FORM EQP 5111 ATTACHMENT TEMPLATE C2
TANK SYSTEMS

This document is an attachment to the Michigan Department of Environmental Quality's (DEQ) *Instructions for Completing Form EQP 5111, Operating License Application Form for Hazardous Waste Treatment, Storage, and Disposal Facilities*.

R 299.9615 and R 299.9627 of the administrative rules promulgated pursuant to Part 111, Hazardous Waste Management, of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451); R 29.4101 to R 29.4505 promulgated pursuant to the provisions of the Michigan Fire Protection Act, PA 207, as amended (Act 207); and Title 40 of the Code of Federal Regulations (CFR) §§270.14(d), 270.16, 270.24, and 270.27 (Part 264, Subpart J and Part 60, Appendix A) establish requirements for tank systems. All references to 40 CFR citations specified herein are adopted by reference in R 299.11003.

This license application template addresses requirements for tank systems at the Dow Michigan Operations & Salzburg Landfill facilities in Midland, Michigan. This template includes assessments of new and existing tank systems; installation of new tank systems; secondary containment systems and release detection; variances for secondary containment; controls and practices to prevent spills and overfills; inspections; response to leaks or spills and disposition of leaking or unfit-for-use tank systems; closure and postclosure requirements; requirements for storing or treating ignitable, reactive, or incompatible wastes.

This template is organized as follows:

(Check as appropriate)

☒ Existing Tank System

☒ New Tank System

There are no tank systems at the Dow Salzburg Landfill facility in Midland, MI.

This template is organized as follows:

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C2.A ASSESSMENT OF EXISTING TANK SYSTEMS

[R 299.9615(1) and 40 CFR, Part 264, Subpart J]

The Dow Michigan Operations Site contains five existing tank systems, as described in section C2.A2. Three of these tanks, V-301, V-302 and V-402, may be used for organic or other liquid wastes; and two tanks, V-101 and V-601, are used for containment of drainage from hazardous waste container management areas, waste unloading areas or for secondary containment of releases from tank systems V-301, V-302, V-303, V-401, V-402, V-403, V-404, and V-701. The engineering drawings for these tanks are provided in Appendix C2-A of this Attachment.

Tanks V-301, V-302, V-402, V-101 and V-601 were installed prior to July 14, 1986 and are not subject to the tank system integrity assessment in 40 CFR 264.191 since they have adequate secondary containment meeting the requirements of 40 CFR 264.193. The liquid waste tank containment plan, drawing B2-422-874008, is provided in Appendix C2-B of this Attachment.

C2.A.1 Design Standards

[R 299.9615(1) and 40 CFR §264.191(b)(1)]

The design standard, if available, according to which each tank and its associated ancillary equipment were constructed is as follows:

- V-301 – Tank = ASME Rules, Section VIII, Division 1, 1983; Ancillary equipment = Not Available
- V-302 – Tank = ASME, Section VIII, Division 1, 1983; Ancillary equipment = Not Available
- V-402 - Tank = ASME, Section VIII, Division 1, 1977 Addenda; Ancillary equipment = Not Available
- V-101 - Tank = Not Available; Ancillary equipment = Not Available
- V-601 - Tank = ASME, Section VIII; Ancillary equipment = Not Available

C2.A.2 Dimensions and Capacity of Each Tank
[R 299.9615(1) and 40 CFR §270.16(b)]

TANK DESCRIPTION

Tank	Shape	Materials of Construction	Diameter (ft.)	Length (ft.)	Nominal Capacity (gal.)	Maximum Capacity (gal.)	Wall Thickness (in.)
V-301	Cylindrical	Carbon Steel SA-537-CL.1 (Norm) & SA-516-70	13	16	16,220	18,700	0.75
V-302	Cylindrical	Carbon Steel SA-537-CL.1 (Norm) & SA-516-70	13	16	16,220	18,700	0.75
V-402	Cylindrical	SA240-304SS	13	14	15,250	15,900	0.250
V-101	Cylindrical	ASTM B-127 (Monel 400) (bottom) & ASTM A516-64 Grade B (top 6')	12	11-10 11/16"	10,675	10,150	5/16" (bottom) & 3/8" (Top 6')
V-601	Cylindrical	SA285C & SA106-B or SA105	9-9"	12-8"	7,000	7,000	3/8"

