnel. NR 670.0014(2)(h)5.	Pg. 1A-5, App. G			
A.16. Description of procedures, structures or equipment used to the atmosphere. NR 670.0014(2)(h)6.	Pg. 1A-5, App. I			
A.17. Traffic patterns, estimated traffic volume, traffic control, access road surfacing and load bearing capacity. NR 670.014(2)(j)	Pg. 1A-5, App. T			
A.18. Chemical and physical analyses of the hazardous waste and debris to be handled at the facility. NR 670.014(2)(b)	Pg. 1A-5, App. E			
A.19. Chemical and physical analyses contains all information that must be known to treat, store or dispose of the waste according to NR 664 requirements. NR 670.014(2)(b)	Pg. 1A-6, App. E			
A.20. Justification of any request for a waiver of the preparedness and prevention requirements of NR 664 subch. C. NR 670.014(2)(f)	Pg. 1A-6, App. F			
A.21. Description of precautions taken to prevent accidental ignition or reaction of ignitable, reactive or incompatible wastes, including A.22 to A.24. NR 670.014(2)(i)	Pg. 1A-7			
A.22. Ignitable and reactive waste is separated and protected from sources of ignition or reaction. NR 664.0017(1)	Pg. 1A-7			
A.23. Smoking and open flame are confined to specially designated locations when handling ignitable or reactive waste. NR 664.0017(1)	Pg. 1A-7			
A.24. "No Smoking" signs are conspicuously placed where there is a hazard from ignitable or reactive waste. NR 664.0017(1)	Pg. 1A-8			



Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
A.25. Documentation demonstrating compliance with A.22. to A.24., including references to published scientific or engineering literature, data from trial tests, waste analysis or the results of treatment of similar waste by similar treatment under similar operating conditions. NR 664.0017(3)	Pg. 1A-8			
<b>Section B. Noncompliance with Plans or Orders NR 670.014(2)(x)1.</b>				
B.1. Identification of all persons owning ≥10% legal or equitable interest in the applicant or their assets. NR 670.014(2)(x)1.a	Pg. 1B-1			
B.2. Identification of all WI solid or hazardous waste facilities for which applicant or other identified person is named in or subject to a department order or plan approval. NR 670.014(2)(x)1.b.	Pg. 1B-1			
B.3. Identification of all WI solid or hazardous waste facilities owned by the applicant or other identified person who owns or previously owned ≥10% interest in the assets. NR670.014(2)(x)1.c.	Pg. 1B-1			
B.4. Statement regarding whether or not all plan approvals and orders relating to all identified facilities are being complied with. NR 670.014(2)(x)1.d.	Pg. 1B-2			
<b>Section C. Environmental Impact Review NR 670.014(2)(x)2.</b>				
C.1. Purpose, history, background, relevant local, state and federal permits or approvals and zoning changes for the project. NR 670.014(2)(x)2.a.	Pg. 1C-1			
C.2. Description of proposed physical changes related to terrestrial resources, such as soil placement, construction of roads, surface water drainage and sedimentation controls. NR 670.014(2)(x)2.b.1)	Pg. 1C-1			
C.3. Description of proposed physical changes related to aquatic resources, such as impacts to streams, wetlands or other water bodies. NR 670.014(2)(x)2.b.2)	Pg. 1C-1			
C.4. Description of proposed physical changes related to the construction of buildings and other structures. NR 670.014(2)(x)2.b.3)	Pg. 1C-1			
C.5. Description of proposed physical changes related to air emissions and water discharges during facility construction, operation and closure. NR 670.014(2)(x)2.b.4)	Pg. 1C-2			

Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
C.6. Description of proposed physical changes related to any other changes anticipated with facility development. NR 670.014(2)(x)2.b.5)	Pg. 1C-2			
C.7. Maps, plans or other materials needed to clarify the information provided for C.2. to C.6. NR 670.014(2)(x)2.b.6)	Pg. 1C-2, App. I			
C.8. Description of the affects on the existing physical environment, such as topography, surface water drainage, hydrogeologic conditions, geology. NR 670.014(2)(x)2.c.1)	Pg. 1C-2			
C.9. Description of the affects on existing dominant aquatic and terrestrial plant and animal species and habitats. NR 670.014(2)(x)2.c.2)	Pg. 1C-2			
C.10. Description of the affects on existing land use, dominant features, and zoning in the area. NR 670.014(2)(x)2.c.3)	Pg. 1C-2			
C.11. Description of the affects on existing social and economic conditions, such as ethnic or cultural groups. NR 670.014(2)(x)2.c.4)	Pg. 1C-2			
C.12. Description of the affects on other existing special resources, such as archaeological, historical, state natural areas, or prime agricultural lands. NR 670.014(2)(x)2.c.5)	Pg. 1C-3			
C.13. Discussion of the probable adverse and beneficial physical impacts associated with facility design, construction and operation. NR 670.014(2)(x)2.d.1)	Pg. 1C-3			
C.14. Discussion of the probable adverse and beneficial biological impacts such as destruction and creation of habitat, alteration of physical environment and impacts to endangered or threatened species. NR 670.014(2)(x)2.d.2)	Pg. 1C-3			
C.15. Discussion of the probable adverse and beneficial impacts on land use. NR 670.014(2)(x)2.d.3)	Pg. 1C-3			
C.16. Discussion of the probable adverse and beneficial social and economic impacts to local residents, cultural groups and communities and industries served by the facility. NR 670.014(2)(x)2.d.4)	Pg. 1C-3			
C.17. Discussion of probable adverse and beneficial impacts on other special resources, such as archaeological, historical, state natural areas and prime agricultural lands. NR 670.014(2)(x)2.d.5)	Pg. 1C-4			



Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
C.18. Discussion of probable adverse impacts that cannot be avoided, such as groundwater and surface water impacts, modifications of topography, loss of agricultural or forest land, displacement of wildlife and adverse aesthetic impacts for people in and around the facility. NR 670.014(2)(x)2.d.6)	Pg. 1C-4			
C.19. Identify, describe and discuss feasible alternatives such as taking no action, enlargement, reduction or modification of the project. NR 670.014(2)(x)2.e.	Pg. 1C-4			
C.20. Needs determination, per s. 289.28, Wis. Stat. NR 670.014(2)(x)3.	Pg. 1C-4			
<b>Section D. Groundwater Protection NR 670.014(3)</b>				
D.1. If all regulated units meet NR 664.0090(2), this Section is not applicable.	Pg. 1D-1, App. P			
D.2. Summary of groundwater monitoring data from interim license period. NR 670.014(3)(a)	Pg. 1D-1, App. P			
D.3. Uppermost aquifer and aquifers hydraulically interconnected beneath the facility property, groundwater flow direction and rate, and basis of identification. NR 670.014(3)(b)	Pg. 1D-1, App. P			
D.4. Topographic map delineating waste management area, property boundary, point of compliance and proposed location of monitoring wells. NR 670.014(3)(c)	Pg. 1D-1, App. P			
D.5. Description of contamination plume that entered the groundwater from a regulated unit at the time of the application, delineation of the extent of the plume on the topographic map and identification of hazardous constituent concentrations in the plume. NR 670.014(3)(d)	Pg. 1D-1, App. P			
D.6. Detailed plans and engineering report describing the proposed groundwater monitoring program to be implemented per NR 664.0097. NR 670.014(3)(e)	Pg. 1D-1, App. P			
D.7. If hazardous constituents have not been detected in the groundwater at the time of the license application, sufficient information, supporting data and analyses to establish a detection monitoring program which meets NR 664.0098. NR 670.014(3)(f)	Pg. 1D-1, App. P			

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D.8. If hazardous constituents have been detected in the groundwater at the point of compliance at the time of the license application, sufficient information, supporting data and analyses to establish a compliance monitoring program meeting NR 664.0099. NR 670.014(3)(g)	Pg. 1D-1, App. P			
D.9. If hazardous constituents have been measured in the groundwater exceeding concentration limits in NR 664.0094 Table 1 or if groundwater monitoring conducted at the time of the license application at the waste boundary indicates the presence of hazardous waste constituents from the facility, sufficient information, supporting data and analyses to establish a corrective action program meeting NR 664.0100. NR 670.014(3)(h)	Pg. 1D-1, App. P			
<b>Section E. Corrective Action and Solid Waste Management Units NR 670.014(4)</b>				
E.1. If applicable, information regarding groundwater protection if there is a release from a SWMU. NR 670.014(3)	Pg. 1E-1, App. P			
E.2. Topographic map showing location of SWMU. NR 670.014(4)(a)1.	Pg. 1E-1, App. P			
E.3. Designate type of SWMU. NR 670.014(4)(a)2.	Pg. 1E-1, App. P			
E.4. General dimensions and structural description of SWMU. NR 670.014(4)(a)3.	Pg. 1E-1, App. P			
E.5. When the SWMU was operated. NR 670.014(4)(a)4.	Pg. 1E-1, App. P			
E.6. All wastes managed at the SWMU are specified. NR 670.014(4)(a)5.	Pg. 1E-1, App. P			
E.7. All available information pertaining to releases of hazardous waste constituents from hazardous waste units. NR 670.014(4)(b)	Pg. 1E-1, App. P			
E.8. Results of sampling and analysis of surface or groundwater, soil and air sampling if the department determines a RFA is necessary. NR 670.014(4)(c)	Pg. 1E-1, App. P			
<b>Section F. Location Standards NR 670.014(2)(k) and NR 670.014(2)(s)</b>				
F.1. Identify if facility is in a 100-year floodplain and source of data. NR 670.014(2)(k)3.	Pg. 1F-1, App. T			
F.2. Copy of federal insurance administration flood map, or calculations and maps if FIA map is not available. NR 670.014(2)(k)3.	Pg. 1F-1, App. T			
F.3. Identify 100-year flood level and other flooding factors (wave action) considered in design, construction, operation or maintenance of facility to withstand washout from 100 year flood. NR 670.014(2)(k)3.	Not Applicable			



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F.4. If facility is located in 100 year flood plain, engineering analysis of various hydrodynamic and hydrostatic forces. NR 670.014(2)(k)4.a. AND	Not Applicable			
F.5. Structural or other engineering studies showing design of operational units and flood protection devices and how they will prevent washout. NR 670.014(2)(k)4.b. OR	Not Applicable			
F.6. Description of procedures to move hazardous waste before flooding, including timing; new approved or licensed location; resources needed; and, potential of discharge during move. NR 670.014(2)(k)4.c.	Not Applicable			
F.7. If a facility located in a 100-year floodplain is not designed, constructed, operated and maintained to prevent washout, a demonstration that procedures in effect to move the waste safely to a location that is not vulnerable to flood waters before flood waters reach the facility. NR 664.0018(2)(a)	Not Applicable			
F.8. If an existing facility is not in compliance with F.7., a plan and schedule to bring the facility into compliance. NR 670.014(2)(k)5.	Not Applicable			
F.9. A dated topographic map showing a distance of 1,000 feet around the facility, with a scale of no more than 1 inch to 200 feet, and contour intervals that clearly shows pattern of surface water flow of waste management unit. NR 670.014(2)(s)	Pg. 1F-1, App. T			
F.10. Map shows map scale and date. NR 670.014(2)(s)1.	Pg. 1F-2			
F.11. Map shows 100 year flood plain area. NR 670.014(2)(s)2.	Pg. 1F-2			
F.12. Map shows surface waters, including intermittent streams. NR 670.014(2)(s)3	Pg. 1F-2			
F.13. Map shows surrounding land uses (residential, commercial, agricultural, recreational). NR 670.014(2)(s)4	Pg. 1F-2, App. T			
F.14. Map shows wind rose (prevailing wind speed and direction). NR 670.014(2)(s)5	Pg. 1F-2, App. T			
F.15. Map shows map orientation. NR 670.014(2)(s)6	Pg. 1F-2			
F.16. Map shows legal boundaries of the hazardous waste facility. NR 670.014(2)(s)7	Pg. 1F-2, App. T, App. Q			
F.17. Map shows access control (fence, gates). NR 670.014(2)(s)8	Pg. 1F-2			
F.18. Map shows location of injection or supply wells on-site and off-site. NR 670.014(2)(s)9	Pg. 1F-2, App. P			

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F.19. Map shows buildings and storage, treatment or disposal operations. NR 670.014(2)(s)10.	Pg. 1F-3			
F.20. Map shows other structures such as recreation areas, runoff control systems, roads, sewers, loading, unloading areas, etc. NR 670.014(2)(s)10.	Pg. 1F-3			
F.21. Map shows barriers for drainage or flood control. NR 670.014(2)(s)11.	Pg. 1F-3			
F.22. Map shows location of operational units where hazardous waste will be treated, stored or disposed. NR 670.014(2)(s)12.	Pg. 1F-3			
F.23. Facility is not located in a wetland. NR 670.014(2)(k)6.b.	Pg. 1F-3, App. T			
F.24. Facility is not located in a critical habitat for threatened or endangered species. NR 670.014(2)(k)6.a.	Pg. 1F-3			
<b>Section G: Waste Analysis Plan Requirements NR 670.014(2)(c)</b>				
G.1. Procedures for obtaining chemical and physical analyses of hazardous waste managed at facility. NR 664.0013(1)(a)	Pg. 1G-1, App. E			
G.2. Analysis by WI certified labs. NR 664.0013(1)(a)1.	Pg. 1G-1, App. E			
G.3. Description of other data to be used rather than lab analysis. NR 664.0013(1)(b)	Pg. 1G-1, App. E			
G.4. For off-site waste, analysis upon receipt to verify waste matches description on manifest. NR 670.0013(1)(d)	Pg. 1G-1, App. E			
G.5. Parameters for which waste will be analyzed and rationale. NR 664.0013(2)(a)	Pg. 1G-1, App. E			
G.6. Test methods that will be used. NR 664.0013(2)(b)	Pg. 1G-1, App. E			
G.7. Sampling methods to obtain representative sample. NR 664.0013(2)(c)	Pg. 1G-1, App. E			
G.8. Frequency of repeating initial analysis to ensure it is accurate and up to date. NR 664.0013(2)(d)	Pg. 1G-1, App. E			
G.9. At a minimum, analysis is repeated if the process generating the waste has changed or when the inspection upon receiving the waste does not match the description on the manifest. NR 664.0013(1)(c).	Pg. 1G-1, App. E			
G.10. For off-site waste, the waste analysis generators agree to supply. NR 664.0013(2)(e)	Pg. 1G-1, App. E			
G.11. If ignitable, reactive or incompatible wastes are managed, the waste analysis methods used to comply with NR 664.0017(3). NR 664.0013(2)(f)	Pg. 1G-1, App. E			