C2.A.3 Description of Feed Systems, Safety Cutoff, Bypass System, and Pressure Controls
[R 299.9615(1) and 40 CFR §270.16(c)]

C2.A.3(a) Feed Systems
[R 299.9615(1) and 40 CFR §270.16(c)]

Aqueous waste tanks are filled from the top or side. Liquids can be pumped or pressure transferred into tanks V-301, V-302 and V-402. The organic liquid waste tanks, V-301, V-302 and V-402, are vented as they are filled. The displaced vapors from the tanks as the tanks are filled are passed to the Incinerator secondary combustion chamber (SCC) or to an activated carbon adsorption system. A schematic of the vent system is shown on drawing B01-011-32PERMIT found in Attachment XIV.C3, Incineration or Thermal Treatment, of this operating license reapplication.

Liquids are either pumped into or gravity drain into tanks V-101 and V-601. V-101 and V-601 are then pumped to V-701.

C2.A.3(b) Safety Cutoff or Bypass Systems
[R 299.9615(1) and 40 CFR §270.16(c)]

Level indicators (e.g., load cells, level transmitters, etc.) are used to monitor tank levels and are connected to the Incinerator Complex process control computer (PCC). The level in these tanks is continuously monitored by the Incinerator Complex PCC. Overfill protection on these waste tanks

consists of a high level alarm or equivalent. If the level indicator detects a high level in the tank, the high level alarm is activated and any transfer of material into the tank is stopped.

C2.A.3(c) Pressure Controls
[R 299.9615(1) and 40 CFR §270.16(c)]

Tank venting for V-301, V-302 and V-402 is provided to prevent excessive pressure or vacuum build-up due to emptying, filling, thermal inbreathing and outbreathing rates. The tanks have an automatic control system to maintain pressure in the tank at approximately 2 psig. The normal "breathing" vents from the tanks go into a closed vent system. This vent system directs the vapors either to the incinerator SCC or to a carbon bed. Each tank is also equipped with a pressure relief device which would relieve pressure inside the tank in the event of a fire or uncontrolled reaction without rupturing the vessel.

V-101 and V-601 are open to atmosphere and therefore do not require vacuum or pressure relief controls.

C2.A.4 Diagram of Piping, Instrumentation, and Process Flow
[R 299.9615(1) and 40 CFR §270.16(c)]

The piping and instrument diagrams (P&IDs) for tanks V-301 (B1-070-32), V-302 (B1-071-32), V-402 (B1-075-32), V-101 (B1-103-32) and V-601 (B1-054-32) are provided in Appendix C2-B of this Attachment.

C2.A.5 Characteristics of Waste
[R 299.9615(1) and 40 CFR §264.191(b)(2)]

See Appendix A of Attachment XIV.A2, Chemical and Physical Analysis, of this operating license reapplication, for a list of acceptable waste types that can be managed in tanks V-301, V-302, and V-402 (INCIN STORAGE).

C2.A.6 Existing Corrosion Protection Measures
[R 299.9615(1) and 40 CFR §264.191(b)(3)]

(Check as appropriate)

External corrosion protection required:

☐ External shell of metal tank will be in contact with soil or water.

☐ Any external metal components of the tank system will be in contact with soil or water.

This section is not applicable as tanks V-301, V-302, V-402, V-101 and V-601 were installed prior to July 14, 1986 and are not subject to the tank system integrity assessment in 40 CFR 264.191 since they have adequate secondary containment meeting the requirements of 40 CFR 264.193. Also, no portion of these tank systems is in contact with the soil or with water.

C2.A.7 Documented Age of Tank System
[R 299.9615(1) and 40 CFR §264.191(b)(4)]

The original service date of each existing tank system is listed below:

- V-301 = 1984
- V-302 = 1984
- V-402 = 1978
- V-101 = 1968
- V-601 = 1979

C2.A.8 Leak Tests, Inspections, and Other Examinations
[R 299.9615(1) and 40 CFR §264.191(b)(5)]

This section is not applicable as tanks V-301, V-302, V-402, V-101 and V-601 were installed prior to July 14, 1986 and are not subject to the tank system integrity assessment in 40 CFR 264.191 since they have adequate secondary containment meeting the requirements of 40 CFR 264.193.