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G.12. If the facility is subject to NR 664 subch. AA standards for process vents, the test methods and procedures used to comply with NR 664.1034(4). NR 664.0013(2)(f)	Pg. 1G-1, App. E			
G.13. If the facility is subject to NR 664 subch. BB standards for equipment leaks, the test methods and procedures used to comply with NR 664.1063(4). NR 664.0013(2)(f)	Pg. 1G-1, App. E			
G.14. If the facility is subject to NR 664 subch. CC standards for containers or tanks, the waste determination procedures in NR 664.1083. NR 664.0013(2)(f)	Pg. 1G-1, App. E			
G.15. The testing performed to determine if the waste meets or exceeds LDR standards, as required by NR 668.07. NR 664.0013(2)(f)	Pg. 1G-1, App. E			
G.16. Information if seeking exemption to subch. CC requirements. NR 664.0013(2)(h)	Pg. 1G-1, App. E			
G.17. For off-site waste, procedures used to inspect, and if necessary, analyze each movement of waste to ensure it matches the identity of the waste designated on the manifest. NR 664.0013(3)	Pg. 1G-1, App. E			
<b>Section H: Security Requirements NR 670.014(2)(d)</b>				
H.1. Security procedures to prevent unknowing entry by a 24 hour surveillance system which continuously monitors and controls entry. NR 664.0014(2)(a) OR,	Pg. 1H-1			
H.2. The artificial or natural barrier surrounding active portions of facility and other means of controlled entry, such as gates or locked entrance AND NR 664.0014(2)(b)	Pg. 1H-1			
H.3. The placement of "Danger – Unauthorized Persons Keep Out" signs at entrances and other locations. NR 664.0014(3)	Pg. 1H-1			
H.4. Demonstration that the above security requirements are not necessary. NR 664.0014(1)	Not Applicable			
<b>I. General Inspection Requirements NR 670.014(2)(e)</b>				
I.1. Description of the equipment and devices inspected. NR 664.0015(2)(a)	Pg. 1I-1			
I.2. Description of problems checked during the inspection. NR 664.0015(2)(c)	Pg. 1I-1			
I.3. Inspection schedule for closed vent system and control device, required by NR 664.1033. NR 670.014(2)(d)	Pg. 1I-1			
I.4. Inspection schedule for subch. BB pumps in light liquid service, required by NR 664.1052. NR 670.014(2)(d)	Pg. 1I-1			

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I.5. Inspection schedule for subch. BB compressors, required by NR 664.1053. NR 670.014(2)(d)	Pg. 11-1			
I.6. Inspection schedule for subch. BB pumps and valves in heavy liquid service, pressure relief devices and connectors, required by NR 664.1058. NR 670.014(2)(d)	Pg. 11-1			
I.7. The inspection frequency for pumps, valves, pressure relief devices or connectors subject to subch. BB is adequate to prevent environmental or human health incidents. NR 664.0015(2)(d)	Pg. 11-1, App. F			
I.8. Areas subject to spills inspected daily when in use. NR 664.0015(2)(d)	Pg. 11-2			
I.9. Inspection frequency for other areas based on deterioration of equipment and probability of environmental or human health incident if problem goes undetected between inspections. NR 664.0015(2)(d)	Pg. 11-2			
I.10. Schedule to remedy ensures problem does not lead to environmental or health hazard. NR 664.0015(3)	Pg. 11-2			
I.11. Inspection log will be kept for at least 3 years and includes date and time of inspection; inspector name; observations made; date and type of remedial actions. NR 664.0015(4)	Pg. 11-3			
<b>Section J. Contingency Plan Requirements NR 670.014(2)(g)</b>				
J.1. Copy of Contingency Plan. NR 670.014(2)(g)	1J-1, App. F			
J.2. Plan is designed to minimize hazards to human health or the environment in the event of a release. NR 664.0051(1)	1J-1, App. F			
J.3. Provisions in the plan will be carried out immediately if release threatens human health or the environment. NR 664.0051(2)	1J-1, App. F			
J.4. Describes actions facility personnel will take if a release. NR 664.0052(1)	1J-1, App. F			
J.5. If using SPCC, it has been amended to incorporate hazardous waste provisions. NR 664.0052(2)	1J-1, App. F			
J.6. Describes arrangements with local emergency agencies, hospitals and contractors. NR 664.0052(3)	1J-1, App. F			
J.7. Current list of emergency coordinator (primary and alternate) names, addresses and home/office phone numbers. NR 664.0052(4)	1J-1, App. F			
J.8. Current list of emergency equipment, describing location, physical description and capability of each item. NR 664.0052(5)	1J-1, App. F			



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J.9. Evacuation plan, signals to begin evacuation and alternate routes. NR 664.0052(6)	1J-1, App. F			
J.10. Copy of plan kept at facility and copy sent to police and fire depts., hospital, and state and local response teams. NR 664.0053	1J-1, App. F			
J.11. Plan will be reviewed and amended, as necessary. NR 664.0054	1J-1, App. F			
J.12. Emergency coordinator always on premises or on call. NR 664.0055	1J-1, App. F			
J.13. Emergency coordinator is thoroughly familiar with plan, site operations, waste types handled, facility records and layout. NR 664.0055	1J-1, App. F			
J.14. Emergency coordinator has authority to commit resources to carry out contingency plan. NR 664.0055	1J-1, App. F			
J.15. Emergency coordinator activates alarms and notifies state or local agencies. NR 664.0056(1)	1J-1, App. F			
J.16. Emergency coordinator identifies the character, sources, amount and extent of release. NR 664.0056(2)	1J-1, App. F			
J.17. Emergency coordinator assesses possible hazards to human health and environment. NR 664.0056(3)	1J-1, App. F			
J.18. Emergency coordinator notifies local authorities if evacuation is necessary. NR 664.0056(4)(a)	1J-1, App. F			
J.19. Emergency coordinator notifies emergency response officials of release outside of facility. NR 664.0056(4)(b)	1J-1, App. F			
J.20. Emergency coordinator takes reasonable measures to ensure fire, explosion or release do not occur or spread to other hazardous waste. NR 664.0056(5)	1J-1, App. F			
J.21. Emergency coordinator monitors for leaks, pressure build-up, and gas generation if operations stop. NR 664.0056(6)	1J-1, App. F			
J.22. Emergency coordinator arranges for treatment, storage, or disposal of materials after emergency. NR 664.0056(7)	1J-1, App. F			
J.23. Emergency coordinator ensures no incompatible waste is treated, stored or disposed until cleanup is completed. NR 664.0056(8)(a)	1J-1, App. F			
J.24. Emergency coordinator ensures all emergency equipment is clean and fit for use before operations resume. NR 664.0056(8)(b)	1J-1, App. F			

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J.25. Owner or operator notifies department and state and local authorities before resuming operations. NR 664.0056(9)	1J-1, App. F			
J.26. Implementation of plan will be noted in operating log and incident report sent to WDNR in 15 days. NR 664.0056(10)	1J-1, App. F			
<b>Section K. Training Plan Requirements NR 670.014(2)(L)</b>				
K.1. Outline of both introductory and continuing training programs to prepare persons to operate or maintain facility in a safe manner. NR 670.014(2)(L)	1K-1, App. G			
K.2. Training program teaches personnel hazardous waste management procedures relevant to the positions in which they are employed. NR 664.0016(1)(b)	1K-1, App. G			
K.3. Training program ensures facility personnel can respond effectively to emergencies by familiarizing them with emergency procedures, equipment and systems. NR 664.0016(1)(c)	1K-1, App. G			
K.4. Personnel complete training within 6 months of being in new position and before working in unsupervised positions. NR 664.0016(2)	1K-1, App. G			
K.5. Training documentation includes job title, job description, type and amount of training to be given and training that is completed. NR 664.0016(4)	1K-1, App. G			
K.6. Brief description of how training will be designed to meet actual job tasks. NR 670.014(2)(L)	1K-1, App. G			
<b>L. Closure Plan Requirements NR 670.014(2)(m)</b>				
L.1. Copy of Closure Plan. NR 670.014(2)(m)	1L-1, App. J			
L.2. Description of how each unit will close during partial or final closure to minimize the need for further maintenance. NR 664.0112(2)(a)	1L-1, App. J			
L.3. Description of how each unit will close during partial or final closure to control, minimize or eliminate post-closure escape of hazardous waste constituents. NR 664.0112(2)(a)	1L-1, App. J			
L.4. Description of the maximum extent of operations during the active life of the facility. NR 664.0112(2)(b)	1L-1, App. J			
L.5. Estimate of maximum inventory during active life of facility. NR 664.0112(2)(c)	1L-1, App. J			



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L.6. Description of methods used to remove, transport, treat, store, and dispose of all hazardous waste during partial and final closure. NR 664.0112(2)(c)	1L-1, App. J			
L.7. Identification of the types of off-site hazardous waste management units to be used. NR 664.0112(2)(c)	1L-1, App. J			
L.8. Detailed description of steps needed to remove or decontaminate all hazardous waste residues and contaminated equipment, structures and soils during partial and final closure. NR 664.0112(2)(d)	1L-1, App. J			
L.9 Detailed description of other activities necessary to ensure all partial and final closures satisfy the closure performance standards. NR 664.0112(2)(e)	1L-1, App. J			
L.10. During closure of container areas, all hazardous waste and residues will be removed from the containment system; remaining contaminated structures and soil will be decontaminated or removed. NR 664.0178	1L-1, App. J			
L.11. During closure of tank systems, all waste residues, contaminated containment system components, soils, structures and equipment is decontaminated or removed. NR 664.0197(1)	1L-1, App. J			
L.12. Schedule for closure of each hazardous waste management unit and final closure of the facility. NR 664.0112(2)(f)	1L-1, App. J			
L.13. The estimated year of final closure if the financial mechanism is a trust fund and the facility expects to close before the operating license expires. NR 664.0112(2)(g)	1L-1, App. J			
L.14. Alternative requirements for closure established by the department. NR 664.0112(2)(h)	1L-1, App. J			
L.15. Department will be notified at least 180 days prior to partial or final closure. NR 664.0112(4)(a)	1L-1, App. J			
L.16. Within 90 days of receiving the final volume of hazardous waste, all hazardous waste is treated, or removed from the unit or facility. NR 664.0113(1)	1L-1, App. J			
L.17. Partial and final closure activities are completed within 180 days after receiving the final volume of hazardous waste. NR 664.0113(2)	1L-1, App. J			
L.18. All contaminated equipment, structures, and soils will be properly disposed of or decontaminated. NR 664.0114	1L-1, App. J			

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L.19. Within 60 days of completing final closure, a certification of closure will be sent to the department. NR 664.0115	1L-1, App. J			
<b>Section M: Closure cost estimate and financial responsibility NR 670.014(2)(o)</b>				
M.1. The most recent detailed written closure cost estimate in current dollars for closing the facility in accordance with the approved closure plan. NR 664.0142(1)	1M-1, App. J			
M.2. Cost estimate equals the cost of final closure when facility operations make closure the most expensive. NR 664.0142(1)(a)	1M-1, App. J			
M.3. Cost estimate is based on hiring a third party to close the facility. NR 664.0142(1)(b)	1M-1, App. J			
M.4. Cost estimate does not incorporate any salvage value of hazardous waste, structures, equipment, land or assets. NR 664.0142(1)(c)	1M-1, App. J			
M.5. Closure estimate does not include a zero cost for hazardous waste that might have economic value. NR 664.0142(1)(d)	1M-1, App. J			
M.6. Facility has established financial assurance that covers the closure cost estimate. NR 664.0143	1M-1, App. J			
M.7. The financial assurance mechanism meets all applicable requirements in NR 664.0143.	1M-1, App. J			
M.8. If a new facility, the financial assurance is submitted 60 days prior to initial receipt of waste. NR 670.014(2)(o)	Not Applicable			
<b>Section N: Pollution Liability Insurance NR 670.014(2)(q)</b>				
N.1. Copy of the insurance policy or other documentation demonstrating liability coverage. NR 670.014(2)(q)	Pg. 1N-1			
N.2. Financial responsibility covers bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility. NR 664.0147(1)	Pg. 1N-1			
N.3. Coverage for sudden accidental occurrences of at least \$1 million per occurrence with annual aggregate of at least \$2 million. NR 664.0147(1)	Pg. 1N-1			
N.4. If a new facility, documentation showing the amount of insurance to be in place before the initial receipt of waste. NR 670.014(2)(q).	Not Applicable			



<b>PART 2 – UNIT SPECIFIC REQUIREMENTS</b>				
<b>Licensing Standard and Code Citation</b>	<b>Location In Report (Page Or Section)</b>	<b>Complete (Y/N)</b>	<b>Technically Adequate (Y/N)</b>	<b>Comments</b>
<b>Section A: Container Standards – Inspections NR 670.014(2)(e)</b>				
A.1. Container storage areas inspected at least weekly for leaking containers and the deterioration of containers and containment system. NR 664.0174	Pg. 2A-1, App. F			
A.2. Inspection frequency of container storage areas is adequate to prevent environmental or human health incident. NR 664.0015(2)(d)	Pg. 2A-1, App. F			
A.3. Inspection schedule for subch. CC containers, as required by 664.1086. NR 670.014(2)(e)	Pg. 2A-1, App. F			
A.4. Inspection schedule includes inspection and monitoring requirements in NR 664.1088 for containers. NR 670.014(2)(e)	Pg. 2A-1, App. F			
A.5. The inspection frequencies required by subch. CC for containers are adequate to prevent environmental or human health incidents. NR 664.0015(2)(d)	Pg. 2A-1, App. F			
<b>Section B. Container Standards – Containment NR 670.015(1)</b>				
B.1. Base of containment system is designed and operated to be free of cracks or gaps and sufficiently impervious to leaks and precipitation until material is removed. NR 664.0175(2)(a)	Pg. 2B-1, App. T, App. U, App. Z			
B.2. Base is sloped or containment system is designed and operated to drain and remove liquids from leaks or precipitation OR containers are elevated or otherwise protected from contacting accumulated liquids. NR 664.0175(2)(b)	Pg. 2B-2, App. U			
B.3. Capacity of containment system is 10% of the volume of containers or the volume of the largest container, which ever is greater. Containers without free liquids need not be considered. NR 664.0175(2)(c)	Pg. 2B-2, App. U			
B.4. Run-on into the containment system is prevented unless the containment system has sufficient excess capacity to contain it. NR 664.0175(2)(d)	Pg. 2B-2, App. T			
B.5. Spilled waste and precipitation are removed from sump or collection area in a timely manner to prevent overflow. NR 664.0175(2)(e)	Pg. 2B-2			
B.6. The design and operation of the containment structure complies with B.1. to B.5. for containers of F020-F023 and F026-F027 wastes that do not contain free liquids. NR 664.0175(4)	Pg. 2B-3			

B.7. Description of basic design parameters, dimensions and materials of construction of the containment system. NR 670.015(1)(a)	Pg. 2B-3, App. U			
<b>Licensing Standard and Code Citation</b>	<b>Location In Report (Page, Section or N/A)</b>	<b>Complete ? (Y/N/N/A)</b>	<b>Technically Adequate? (Y/N/N/A)</b>	<b>Comments</b>
B.8. Description of how the design of the containment system promotes drainage or how containers are kept from contacting standing liquids. NR 670.015(1)(b)	Pg. 2B-3, App. U			
B.9. Description of the capacity of the containment system relative to the number and volume of containers to be stored. NR 670.015(1)(c)	Pg. 2B-3, App. U, App. Z			
B.10. Provisions for preventing or managing run-on. NR 670.015(1)(d)	Pg. 2B-3			
B.11. How accumulated liquids will be analyzed and removed to prevent overflow. NR 670.015(1)(e)	Pg. 2B-3			
B.12. Other than B.6., if all containers do not contain free liquids, either the storage area is sloped or otherwise designed to drain and remove precipitation; or, the containers are elevated or otherwise protected from contact with accumulated liquid. NR 670.015(2)	Pg. 2B-4, App. U			
B.13. Test procedures and results or other documentation or information showing waste in B.12. does not contain free liquids. NR 670.015(2)(a)	Pg. 2B-4			
B.14. Description of how the storage area for waste in B.12. is designed or operated to drain and remove liquids, or how containers with no free liquids are kept from contacting standing liquids. NR 670.015(2)(b)	Pg. 2B-4			
<b>Section C: Container Standards – Incompatible, Reactive, Ignitable Waste NR 670.015(3) and NR 670.015(4)</b>				
C.1. Sketches, drawings or data demonstrating containers of ignitable or reactive waste are located at least 50 feet from the facility property line. NR 664.0176	Pg. 2C-1, App. Q, App. U			
C.2. Sketches, drawings or data demonstrating storage containers of hazardous waste that are incompatible with other waste or materials stored nearby in other containers, piles or open tanks are separated or protected by a dike, berm, wall or other device. NR 664.0177(3)	Pg. 2C-1, App. T, App. Z			
C.3. Description of procedures to ensure incompatible wastes are not placed in the same container unless the requirements in C.4. to C.10. are met. NR 670.0015(4)	Pg. 2C-2, App. T, App. Z			
C.4. Precautions taken to prevent reactions generating extreme heat or pressure, fire or explosions or violent reactions. NR 664.0017(2)(a)	Pg. 2C-2			



Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
C.5. Precautions taken to prevent reactions producing uncontrolled toxic mists, fumes, dusts or gases in sufficient quantities to threaten human health or the environment. NR 664.0017(2)(b)	Pg. 2C-3, App. F			
C.6. Precautions taken to prevent reactions producing uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosion. NR 664.0017(2)(c)	Pg. 2C-3			
C.7. Precautions taken to prevent reactions damaging the structural integrity of the device or facility. NR 664.0017(2)(d)	Pg. 2C-3, App. F			
C.8. Precautions taken to prevent reactions through other means to threaten human health or the environment. NR 664.0017(2)(e)	Pg. 2C-3			
C.9. Documentation of compliance with C.4. to C.8., based on references to published scientific or engineering literature, data from trial tests, waste analyses or the results of treatment of similar wastes or similar treatment processes and under similar operating conditions. NR 664.0017(3)	Pg. 2C-3, App. U			
C.10. Description of procedures to ensure hazardous waste is not placed in an unwashed container that previously held an incompatible waste or material. NR 664.0177(2)	Pg. 2C-3, App. K			
<b>Section D: Tank Standards – General NR 670.016</b>				
D.1. Dimensions and capacity of each tank. NR 670.016(2)	Not Applicable			
D.2. Description of feed systems, safety cutoff, bypass systems and pressure controls. NR 670.016(3)	Not Applicable			
D.3. Diagram of piping, instrumentation and process flow for each tank system. NR 670.016(4)	Not Applicable			
D.4. Description of spill prevention controls, such as check valves, dry disconnect couplings. NR 664.0194(2)(a)	Not Applicable			
D.5. Description of overfill prevention controls, such as level sensing devices, high level alarms, automatic feed cutoff or bypass to a standby tank. NR 664.0194(2)(b)	Not Applicable			
D.6. Description of how sufficient freeboard in uncovered tanks will be maintained to prevent overtopping by wave or wind action or precipitation. NR 664.0194(2)(c)	Not Applicable			
<b>Section E: Tank Standards – Inspections NR 670.014(2)(e)</b>				
E.1. Inspection schedule for tank overfill controls. NR 664.0195(1).	Not Applicable			

Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
E.2. Aboveground portions of tank systems inspected at least once each operating day to detect corrosion or releases of waste. NR 664.1095(2)(a)	Not Applicable			
E.3. Construction materials and area immediately surrounding tank systems inspected at least once each operating day to detect erosion or signs of releases. NR 664.1095(2)(c)	Not Applicable			
E.4. Data gathered from monitoring and leak detection equipment inspected at least once each operating day to ensure the tank system is operated according to design. NR 664.1095(2)(b)	Not Applicable			
E.5. Proper operation of the cathodic protection system is confirmed by inspection within 6 months of initial installation and annually thereafter. NR 664.1095(3)(a)	Not Applicable			
E.6. All sources of impressed current inspected and/or tested, as appropriate, at least every other month. NR 664.1095(3)(b)	Not Applicable			
E.7. Inspection schedule for subch. CC tank requirements, as stated in 664.1084 and 664.1088. NR 670.014(2)(e)	Not Applicable			
E.8. Inspection frequencies required by subch. CC for tanks are adequate to prevent environmental or human health incidents. NR 664.0015(2)(d)	Not Applicable			
<b>Section F: Tank Standards – Existing Tanks NR 670.016(1)</b>				
F.1. For each tank system installed before March 1, 1991, a written assessment reviewed and certified by an independent, qualified, registered PE as to the structural integrity and suitability for handling hazardous waste which includes the information in F.2. to F.8. NR 670.016(1)	Not Applicable			
F.2. Design standards for construction of the tank and ancillary equipment. NR 664.0191(2)(a)	Not Applicable			
F.3. Hazardous characteristics for the wastes handled. NR 664.0191(2)(b)	Not Applicable			
F.4. Existing corrosion protection measures. NR 664.0191(2)(c)	Not Applicable			
F.5. The age of the tank system, either documented or estimated. NR 664.0191(2)(d)	Not Applicable			
F.6. Results of a leak test, internal inspection or other tank integrity examination. NR 664.0191(2)(e)	Not Applicable			



Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
F.7. If underground tanks cannot be entered, a leak test capable of taking into account the effects of temperature variations, tank end deflection, vapor pockets and high water table effects. NR 664.0191(2)(e)1.	Not Applicable			
F.8. If other tanks cannot be entered, a leak test or other integrity examination certified by a PE that addresses cracks, leaks, corrosion, and erosion. NR 664.0191(2)(e)2.	Not Applicable			
F.9. If, as a result of the assessment, the tank was found to be leaking or unfit for use, steps were taken to comply with F.10. to F.22. NR 664.0191(4)	Not Applicable			
F.10. Tank system or secondary containment system removed from service immediately. NR 664.0196	Not Applicable			
F.11. Flow of hazardous waste into the tank system or secondary containment system stopped immediately and the system inspected to determine the cause of the release. NR 664.0196(1)	Not Applicable			
F.12. If the release was from the tank system, as much waste as necessary was removed to prevent further releases and to allow inspection and repair of the tank system within 24 hours after detection or at the earliest practicable time. NR 664.0196(2)(a)	Not Applicable			
F.13. If the material was released to a secondary containment system, all released material was removed within 24 hours or in a timely manner to prevent harm to human health and the environment. NR 664.0196(2)(b)	Not Applicable			
F.14. Visual inspection of the release conducted. NR 664.0196(3)	Not Applicable			
F.15. Further migration of the spill to soils or surface water was prevented. NR 664.0196(3)(a)	Not Applicable			
F.16. Visible contamination of the soil or surface water was removed and properly disposed. NR 664.0196(3)(b)	Not Applicable			
F.17. Release reported to the Department within 24 hours of its detection, unless less than one pound was released and material was contained and cleaned up immediately. NR 664.0196(4)	Not Applicable			
F.18. Written report submitted to the Department within 30 days of detecting the release. NR 664.0196(4)(c)	Not Applicable			

Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
F.19. System was returned to service after cleanup and repairs if the integrity of the tank system was not damaged. NR 664.0196(5)(b)	Not Applicable			
F.20. If the leak was from the tank system into secondary containment, the system was repaired before the tank was returned to service. NR 664.0196(5)(c)	Not Applicable			
F.21. If the leak was from a component that did not have secondary containment, either secondary containment will be provided or repairs are made if the component can be visually inspected. NR 664.0196(5)(d)	Not Applicable			
F.22. If major repairs were made, a PE certification was submitted to the Department within 7 days of returning the tank system to use. NR 664.0196(6)	Not Applicable			
<b>Section G: Tank Standards – New Tanks NR 670.016(1) and NR 670.016(6)</b>				
G.1. For each new tank system, a written assessment reviewed and certified by an independent, qualified, registered PE as to the structural integrity and suitability for handling hazardous waste which includes the information in G.2. to G.19. NR 670.016(1)	Not Applicable			
G.2. Design standards to which the tanks and ancillary equipment are constructed. NR 664.0192(1)(a)	Not Applicable			
G.3. Hazardous characteristics of the wastes to be handled. NR 664.0192(1)(b)	Not Applicable			
G.4. If the external shell of the metal tank or any external metal component of the tank system will be in contact with soil or water, a determination by a corrosion expert of factors affecting the potential for corrosion, including G.5. to G.9, at a minimum. NR 664.0192(1)(c)	Not Applicable			
G.5. Soil moisture content, pH, sulfides level, and resistivity. NR 664.0192(1)(c)1	Not Applicable			
G.6. Structure to soil potential. NR 664.0192(1)(c)1	Not Applicable			
G.7. Influence of nearby underground metal structures, such as piping. NR 664.0192(1)(c)1	Not Applicable			
G.8. Existence of stray electric current. NR 664.0192(1)(c)1	Not Applicable			
G.9. Existing corrosion-protection measures. NR 664.0192(1)(c)1	Not Applicable			



Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
G.10. A description of materials and equipment used to provide external corrosion protection to ensure the integrity of the tank system during its use, including one or more of those in G.11 to G.13. NR 664.0192(1)(c)2	Not Applicable			
G.11. Corrosion-resistant materials of construction such as special alloys, fiberglass, reinforced plastic, etc. NR 664.0192(1)(c)2.a.	Not Applicable			
G.12. Corrosion-resistant coating with cathodic protection. NR 664.0192(1)(c)2.b.	Not Applicable			
G.13. Electrical isolation devices such as insulating joints, flanges, etc. NR 664.0192(1)(c)2.c.	Not Applicable			
G.14. For underground tank system components that are likely to be adversely affected by vehicular traffic, the design or operational measures that will protect the tank system against potential damage. NR 664.0192(1)(d)	Not Applicable			
G.15. Design considerations to ensure tank foundations will maintain the load of a full tank. NR 664.0192(1)(e)1.	Not Applicable			
G.16. Design considerations to ensure tank systems will be anchored to prevent flotation or dislodgment when the tank system is placed in a saturated zone. NR 664.0192(1)(e)2.	Not Applicable			
G.17. Design considerations to ensure tank systems will withstand the effects of frost heave. NR 664.0192(1)(e)3.	Not Applicable			
G.18. Foundation, structural support, seams, connections and pressure controls, if needed, are adequately designed to ensure the tank system will not collapse, rupture or fail. NR 664.0192(1)	Not Applicable			
G.19. The tank system has sufficient structural strength, compatibility with the wastes to be stored or treated and corrosion protection to ensure it will not collapse, rupture or fail. NR 664.0192(1)	Not Applicable			
G.20. A detailed description of how the tank systems will be installed in compliance with G.21. to G.28. NR 670.016(6)	Not Applicable			

Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
G.21. Before covering, enclosing or placing a new tank system or component in use, an independent qualified installation inspector or registered PE who is trained and experienced in the proper installation of tank systems or components will inspect the system for the presence of weld breaks, punctures, scrapes of protective coatings, cracks, corrosion and other structural damage or inadequate construction or installation. NR 664.0192(2)	Not Applicable			
G.22. All structural damage or inadequate construction or installation will be remedied before the tank system is covered, enclosed or placed in use. NR 664.0192(2)	Not Applicable			
G.23. For tank systems or components placed underground, the backfill material is noncorrosive, porous and homogeneous, installed so the backfill is placed completely around the tank, and compacted to ensure the tank and piping are fully and uniformly supported. NR 664.0192(3)	Not Applicable			
G.24. All tanks and ancillary equipment will be tightness tested before being covered, enclosed or placed in use. NR 664.0192(4)	Not Applicable			
G.25. If the tank system is found not to be tight, all repairs necessary to remedy the leaks in the system will be performed before the tank system is covered, enclosed or placed into use. NR 664.0192(4)	Not Applicable			
G.26. Ancillary equipment is supported and protected against physical damage and excessive stress due to settlement, vibration, expansion or contraction. NR 664.0192(5)	Not Applicable			
G.27. The type and degree of corrosion protection recommended by an independent corrosion expert is provided. NR 664.0192(6)	Not Applicable			
G.28. If field fabricated, a corrosion expert will supervise the installation of the corrosion protection system to ensure proper installation. NR 664.0192(6)	Not Applicable			
<b>Section H: Tank Standards – Secondary Containment NR 670.016(7) and NR 670.016(8)</b>				
H.1. Detailed plans and description of how the secondary containment system for each tank system meets the requirements stated in H.2. to H.9. NR 670.016(7)	Not Applicable			



Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
H.2. Designed, constructed and operated to prevent the migration of wastes or accumulated liquid out of the system to the soil, groundwater or surface water at any time during use of the tank system. NR 664.0193(2)(a)	Not Applicable			
H.3. Designed, constructed and operated to detect and collect releases and accumulated liquid until the material is removed. NR 664.0193(2)(b)	Not Applicable			
H.4. Constructed of or lined with materials that are compatible with the wastes to be placed in the tank system. NR 664.0193(3)(a)	Not Applicable			
H.5. Has sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste, climatic conditions and stress of daily operation. NR 664.0193(3)(a)	Not Applicable			
H.6. Placed on a foundation or base capable of providing support and resistance to pressure gradients above and below the system, and preventing failure due to settlement, compression or uplift. NR 664.0193(3)(b)	Not Applicable			
H.7. Provided with a leak detection system designed and operated to detect the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours or at the earliest practicable time unless demonstrated that existing detection technologies or site conditions will not allow detection of a release within 24 hours. NR 664.0193(3)(c)	Not Applicable			
H.8. Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills or precipitation. NR 664.0193(3)(d)	Not Applicable			
H.9. Spilled or leaked waste and accumulated precipitation will be removed from the secondary containment system within 24 hours or in a timely manner that prevents harm to human health and the environment if demonstrated that the material cannot be removed in 24 hours. NR 664.0193(3)(d)	Not Applicable			
H.10. Detailed plans and description of how an external liner system for each tank system meets the requirements stated in H.11. to H.14. NR 670.016(7)	Not Applicable			

Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
H.11. Designed or operated to contain 100% of the capacity of the largest tank within its boundary. NR 664.0193(5)(a)1.	Not Applicable			
H.12. Designed or operated to prevent run-on or infiltration of precipitation into the external liner system unless the collection system has sufficient excess capacity to contain run-on or infiltration from a 25 year, 24 hour rainfall event. NR 664.0193(5)(a)2.	Not Applicable			
H.13. Free of cracks and gaps. NR 664.0193(5)(a)3.	Not Applicable			
H.14. Designed and installed to surround the tank completely and cover all surrounding earth likely to come into contact with the waste if a release from the tank (capable of preventing lateral and vertical migration of waste). NR 664.0193(5)(a)4.	Not Applicable			
H.15. Detailed plans and description of how a vault system for each tank system meets the requirements stated in H.16. to H.21. NR 670.016(7)	Not Applicable			
H.16. Designed or operated to contain 100% of the capacity of the largest tank within its boundary. NR 664.0193(5)(b)1.	Not Applicable			
H.17. Designed or operated to prevent run-on or infiltration of precipitation into the vault system unless the collection system has sufficient excess capacity to contain run-on or infiltration from a 25 year, 24 hour rainfall event. NR 664.0193(5)(b)2.	Not Applicable			
H.18. Constructed with chemical-resistant water stops in place at all joints. NR 664.0193(5)(b)3.	Not Applicable			
H.19. Provided with an impermeable interior coating or lining compatible with the stored waste to prevent migration of waste into the concrete. NR 664.0193(5)(b)4.	Not Applicable			
H.20. Provided with a means to protect against the formation and ignition of vapors within the vault, if the waste stored or treated is ignitable waste or reactive waste capable of forming ignitable or explosive vapor. NR 664.0193(5)(b)5.	Not Applicable			
H.21. Provided with an exterior moisture barrier or otherwise designed or operated to prevent migration of moisture into the vault if it is subject to hydraulic pressure. NR 664.0193(5)(b)6.	Not Applicable			



Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
H.22. Detailed plans and description of how a double-walled tank system for each tank system meets the requirements stated in H.23. to H.25. NR 670.016(7)	Not Applicable			
H.23. Designed as an integral structure so that the outer shell contains any release from the inner tank. NR 664.0193(5)(c)1.	Not Applicable			
H.24. Protected, if constructed of metal, from both corrosion of the primary tank interior and of the external surface of the outer shell. NR 664.0193(5)(c)2.	Not Applicable			
H.25. Provided with a built-in continuous leak detection system capable of detecting a release within 24 hours or at the earliest practicable time if demonstrated that existing detection technology or site conditions would not allow detection of a release within 24 hours. NR 664.0193(5)(c)3.	Not Applicable			
H.26. Detailed plans and description of how ancillary equipment for each tank system will be provided with secondary containment except for aboveground piping; welded flanges, joints and connections; sealless or magnetic coupling pumps and sealless valves; and, pressurized aboveground piping systems with automatic shut-off devices that are visually inspected for leaks on a daily basis. NR 664.0193(6)	Not Applicable			
H.27. If seeking an alternative to the requirements of this section, detailed plans and engineering and hydrogeologic reports describing alternate design and operating practices; and, an evaluation of location characteristics which demonstrate the migration of hazardous waste or constituents into groundwater or surface water during the life of the facility is prevented. NR 670.016(8)(a)	Not Applicable			
H.28. If seeking an alternative to the requirements of this section, a detailed assessment of the substantial present or potential hazards posed to human health or the environment should a release enter the environment. NR 670.016(8)(b)	Not Applicable			
<b>Section I: Tank Standards – Ignitable, Reactive and Incompatible Wastes NR 670.016(10)</b>				

Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
I.1. If ignitable or reactive waste is treated, rendered or mixed before or immediately after placement in the tank system, a description of how operating procedures and tank system and facility design will ensure the resulting waste, mixture or dissolved material no longer meets the definition of ignitable or reactive waste. NR 664.0198(1)(a)1.	Not Applicable			
I.2. If ignitable or reactive waste is treated, rendered or mixed before or immediately after placement in the tank system, a description of how operating procedures and tank system and facility design will ensure I.3. to I.7. will be met. NR 664.0198(1)(a)2.	Not Applicable			
I.3. Precautions taken to prevent reactions generating extreme heat or pressure, fire or explosions or violent reactions. NR 664.0017(2)(a)	Not Applicable			
I.4. Precautions taken to prevent reactions producing uncontrolled toxic mists, fumes, dusts or gases in sufficient quantities to threaten human health or the environment. NR 664.0017(2)(b)	Not Applicable			
I.5. Precautions taken to prevent reactions producing uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosion. NR 664.0017(2)(c)	Not Applicable			
I.6. Precautions taken to prevent reactions damaging the structural integrity of the device or facility. NR 664.0017(2)(d)	Not Applicable			
I.7. Precautions taken to prevent reactions which, through other means, threaten human health or the environment. NR 664.0017(2)(e)	Not Applicable			
I.8. Documentation demonstrating compliance with I.2. to I.7., including references to published scientific or engineering literature, data from trial tests, waste analysis or the results of treatment of similar waste by similar treatment under similar operating conditions. NR 664.0017(3)	Not Applicable			
I.9. If ignitable or reactive waste is placed in the tank system, an alternative to I.2. to I.8. is to provide a description of how operating procedures and tank system and facility design will ensure the waste is stored or treated in such a way that it is protected from any material or conditions that may cause the waste to ignite or react. NR 664.0198(1)(b)	Not Applicable			



Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
I.10. If ignitable or reactive waste is placed in the tank system, an alternative to I.2 to I.8 or I.9. is to provide a description of how operating procedures, the tank system and facility design will ensure the tank system is used solely for emergencies. NR 664.0198(1)(c)	Not Applicable			
I.11. If the facility stores or treats ignitable or reactive waste in a tank, demonstrate compliance with the requirements to maintain protective distances between the waste management area and any public ways, streets, alleys or an adjoining property line that can be built upon, as required by Tables 2-1 to 2-6 of NFPA's "Flammable and Combustible Liquids Code. NR 664.0198(2)	Not Applicable			
I.12. Incompatible wastes are not placed in the same tank system unless the requirements in I.3. to I.8. are met. NR 664.0199(1)	Not Applicable			
I.13. Hazardous waste is not placed in a tank system that previously held an incompatible waste and has not been decontaminated unless the requirements of I.3. to I.8. are met. NR 664.0199(2)	Not Applicable			
<b>Section J: Standards for Miscellaneous Units – Storage and Treatment NR 670.023</b>				
J.1. Detailed description of the unit being used or proposed for use. NR 670.023(1)	Not Applicable			
J.2. Detailed description of the physical characteristics, materials of construction and dimensions of the unit. NR 670.023(1)(a)	Not Applicable			
J.3. Detailed plans and engineering reports describing how the unit will be located, designed, constructed, operated, maintained, monitored, inspected and closed to comply with J.4. to J.34. NR 670.023(1)(b)	Not Applicable			
J.4. Prevention of releases that may have adverse effects on human health or the environment due to migration of waste constituents in the groundwater or subsurface environment, considering items J.5. to J.13. NR 664.0601(1)	Not Applicable			
J.5. The volume and physical and chemical characteristics of the waste in the unit, including potential for migration through soil, liners or other containing structures. NR 664.0601(1)(a)	Not Applicable			
J.6. The hydrologic and geologic characteristics of the unit and surrounding area. NR 664.0601(1)(b)	Not Applicable			

Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
J.7. The existing quality of groundwater, including other sources of contamination and their cumulative impact on groundwater. NR 664.0601(1)(c)	Not Applicable			
J.8. Quantity and direction of groundwater flow. NR 664.0601(1)(d)	Not Applicable			
J.9. Proximity to and withdrawal rates of current and potential groundwater users. NR 664.0601(1)(e)	Not Applicable			
J.10. Patterns of land use in the region. NR 664.0601(1)(f)	Not Applicable			
J.11. Potential of migration or deposition of waste constituents into subsurface physical structures and into the root zone of food-chain crops and other vegetation. NR 664.0601(1)(g)	Not Applicable			
J.12. Potential for health risks caused by human exposure to waste constituents. NR 664.0601(1)(h)	Not Applicable			
J.13. Potential for damage to domestic animals, wildlife, crops, vegetation and physical structures caused by exposure to waste constituents. NR 664.0601(1)(i)	Not Applicable			
J.14. Prevention of any releases that may have adverse effects on human health or the environment due to migration of waste constituents in surface water, wetlands, or on soil surface, considering J.15.- J.25. NR 664.0601(2)	Not Applicable			
J.15. Volume and physical and chemical characteristics of the waste in the unit. NR 664.0601(2)a.	Not Applicable			
J.16. Effectiveness and reliability of containing, confining and collecting systems and structures in preventing migration. NR 664.0601(2)b.	Not Applicable			
J.17. Hydrologic characteristics of the unit and the surrounding area, including the topography of the land around the unit. NR 664.0601(2)c.	Not Applicable			
J.18. Precipitation patterns in the region. NR 664.0601(2)d.	Not Applicable			
J.19. Quantity, quality and direction of groundwater flow. NR 664.0601(2)e.	Not Applicable			
J.20. Proximity of the unit to surface waters NR 664.0601(2)f.	Not Applicable			
J.21. Current and potential uses of nearby surface waters and any water quality standards established for those surface waters. NR 664.0601(2)g.	Not Applicable			

Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
J.22. Existing quality of surface waters and surface soils, including other sources of contamination and their cumulative impact on surface waters and surface soils. NR 664.0601(2)(h)	Not Applicable			
J.23. Land use patterns in the region. NR 664.0601(2)(i)	Not Applicable			
J.24. Potential for health risks caused by human exposure to waste constituents. NR 664.0601(2)(j)	Not Applicable			
J.25. Potential for damage to domestic animals, wildlife, crops, vegetation and physical structures caused by exposure to waste constituents. NR 664.0601(2)(k)	Not Applicable			
J.26. Prevention of releases that may have adverse effects on human health or the environment due to migration of waste constituents in the air, considering J.27. to J.33. NR 664.0601(3)	Not Applicable			
J.27. Volume, physical and chemical characteristics of the waste in the unit, including its potential for the emission and dispersal of gases, aerosols and particulates. NR 664.0601(3)a.	Not Applicable			
J.28. Effectiveness and reliability of systems and structures to reduce or prevent emissions of hazardous constituents to the air. NR 664.0601(3)b.	Not Applicable			
J.29. Operating characteristics of the unit. NR 664.0601(3)c.	Not Applicable			
J.30. Atmospheric, meteorologic and topographic characteristics of the unit and the surrounding area. NR 664.0601(3)d.	Not Applicable			
J.31. Existing quality of the air, including other sources of contamination and their cumulative impact on the air. NR 664.0601(3)e.	Not Applicable			
J.32. Potential for health risks caused by human exposure to waste constituents. NR 664.0601(3)f.	Not Applicable			
J.33. Potential for damage to domestic animals, wildlife, crops, vegetation and physical structures caused by exposure to waste constituents. NR 664.0601(3)g.	Not Applicable			
J.34. Inspection procedures and frequencies minimize or prevent releases that may have adverse effects on human health or the environment. NR 664.0602	Not Applicable			



Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
J.35. Detailed hydrologic, geologic and meteorologic assessments and land-use maps for the region surrounding the site that address and ensure compliance of the unit with each factor in J.4. to J.33. NR 670.023(2)	Not Applicable			
J.36. Only preliminary hydrologic, geologic and meteorologic assessments are submitted if the applicant demonstrates they do not violate the environmental performance standards in J.4. to J.33. NR 670.023(2)	Not Applicable			
J.37. Information on the potential pathways of exposure of humans or environmental receptors to hazardous waste constituents and the potential magnitude and nature of exposures. NR 670.023(3)	Not Applicable			
J.38. For treatment units, a report on a demonstration of the effectiveness of the treatment based on laboratory or field data. NR 670.023(4)	Not Applicable			
J.39. Additional information necessary to evaluate if the unit complies with the environmental performance standards in J.4 to J.33., as determined by the department. NR 670.023(5)	Not Applicable			
J.40. If an existing miscellaneous unit located in a 100-year floodplain is not designed, constructed, operated and maintained to prevent washout, a demonstration that no adverse effects on human health or the environment will result if washout occurs, considering the volume and physical and chemical characteristics of the waste, and the concentrations and potential impacts of hazardous constituents on surface waters, sediments or soils. NR 664.0018(2)(a)2.	Not Applicable			
J.41. If an existing miscellaneous unit is not in compliance with J.40. and there are no procedures to move the waste to a location that is not vulnerable to flood waters, a plan and schedule to bring the facility into compliance. NR 670.014(2)(k)5.	Not Applicable			
<b>Section K: Subch. AA – Air Emission Control Standards for Process Vents NR 670.024</b>				
K.1. Documentation of compliance with the process vent standards in NR 664.1032, including K.2. to K.6. NR 670.024(2)	Not Applicable			
K.2. A facility plot plan and information identifying the hazardous waste management units in the facility, the approximate location of each affected hazardous waste management unit in the facility and all affected process vents. NR 670.024(2)(a)	Not Applicable			

Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
K.3. Information on annual throughput and operating hours of each affected unit, estimated emission rates for each affected vent and the overall facility. NR 670.024(2)(a)	Not Applicable			
K.4. Information and data supporting estimates of vent emissions and emission reduction achieved by add-on control devices based on engineering calculations or source tests. NR 670.024(2)(b)	Not Applicable			
K.5. Estimates of vent emissions and emission reductions are made using operating parameter values that represent the conditions that exist when the waste management unit is operating at the highest load or capacity level reasonably expected to occur. NR 670.024(2)(b)	Not Applicable			
K.6. Information and data used to determine whether or not a process vent is subject to NR 664.1032. NR 670.024(2)(c)	Not Applicable			
K.7. Documentation of compliance with NR 664.1033, including information in K.8 to K.13. NR 670.024(4)	Not Applicable			
K.8. List of all information references and sources used in preparing the documentation. NR 670.024(4)(a)	Not Applicable			
K.9. Records, including the dates of each compliance test required by NR 664.1033(11). NR 670.024(4)(b)	Not Applicable			
K.10. Design analysis, specifications, drawings, schematics, and piping and instrumentation diagrams based on APTI Course 41.5 or other acceptable references. NR 670.024(4)(c)	Not Applicable			
K.11. Design analysis addresses the vent stream characteristic and control device operation parameters specified in NR 664.1035(2)(d). NR 670.024(4)(c)	Not Applicable			
K.12. Statement signed and dated by the owner/operator certifying the operating parameters used in the design analysis reasonably represent conditions that exist when the unit operates at the highest capacity reasonably expected to occur. NR 670.024(4)(d)	Not Applicable			
K.13. Statement signed and dated by the owner/operator certifying the control device for the affected process vents is designed to operate at the required efficiency levels. NR 670.024(4)(e)	Not Applicable			

Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
K.14. If applying to use an alternate control device, a performance test plan if using test data. NR 670.024(3)	Not Applicable			
<b>Section L: Subch. BB – Air Emission Control Standards for Equipment NR 670.025</b>				
L.1. For each piece of equipment subject to subch. BB, the information in L.2. to L.7. NR 670.025(1)	Not Applicable			
L.2. Equipment identification number and hazardous waste management unit identification. NR 670.025(1)(a)	Not Applicable			
L.3. Approximate location within the facility, as identified on a facility plot plan. NR 670.025(1)(b)	Not Applicable			
L.4. Type of equipment. NR 670.025(1)(c)	Not Applicable			
L.5. Percent by weight total organics in the hazardous waste stream at each piece of equipment. NR 670.025(1)(d)	Not Applicable			
L.6. Hazardous waste state (gas, vapor, etc.) at each piece of equipment. NR 670.025(1)(e)	Not Applicable			
L.7. Method of compliance with the applicable subch. BB standard. NR 670.025(1)(f)	Not Applicable			
L.8. Documentation demonstrating compliance with the equipment standards in NR 664.1052 to 664.1059, including records required by NR 664.1064. NR 670.025(4)	Not Applicable			
L.9. Additional documentation necessary to determine compliance with the subch. BB standards. NR 670.025(4)	Not Applicable			
L.10. Documentation demonstrating compliance with NR 664.1060 includes the information in L.11 to L.17. NR 670.025(5)	Not Applicable			
L.11. List of all information references and sources used to prepare the documentation. NR 670.025(5)(a)	Not Applicable			
L.12. Records, including the dates, of each compliance test required by NR 664.1033(10). NR 670.025(5)(b)	Not Applicable			
L.13. Design analysis, specifications, drawings, schematics and piping and instrumentation diagrams based on the appropriate sections of ATPI Course 415 or other engineering text that present basic control device design information. NR 670.025(5)(c)	Not Applicable			
L.14. Design analysis addresses the vent stream characteristics and control device operation parameters in NR 664.1035(2)(d)3. NR 670.025(5)(c)	Not Applicable			



Licensing Standard and Code Citation	Location In Report (Page, Section or N/A)	Complete ? (Y/N/N/A)	Technically Adequate? (Y/N/N/A)	Comments
L.15. Statement signed and dated by the owner/operator certifying the operating parameters used in the design analysis reasonably represent the conditions when the unit is operating at the highest capacity level reasonably expected to occur. NR 670.025(5)(d)	Not Applicable			
L.16. Statement signed and dated by the owner/operator certifying the control device is designed to operate at an efficiency of $\geq 95$ weight %. NR 670.025(5)(e)	Not Applicable			
L.17. If applying to use an alternate control device, a performance test plan if using test data. NR 670.025(3)	Not Applicable			
<b>Section M: Subch. CC – Air Emission Control Standards for Containers and Tanks NR 670.027</b>				
M.1. Documentation for each floating roof cover installed on a tank subject to NR 664.1084(4)(a) or (b). NR 670.027(1)(a)	Not Applicable			
M.2. Identification of each container area subject to subch. CC. NR 670.027(1)(b)	Pg. 2M-1			
M.3. Owner/operator certification that the requirements of subch. CC are met for container storage areas. NR 670.027(1)(b)	Pg. 2M-1, App. I			
M.4. Documentation for each enclosure used to control air emissions from containers per NR 664.1086(5)(a)2 and tanks per NR 664.1084(4)(e). NR 670.027(1)(c)	Pg. 2M-1, App. I			
M.5. Records for the most recent set of calculations and measurements verifying the enclosure meets the criteria of a permanent total enclosure as specified by Procedure T in 40 CFR 52.741, appendix B. NR 670.027(1)(c)	Not Applicable			
M.6. Documentation for each closed-vent system and control device installed according to NR 664.1087, including design and performance information. NR 670.027(1)(e)	Not Applicable			
M.7. An emission monitoring plan for Method 21 in 40 CFR part 60 Appendix A and control device monitoring methods. NR 670.027(1)(f)	Not Applicable			

Revision 1 10/11

**APPENDIX Y**  
**PLAN CERTIFICATIONS**





# **SPECTRUM ENGINEERING INCORPORATED**

262-783-7725  
FAX 262-783-7726

June 6, 2013

Mr. Kevin Bagin  
V.P. Operations  
Brenntag Great Lakes, LLC  
P.O. Box 444  
Butler, Wisconsin 53007


**Subject: Review and Certification of Feasibility and Plan of Operation Report  
for Hazardous Waste Storage and Fuel Blending Facility  
(EPA I.D. WID 023350192)  
Spectrum Engineering Project No. 12047**

Dear Mr. Bagin:

I have reviewed the Feasibility and Plan of Operation Report for Brenntag Great Lakes' Menomonee Falls Hazardous Waste Storage Facility and determined that it contains the elements required by Wisconsin Administrative Code Chapters NR 664 and NR 670. This review is limited to data provided in the Feasibility and Plan of Operation Report, dated June 6, 2013, and kept on file at Spectrum Engineering. This review in no way assumes responsibility for Plan implementation or design work performed by others.

I, Renee B. Smits, hereby certify that I am a registered professional engineer in the State of Wisconsin in accordance with CH. A-E 4, Wisconsin Administrative Code and that this report has been prepared in accordance with the Rules of Professional Conduct in Ch. A-E 8, Wisconsin Administrative Code.



  
Renee B. Smits, P.E.  
Vice President  
Spectrum Engineering Incorporated  
P.E. Certificate Number E-27382

6/6/2013  
Date





## Chapter A-E 4

### PROFESSIONAL ENGINEER REGISTRATION

A-E 4.01	Authority and purpose.	A-E 4.06	Education as an experience equivalent for registration.
A-E 4.02	Application for registration.	A-E 4.07	Engineer-in-training.
A-E 4.03	Engineering experience.	A-E 4.08	Examinations.
A-E 4.04	Experience credit limitation.	A-E 4.09	Application contents.
A-E 4.05	Requirements for registration as a professional engineer.		

**Note:** Chapter A-E 4 as it existed on February 28, 1987 was repealed and a new chapter A-E 4 was created effective March 1, 1987.

**A-E 4.01 Authority and purpose.** The rules in this chapter are adopted under authority in ss. 15.08 (5) (b), 227.11, 443.04, 443.05, 443.09 and 443.10, Stats. The purpose of rules in this chapter is to interpret basic education, experience and examination requirements for registration as a professional engineer as specified in ss. 443.04, 443.05, 443.09 and 443.10, Stats.

**History:** Cr. Register, February, 1987, No. 374, eff. 3-1-87.

**A-E 4.02 Application for registration.** An applicant who files an application but who does not comply with a request for information related to the application within one year from the date of the request shall file a new application and fee.

**Note:** Applications are available upon request to the board office located at 1400 East Washington Avenue, P.O. Box 8935, Madison, Wisconsin 53708.

**History:** Cr. Register, February, 1987, No. 374, eff. 3-1-87; am. Register, May, 1990, No. 413, eff. 6-1-90; am. Register, January, 1999, No. 517, eff. 2-1-99.

**A-E 4.03 Engineering experience.** To qualify as satisfactory experience in engineering work for the purpose of meeting requirements of s. 443.04, Stats., an applicant's experience shall include the application of engineering principles and data and shall demonstrate an applicant's progressive development of competence to do engineering work. The experience shall be acquired in the areas of engineering practice listed in subs. (1) to (7) or in other areas of engineering practice or academic course work which in the opinion of the board provides the applicant with a knowledge of engineering principles and data at least equivalent to that which would be acquired by experience in the areas of practice listed. Experience in all areas listed is not required.

**(1) RESEARCH AND DEVELOPMENT.** (a) Problem identification, including consideration of alternative approaches to problem solving.

(b) Planning, including selecting a theoretical or experimental approach.

(c) Execution of plan, including completing design calculations.

(d) Interpreting and reporting results, including all of the following:

1. Evaluating project feasibility studies.
2. Analyzing research and development data.
3. Producing interpretive reports.
4. Formulating conclusions and recommendations.
5. Producing final reports.

**(2) DESIGN.** (a) Problem identification, including all of the following:

1. Identifying design objectives.
2. Identifying possible design concepts or methods.
3. Selecting methods to be employed in consideration of aesthetics, cost and reliability.
4. Defining performance specifications and functional requirements such as materials, energy balances and environmental considerations.

5. Formulating conceptual design specifications.

6. Defining physical properties of all key materials.

(b) Planning, including defining safety, health and environmental constraints.

(c) Execution of plan, including all of the following:

1. Developing design concepts.
2. Conducting feasibility studies.
3. Evaluating design and design methods.
4. Solving design problems.
5. Preparing designs, layouts and models.
6. Selecting materials and components.
7. Conducting value analysis of design.
8. Producing final designs.
9. Preparing supporting technical information.
10. Preparing detailed working drawings.
11. Preparing specifications and data sheets.
12. Interacting with engineers from other areas of work such as research and development and construction.

(d) Interpreting and reporting results, including all of the following:

1. Evaluating design for conformity to specifications.
2. Evaluating design solutions for efficiency, economic and technical feasibility and economic alternatives.
3. Evaluating design impact on public health, safety and welfare.
4. Evaluating design solution for adherence to laws and codes.
5. Evaluating product liability risk.
6. Reviewing designs with clients or management.
7. Preparing final reports.

(e) Implementation of results, including interacting with engineers from other disciplines of engineering.

**(3) CONSTRUCTION.** (a) Problem identification, including checking working drawings and specifications.

(b) Execution of plan, including all of the following:

1. Consulting with designers.
2. Identifying and requesting design changes.

**(4) MANUFACTURING, PRODUCTION AND OPERATIONS.** (a) Planning, including all of the following:

1. Proposing design or methods improvement.
2. Planning operational processes and strategies.

(b) Execution of plan, including all of the following:

1. Preparing equipment, system and process specifications.
2. Determining feasibility of new or improved products, systems and processes.

(c) Interpreting and reporting results, including preparing final reports.

**(5) MAINTENANCE.** (a) Problem identification, including determining causes of failures in equipment, structures or schedules.

(b) Interpreting and reporting results, including reporting the causes of failures in equipment, structures or schedules.



(6) ADMINISTRATION. Administration and management, including execution of plan by communicating with others.

(7) OTHER ENGINEERING TASKS. (a) Conducting systems analysis or operations research.

(b) Serving as a consultant or specialist to individual or business clients.

**History:** Cr. Register, February, 1987, No. 374, eff. 3-1-87; am. (1) (a) to (d) 4., (2) (a) (intro.) to 5., (b) to (c) 11., (d) (intro.) to 6., (c), (3) to (7) (a), Register, January, 1999, No. 517, eff. 2-1-99.

**A-E 4.04 Experience credit limitation.** Not more than one year of satisfactory experience credit may be granted for any calendar year.

**History:** Cr. Register, February, 1987, No. 374, eff. 3-1-87.

**A-E 4.05 Requirements for registration as a professional engineer.** (1) Requirements for registration under s. 443.04 (1) (a), Stats., are as follows:

(a) A bachelor of science degree from a school or college of engineering accredited by the engineering accreditation commission of the accreditation board for engineering and technology (EAC/ABET) in an engineering course of not less than 4 years, or a diploma of graduation in an engineering course of not less than 4 years deemed by the board to be equivalent to a B.S. degree in engineering from an EAC/ABET accredited school or college of engineering.

(b) Not less than 4 years of experience within the 10 years preceding the application in engineering work of a character satisfactory to the board indicating that the applicant is competent to practice engineering. Experience gained in obtaining a master's degree in engineering and experience gained in obtaining a Ph.D. in engineering or in an engineering related program shall each be deemed equivalent to one year of qualifying experience.

(c) Successful completion of the fundamentals of engineering examination and the principles and practice of engineering examination.

**Note:** Section 443.04 (1) (a), Stats., was renumbered to s. 443.04 (1m), Stats., and amended by 2009 Wis. Act. 350. Subsection (1) will be modified accordingly in future rule-making by the Board.

(2) Requirements for registration under s. 443.04 (1) (b), Stats., are as follows:

(a) A specific record of 8 or more years of experience within the 10 years preceding the application in engineering work of a character satisfactory to the board indicating that the applicant is competent to be placed in responsible charge of the work, or a combination of engineering experience and equivalent education totaling 8 years.

(b) Successful completion of the fundamentals of engineering and the principles and practice of engineering examination.

**Note:** Section 443.04 (1) (b), Stats., was renumbered to s. 443.04 (2m) (a), Stats., and amended by 2009 Wis. Act. 350. Subsection (2) will be modified accordingly in future rule-making by the Board.

(3) Requirements for registration under s. 443.04 (1) (c), Stats., are as follows:

(a) A specific record of not less than 12 years experience within the 15 years preceding the application in engineering work of a character satisfactory to the board indicating that the applicant is competent to practice engineering, or a combination of experience and equivalent education totaling 12 years.

(b) Submission of documentary evidence establishing to the satisfaction of the board that the applicant has acquired by practical experience or professional education sufficient knowledge of mathematics, the physical sciences and the principles of engineering to competently practice engineering.

(c) Successful completion of the principles and practice of engineering examination.

**Note:** Subsection (3) was invalidated by the repeal of s. 443.04 (1) (c), Stats., in 2009 Wis. Act 350 and will be removed in future rule-making by the Board.

(4) Requirements for registration under s. 443.04 (1) (d), Stats., are as follows:

(a) A bachelor of science degree from a school or college of engineering accredited by the engineering accreditation commission of the accreditation board for engineering and technology (EAC/ABET) in an engineering course of not less than 4 years, or a diploma of graduation in an engineering course of not less than 4 years deemed by the board to be equivalent to a B.S. degree in engineering from an EAC/ABET accredited school or college of engineering.

(b) Not less than 8 years of experience in engineering work within the 10 years preceding application of a character satisfactory to the board indicating that the applicant is competent to practice engineering. Experience gained in obtaining a master's degree in engineering and experience gained in obtaining a Ph.D. in engineering or in an engineering related program shall each be deemed equivalent to one year of qualifying experience.

(c) Submission of a statement describing provisions of Wisconsin law which govern the practice of engineering.

(d) Submission of evidence that the applicant has had at least 6 months of engineering experience in Wisconsin or has had sufficient contacts with this state to make the applicant familiar with Wisconsin engineering law and practice.

**Note:** Subsection (4) was invalidated by the repeal of s. 443.04 (1) (d), Stats., in 2009 Wis. Act 350 and will be removed in future rule-making by the Board.

(5) If an engineering degree is from an international educational institution, the applicant shall provide an official evaluation by a transcript evaluation service acceptable to the board which shows that the degree is equivalent to a B.S. or higher degree in an engineering program accredited by the engineering accreditation commission of the accreditation board for engineering and technology. The board may approve the degree if it finds equivalence.

**History:** Cr. Register, February, 1987, No. 374, eff. 3-1-87; am. (1), cr. (3) and (4), Register, January, 1993, No. 445, eff. 2-1-93; r. and recr. Register, March, 1996, No. 483, eff. 4-1-96; am. (1) (b), (2) (a), (3) (a) and (4) (b), Register, November, 2000, No. 539, eff. 12-1-00; CR 04-119; am. (1) (c), (2) (b), (3) (c) and (4) (c) Register December 2005 No. 600, eff. 1-1-06.

**A-E 4.06 Education as an experience equivalent for registration.** For the purpose of meeting experience requirements for registration as a professional engineer under s. 443.04 (1) (b) and (c), Stats., an applicant may claim education as equivalent to experience as follows:

**Note:** 2009 Wis. Act 350 repealed s. 443.04 (1) (c), Stats., and renumbered and amended s. 443.04 (1) (b), Stats., to be s. 443.04 (2m) (a), Stats. This section will be modified accordingly in future rule-making by the Board.

(1) Completion of each year of engineering coursework at a school or college of engineering accredited by the engineering accreditation commission of the accreditation board for engineering and technology (EAC/ABET) in an engineering program of not less than 4 years, or completion of each year of engineering coursework at a school or college of engineering in an engineering program of not less than 4 years deemed by the board to be equivalent to an EAC/ABET accredited school or college of engineering program, shall be deemed equivalent to one year of qualifying experience.

(2) Completion of each year of engineering coursework at a school or college of engineering in an engineering program of not less than 4 years deemed by the board not to be equivalent to an EAC/ABET accredited school or college of engineering shall be deemed equivalent to not more than 7/8 of one year of qualifying experience.

(3) Completion of each year of coursework in engineering technology at a school or college of engineering technology accredited by the technology accrediting commission of the accreditation board for engineering and technology in an engineering technology program of not less than 4 years shall be deemed equivalent to 3/4 of one year of qualifying experience.

(4) Completion of each year of coursework in engineering technology at a school or college of engineering technology not accredited by the technology accreditation commission of the



accreditation board for engineering and technology in an engineering technology program of not less than 4 years shall be deemed equivalent to not more than 2/3 of one year of qualifying experience.

(5) Completion of each year of coursework leading to a B.S. degree in engineering related sciences, including but not limited to physics, mathematics and chemistry, from a college or university accredited by a regional accrediting agency approved by the state board of education in the state in which the college or university is located shall be deemed equivalent to 3/4 of one year of qualifying experience.

(6) Completion of each year of coursework leading to a B.S. degree in areas other than engineering or engineering related sciences from a college or university accredited by a regional accrediting agency approved by the state board of education in the state in which the college or university is located shall be deemed to be equivalent to not more than 1/2 of one year of qualifying experience.

(7) Engineering experience gained in a cooperative educational program shall be evaluated on an individual basis but may not be deemed to be equivalent to more than a total of one year of qualifying experience. To obtain equivalent work experience credit, an applicant shall submit a record of work completed in the cooperative educational program with the application for registration. The engineering section shall determine the amount of equivalent experience awarded by evaluating the record of work completed using the criteria in s. A-E 4.03.

**History:** Cr. Register, February, 1987, No. 374, eff. 3-1-87; r. and recr. Register, March, 1996, No. 483, eff. 4-1-96.

**A-E 4.07 Engineer-in-training.** An applicant for certification as an engineer-in-training shall take and pass a fundamentals examination.

**History:** Cr. Register, February, 1987, No. 374, eff. 3-1-87; am. Register, January, 1999, No. 517, eff. 2-1-99.

**A-E 4.08 Examinations.** (1) **SCOPE OF WRITTEN EXAMINATIONS.** (a) The fundamentals examination requires an understanding of the physical and mathematical sciences involved in the fundamentals of engineering.

(b) The principles and practice examination requires the ability to apply engineering principles and judgment to problems in general engineering fields such as chemical, civil, electrical and mechanical fields.

(2) **REQUIREMENTS FOR ENTRANCE TO EXAMINATIONS.** (a) To be eligible to take the examination on fundamentals of engineering, the applicant shall:

1. Be of not less than senior standing in an accredited B.S. engineering program;
2. Have at least 4 years of engineering experience qualifying under s. A-E 4.03; or
3. Have a combination of engineering experience qualifying under s. A-E 4.03 and education qualifying under s. A-E 4.05 totalling at least 4 years.

(b) To be eligible to take the examination on the principles and practices of engineering, the applicant shall:

1. Have a B.S. degree from an accredited engineering program, and at least 4 years of engineering experience qualifying under s. A-E 4.03;
2. Have at least 8 years of engineering experience qualifying under s. A-E 4.03; or
3. Have a combination of engineering experience qualifying under s. A-E 4.03 and education qualifying under s. A-E 4.05 totalling at least 8 years.

**Note:** Subsection (2) was affected by the repeal of s. 443.04 (1) (c) and (d), Stats., in 2009 Wis. Act 350 and will be revised in future rule-making by the Board.

(3) **APPLICATION FOR EXAMINATION.** An application for examination must be filed with the board no later than 90 days before the scheduled date for the examination. An applicant applying for reexamination shall file the application for reexamination no later than 45 days before the scheduled date for the next examination.

**Note:** An otherwise qualified applicant with a disability shall be proved with reasonable accommodations.

(4) **EXAMINATION AND REFUND FEES.** The fee for an engineer-in-training or professional engineer examination and requirements for refund of fees are specified in s. 440.05, Stats., and ch. SPS 4.

(5) **PLACE AND TIME OF EXAMINATIONS.** The examinations shall be held at sites and on dates designated by the board.

(6) **GRADING OF WRITTEN EXAMINATIONS.** The passing scores set by the board represent the minimum competency required to protect public health and safety. Experience ratings may not be weighed as a part of the examinations.

(7) **EXAMINATION REVIEW.** (a) *One-year limitation.* An applicant for an engineer examination may review questions on any part of an examination failed by the applicant within one year from the date of the examination, as specified in s. 443.09 (6), Stats. An applicant may review the examination only once.

(b) *Review procedure.* Failing candidates shall be notified of the procedure to schedule a review of the appropriate examination parts. The applicant may take notes on the examination questions reviewed. No notes may be retained by the applicant following the review. The review may not take place within 30 days prior to a scheduled examination. If the section confirms the failing status following its review, the application shall be deemed incomplete, and the applicant may be reexamined.

**Note:** Subsection (7) was invalidated by the repeal of s. 443.09 (6), Stats., in 2009 Wis. Act 350 and will be removed in future rule-making by the Board.

(8) **CHEATING.** Any applicant for registration who receives aid or cheats in any other manner in connection with the examination shall be barred from completing the examination or shall not be given a passing grade, or both.

**History:** Cr. Register, February, 1987, No. 374, eff. 3-1-87; am. (1) (b), Register, May, 1990, No. 413, eff. 6-1-90; r. and recr. (2), Register, June, 1993, No. 450, eff. 10-1-93; am. (1) (b) and (c), Register, December, 1993, No. 456, eff. 1-1-94; am. (3), Register, August, 1995, No. 476, eff. 9-1-95; am. (7) (b), Register, March, 1996, No. 483, eff. 4-1-96; am. (7) (a), Register, October, 1996, No. 490, eff. 11-1-96; am. (1) (a), (3) and (6), cr. (8), Register, January, 1999, No. 517, eff. 2-1-99; CR 04-119; r. (1) (c) Register December 2005 No. 600, eff. 1-1-06; correction in (4) made under s. 13.92 (4) (b) 7., Stats., Register November 2011 No. 671.

**A-E 4.09 Application contents.** (1) An application for initial registration shall include all of the following:

- (a) Transcripts or apprenticeship records verifying the applicant's education and training.
- (b) References from at least 5 individuals having personal knowledge of the applicant's experience in professional engineering, 3 or more of whom are registered professional engineers.
- (c) A chronological history of the applicant's employment.
- (d) Any additional data, exhibits or references showing the extent and quality of the applicant's experience that may be required by the professional engineer section.

(2) An application for registration by comity from another state shall include all of the following:

(a) Verification of registration submitted directly from all states, territories or provinces of Canada where the applicant is or has been registered, including a statement regarding any disciplinary action taken.

(b) Any additional data, exhibits or references showing the extent and quality of the applicant's experience that may be required by the section.

**History:** Cr. Register, January, 1993, No. 445, eff. 2-1-93; am. Register, January, 1999, No. 517, eff. 2-1-99; CR 03-087; renum. (intro.) and (1) to (4) to be (1) (intro.), (a) to (d) and am. (1) (intro.) and (b), cr. (2) Register May 2005 No. 593, eff. 6-1-05.



# SPECTRUM ENGINEERING INCORPORATED

414-783-7725  
FAX 414-783-7726

February 11, 2000

Mr. Kevin Bagin  
Operations Manager  
MILSOLV Corporation  
P.O. Box 444  
Butler, Wisconsin 53007

**Subject: Review and Certification of Feasibility and Plan of Operation Report  
for Hazardous Waste Storage Facility (EPA I.D. WID 023350192)  
Spectrum Engineering Project No. 99576**

Dear Mr. Bagin:

I have reviewed the Feasibility and Plan of Operation Report for MILSOLV Corporation's Menomonee Falls Hazardous Waste Storage Facility and determined that it contains the elements required by Wisconsin Administrative Code Chapters NR 630, NR 640, NR 645, and NR 680. This review is limited to data provided in the Feasibility and Plan of Operation Report dated February 11, 2000, and kept on file at Spectrum Engineering. This review in no way assumes responsibility for Plan implementation or design work performed by others.

I, Renee B. Smits, hereby certify that I am a registered professional engineer in the State of Wisconsin in accordance with CH. A-E 4, Wisconsin Administrative Code and that this report has been prepared in accordance with the Rules of Professional Conduct in Ch. A-E 8, Wisconsin Administrative Code.



*Renee B. Smits*  
Renee B. Smits, P.E.  
Vice President  
Spectrum Engineering Incorporated  
P.E. Certificate Number E-27382

*2/11/00*  
Date





January 8, 1993

Mr. Robert Heitzer  
Manager, Technical Services  
Milwaukee Solvents and Chemicals Corporation  
P.O. Box 444  
Butler, Wisconsin 53007

**Subject: Review and Certification of Revisions to the Plan of Operations Modification  
Milwaukee Solvents and Chemicals Corporation (EPA I.D. WID 023350192)  
Triad Engineering Project No. 10597**

Dear Mr. Heitzer:

I have reviewed the revisions to the Plan of Operations Modification for Milwaukee Solvents and Chemicals Corporation. These revisions were made in response to the September 30, 1992 Notice of Incompleteness from the Department of Natural Resources, Southeast District. Based on this review, I have determined that the revisions are consistent with the engineering report and plan submittal prepared by Triad Engineering dated January 1993.

This review, as required by NR 680 - Plan Review and Licensing, is limited to data available in the revised Plan of Operations Modification provided on January 5, 1993, and kept on file at Triad Engineering. This review in no way assumes responsibility for plan implementation of design work performed by others.

"I, Richard J. Fulk, hereby certify that I am a registered professional engineer in the State of Wisconsin in accordance with Ch. A-E 4, Wisconsin Administrative Code and that this report has been prepared with the Rules of Professional Conduct in Ch. A-E 8, Wisconsin Administrative Code."

Richard J. Fulk  
Richard J. Fulk, P.E.  
Executive Vice President  
P.E. Certificate Number E-19457

1/8/93  
Date



325 east chicago street  
milwaukee, wisconsin 53202  
414/291-8840  
fax: 414/291-8841





July 30, 1992

Mr. Robert Heitzer  
Manager, Technical Services  
Milwaukee Solvents and Chemical Corporation  
P.O. Box 444  
Butler, Wisconsin 53007

**Subject: Review of Milwaukee Solvents and Chemical Corporation's  
Plan of Operation - EPA I.D. WID 023350192  
Triad Project No. 10597**

Dear Mr. Heitzer:

I have reviewed the revisions to the Milwaukee Solvents and Chemical Corporation's Plan of Operation which were prepared in July of 1992 to address the relocation of the drum storage and processing areas. Based on this review, I have determined that the revisions are consistent with the conceptual engineering report and plan submittal prepared by Triad Engineering and dated July 30, 1992.

This review, as required by NR 600, is limited to data available in the Plan of Operation provided on July 31, 1992, and kept on file at Triad Engineering. This review in no way assumes responsibility for Plan implementation of design work performed by others.

Sincerely,

TRIAD ENGINEERING INC.

Farhad Mohsenian, P.E.  
P.E. Certificate Number E-26234

FM/cl:10597-B



325 east chicago street  
milwaukee, wisconsin 53202  
414/291-8840  
fax: 414/291-8841



November 9, 1989

Mr. Robert Heitzer  
Manager, Technical Services  
Milwaukee Solvents and  
Chemical Corporation  
P.O. Box 444  
Butler, Wisconsin 53007

Dear Mr. Heitzer:

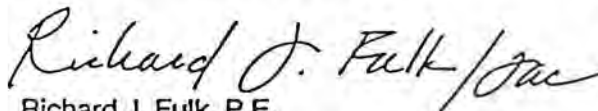
**Subject: Review of Milwaukee Solvents and Chemical Corporation  
Plan of Operation - EPA I.D. WID 023350192**

I have reviewed Milwaukee Solvents and Chemical Corporation's Plan of Operation and determined that it contains elements required by the State of Wisconsin as codified in NR181.43(4). The plan is consistent with others reviewed and/or prepared by Triad Engineering in that it incorporates required plans and policies.

This review as required by NR181.51(1)(c), is limited to data available in the Plan of Operation provided on November 9, 1989, and kept on file at Triad Engineering. This review in no way assumes responsibility for Plan implementation or design work performed by others.

Yours truly,

TRIAD ENGINEERING INC.



Richard J. Fulk, P.E.  
P.E. Certificate Number E-19457

RJF/cd:1467PROP

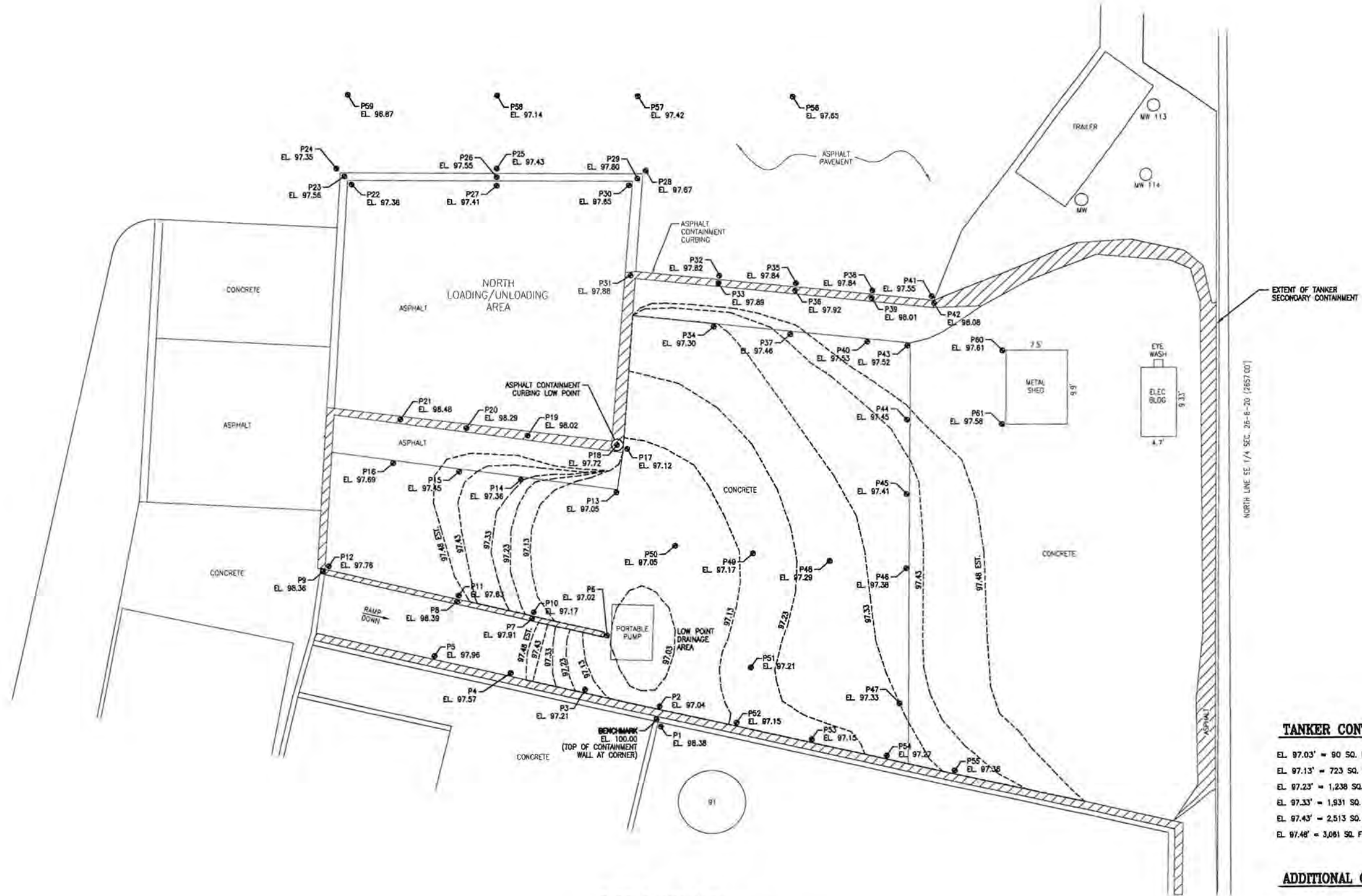


3333 north mayfair road  
milwaukee, wisconsin 53222  
414/771-5050  
FAX 414/771-5771

**APPENDIX Z**

**FUEL BLENDING PROCESS FLOW DIAGRAM  
AND TANKER  
SECONDARY CONTAINMENT DRAWING**





**PARTIAL SITE PLAN**  
SCALE: 1/4" = 1'-0"

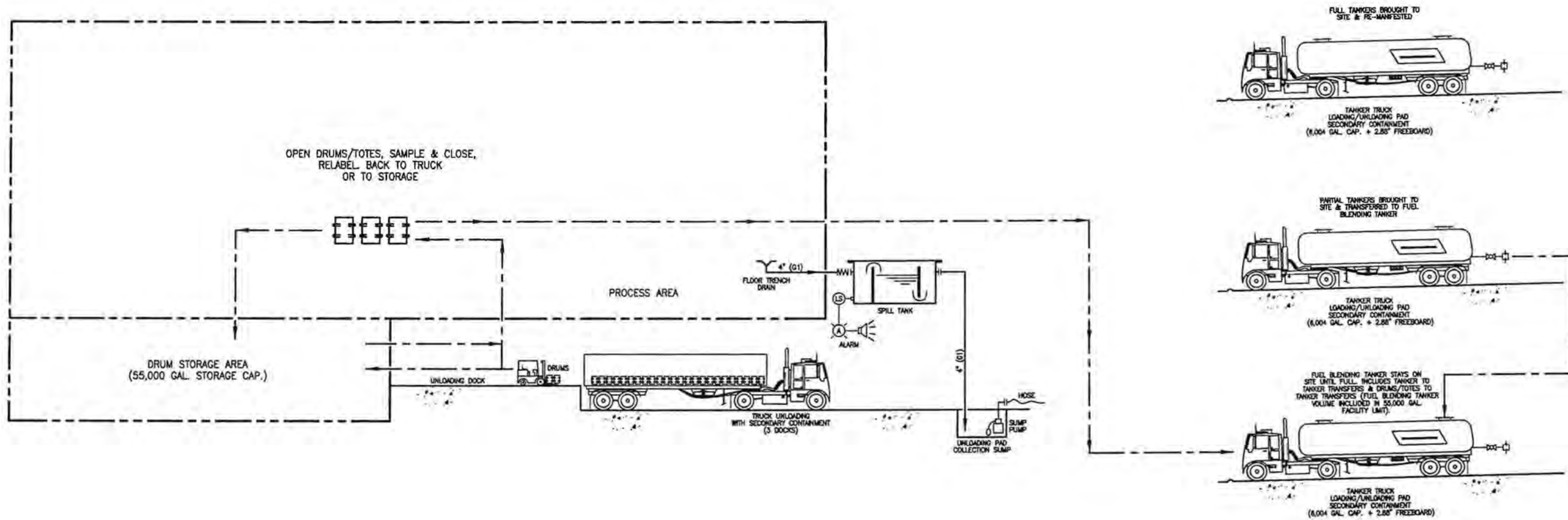
**TANKER CONTAINMENT CAPACITY:**

EL. 97.03'	= 90 SQ. FT. x 0.1 FT. x 7.481 GAL./C.F. = 67 GAL.
EL. 97.13'	= 723 SQ. FT. x 0.1 FT. x 7.481 GAL./C.F. = 541 GAL.
EL. 97.23'	= 1,238 SQ. FT. x 0.1 FT. x 7.481 GAL./C.F. = 926 GAL.
EL. 97.33'	= 1,931 SQ. FT. x 0.1 FT. x 7.481 GAL./C.F. = 1,445 GAL.
EL. 97.43'	= 2,513 SQ. FT. x 0.1 FT. x 7.481 GAL./C.F. = 1,880 GAL.
EL. 97.48'	= 3,081 SQ. FT. x 0.05 FT. x 7.481 GAL./C.F. = 1,145 GAL. EST.
<b>TOTAL</b>	<b>= 6,004 GAL.</b>

**ADDITIONAL CONTAINMENT CAPACITY:**

EL. 97.72' - EL. 97.45' = 0.24'  
FREEBOARD = 2.88'

<p>322-783-7725 FAX 322-783-7725 18295 West Capital Drive, Brookfield, Wisconsin 53045</p>	<p>THIS DRAWING, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, REMAINS THE PROPERTY OF SPECTRUM ENGINEERING INCORPORATED. ANY CHANGES, REVISIONS, OR AMENDMENTS MADE BY ANYONE OTHER THAN SPECTRUM ENGINEERING INCORPORATED, WITHOUT THE WRITTEN APPROVAL OF SPECTRUM ENGINEERING INCORPORATED, ARE NOT TO BE USED.</p>	<p>VERIFY SCALES ONE IN ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, READ SCALES ACCORDING TO REVISION</p>	<p>OWNED BY: S.A.M.</p>	<p>CHECKED BY: J.M.K.</p>	<p>Brenntag Great Lakes, LLC Menomonee Falls Facility</p>	<p>FUEL BLENDING MODIFICATION SURVEY POINTS AND ESTIMATED VOLUMES PARTIAL SITE PLAN OF TANKER CONTAINMENT</p>	<p>DRAWING NUMBER: G-1</p>
			<p>DESIGNED BY: J.M.K.</p>	<p>PROJECT MANAGER: J.M. HOLL, P.E.</p>			<p>DATE: 8/8/13</p>



THIS DRAWING WAS PREPARED FROM AN EXISTING PROCESS FLOW DIAGRAM FOR THIS FACILITY. THE DRAWING WAS MODIFIED TO REFLECT CURRENT CONDITIONS RELATED TO FUEL BLENDING. ITEMS FROM ORIGINAL DRAWING THAT ARE NOT CURRENTLY RELATED TO FUEL BLENDING ARE SHOWN IN GREY ON THIS DRAWING.

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 1" = 1' ON THIS SHEET. ADJUST SCALES ACCORDINGLY.

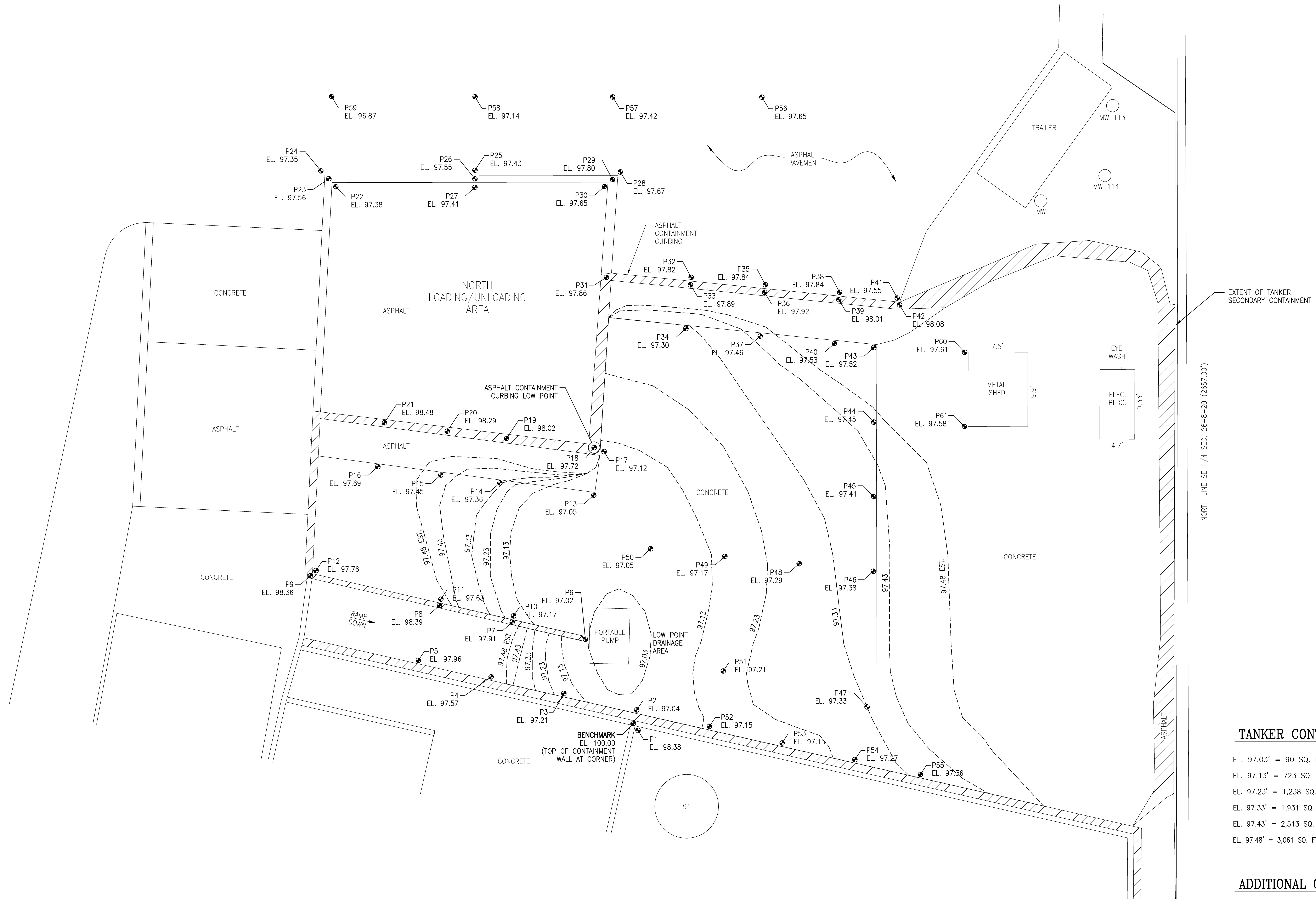
NO.	DATE	BY	REVISION
2	8/6/13	J.M.N.	REVISED FOR 2013 LICENSE RENEWAL & FPOUR UPDATE (SEE PROJ. NO. 12047)
1	5/22/07	S.A.M.	UPDATED TANK 75 VENTING ARRANGEMENT

DRAWN BY: S.A.M.  
 CHECKED BY: E.G.L.  
 DESIGNED BY:  
 PROJECT MANAGER: R.B. SMITS, P.E.

**BRENNTAG**  
 Brenntag Great Lakes, LLC  
 Menomonee Falls Facility

**HAZARDOUS WASTE FUELS BLENDING  
 PROCESS FLOW DIAGRAM**

DRAWING NUMBER:	M-1
DATE:	12/13/06
PROJECT NUMBER:	06560
SHEET NUMBER:	1 OF 1



**TANKER CONTAINMENT CAPACITY:**

- EL. 97.03' = 90 SQ. FT. x 0.1 FT. x 7.481 GAL./C.F. = 67 GAL.
- EL. 97.13' = 723 SQ. FT. x 0.1 FT. x 7.481 GAL./C.F. = 541 GAL.
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- TOTAL = 6,004 GAL.**

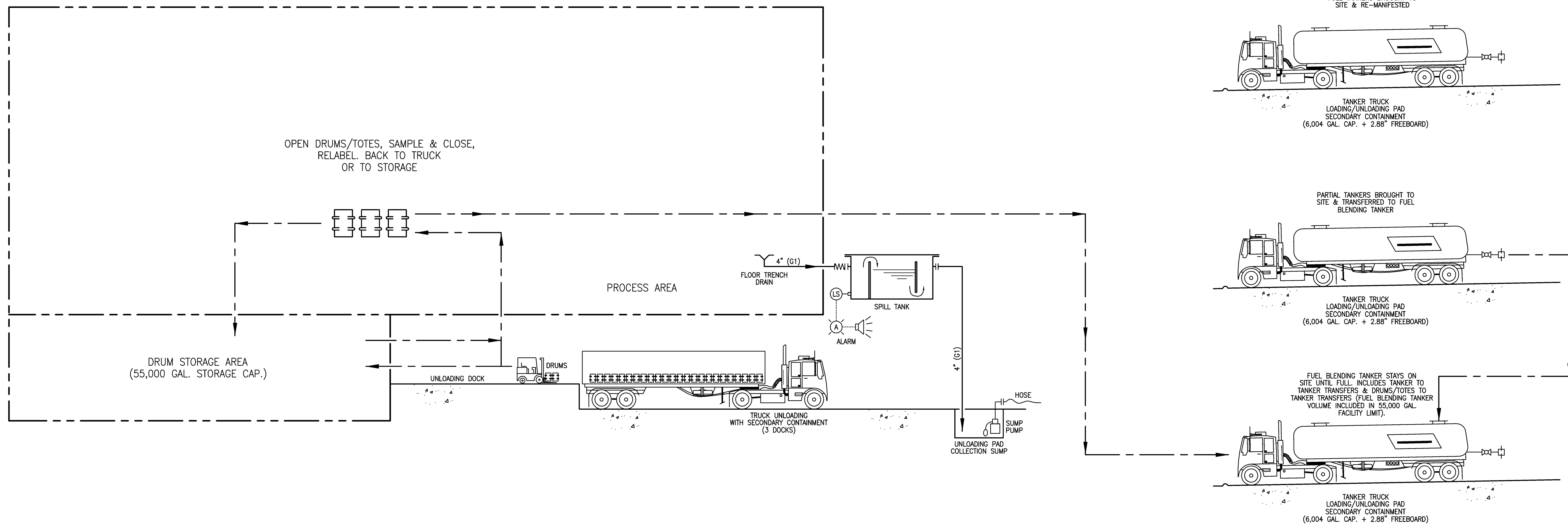
**ADDITIONAL CONTAINMENT CAPACITY:**

EL. 97.72' - EL. 97.48' = 0.24'  
 FREEBOARD = 2.88'

**PARTIAL SITE PLAN**  
 SCALE: 1/4" = 1'-0"

	262-783-7725 FAX 262-783-7726 19395 West Capitol Drive, Brookfield, Wisconsin 53045	THIS DRAWING, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, REMAINS THE PROPERTY OF SPECTRUM ENGINEERING INCORPORATED. ANY CHANGES, REPRODUCTION, OR UNAUTHORIZED USE, IN WHOLE OR IN PART, FOR OTHER PROJECTS IS PROHIBITED UNLESS EXPRESSLY APPROVED BY SPECTRUM ENGINEERING INCORPORATED.	VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NO.</th> <th>DATE</th> <th>BY</th> <th>REVISION</th> </tr> <tr> <td>1</td> <td>6/5/13</td> <td>J.M.N.</td> <td>REVISED FOR 2013 LICENSE RENEWAL &amp; FPOUR UPDATE (SEE PROJ. NO. 12047)</td> </tr> </table>	NO.	DATE	BY	REVISION	1	6/5/13	J.M.N.	REVISED FOR 2013 LICENSE RENEWAL & FPOUR UPDATE (SEE PROJ. NO. 12047)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DRAWN BY:</td> <td>CHECKED BY:</td> </tr> <tr> <td>S.A.M.</td> <td>J.M.N.</td> </tr> <tr> <td>DESIGNED BY:</td> <td></td> </tr> <tr> <td>J.M.N.</td> <td></td> </tr> <tr> <td>PROJECT MANAGER:</td> <td></td> </tr> <tr> <td>J.M. NOLL, P.E.</td> <td></td> </tr> </table>	DRAWN BY:	CHECKED BY:	S.A.M.	J.M.N.	DESIGNED BY:		J.M.N.		PROJECT MANAGER:		J.M. NOLL, P.E.		<p>Brenntag Great Lakes, LLC                  Menomonee Falls Facility</p>	FUEL BLENDING MODIFICATION SURVEY POINTS AND ESTIMATED VOLUMES PARTIAL SITE PLAN OF TANKER CONTAINMENT	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DRAWING NUMBER:</td> <td>G-1</td> </tr> <tr> <td>DATE:</td> <td>10/9/06</td> </tr> <tr> <td>PROJECT NUMBER:</td> <td>06550</td> </tr> <tr> <td>SHEET NUMBER:</td> <td>1 OF 1</td> </tr> </table>	DRAWING NUMBER:	G-1	DATE:	10/9/06	PROJECT NUMBER:	06550	SHEET NUMBER:	1 OF 1
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**VERIFY SCALES**  
 BAR IS ONE INCH ON ORIGINAL DRAWING.  
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

NO.	DATE	BY	REVISION
2	6/6/13	J.M.N.	REVISED FOR 2013 LICENSE RENEWAL & FPOR UPDATE (SEI PROJ. NO. 12047)
1	5/22/07	S.A.M.	UPDATED TANK 75 VENTING ARRANGEMENT

DRAWN BY: S.A.M.  
 CHECKED BY: B.G.L.  
 DESIGNED BY:  
 PROJECT MANAGER: R.B. SMITS, P.E.

**BRENNTAG**  
 Brenntag Great Lakes, LLC  
 Menomonee Falls Facility

**HAZARDOUS WASTE FUELS BLENDING PROCESS FLOW DIAGRAM**

DRAWING NUMBER:	M-1
DATE:	12/13/06
PROJECT NUMBER:	06550
SHEET NUMBER:	1 OF 1