C2.A.8(a) Nonenterable Underground Tanks
[R 299.9615(1) and 40 CFR §264.191(b)(5)(i)]

C2.A.8(b) Other than Nonenterable Underground Tanks and for Ancillary Equipment
[R 299.9615(1) and 40 CFR §264.191(b)(5)(ii)]

C2.A.8(c) Internal Inspections
[R 299.9615(1) and 40 CFR §264.191(b)(5)(ii)]

C2.A.9 Ancillary Equipment Assessment
[{ 299.9615(1) and 40 CFR §264.191(b)(5)(ii)]

This section is not applicable as tanks V-301, V-302, V-402, V-101 and V-601 were installed prior to July 14, 1986 and are not subject to the tank system integrity assessment in 40 CFR 264.191 since they have adequate secondary containment meeting the requirements of 40 CFR 264.193.

C2.A.10 Leaking or Unfit-for-Use Tank Systems
[R 299.9615(1) and 40 CFR §264.191(b)(5)(ii)]

This section is not applicable as tanks V-301, V-302, V-402, V-101 and V-601 were installed prior to July 14, 1986 and are not subject to the tank system integrity assessment in 40 CFR 264.191 since they have adequate secondary containment meeting the requirements of 40 CFR 264.193.

C2.A.11 Tank Labels
[R 299.9615 (5)]

Each tank system is labeled, in accordance with the National Fire Protection Association (NFPA) Standard No. 704, Standard System for the Identification of the Hazards of Materials for Emergency Response, with the appropriate Health, Flammability, Instability and any applicable Special Hazard markings to identify the hazards of the material(s) stored in the tank system.

C2.B ASSESSMENT OF NEW TANK SYSTEMS

[R 299.9615(1) and 40 CFR §264.192]

The Dow Michigan Operations Site contains seven new tank systems, as described in section C2.B2. Four of these tanks, V-303, V-401, V-403 and V-404, may be used for organic or other liquid wastes; one tank, V-701, is used for water wastes; and two non-traditional tanks, 1163 Building and 33 Building, are used for interim storage, prior to treatment, and/or treatment as described in Appendix C2-D of this Attachment, prior to disposal, of bulk solids or sludges. 1163 Building and 33 Building are designed to meet the tank standards of 40 CFR 264 Subpart J. Materials stored in 1163 Building and 33 Building are not subject to RCRA Subpart CC because they are less than 500 ppm VOCs at the point of generation. The engineering drawings for these tanks are provided in Appendix C2-A of this Attachment.

Tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building were installed after July 14, 1986 and are subject to the tank system integrity assessment in 40 CFR 264.192. The tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building are provided in Appendix C2-C of this Attachment.

C2.B.1 Design standards

[R 299.9615(1) and 40 CFR §264.192(a)(1)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.B.2 Dimensions and Capacity of Each Tank
[R 299.9615(1) and 40 CFR §270.16(b)]

TANK DESCRIPTION

Tank Designation	Shape	Materials of Construction	Diameter (ft.)	Length (ft.)	Nominal Capacity (gal.)	Maximum Capacity (gal.)	Wall Thickness (in.)
V-303	Cylindrical	Steel SA-516-70 & SA-105	13	20-10 ¾"	22,000	18,700	0.5
V-401	Cylindrical	Steel SA-240-216L & SA-105/SA-516-70	13	20-9 ½"	18,000	18,700	0.25
V-403	Cylindrical	Steel SA-240-316L & SA-105/SA-516-70	13	20-9 ½"	18,000	18,700	0.25
V-404	Cylindrical	Steel SA-240-316L & SA-105/SA-516-70	13	21-0 ½"	22,000	18,700	0.25
V-701	Cylindrical	Carbon Steel SA-285-C & SA-53 E/A or SA258C	10	11-4"	7,000	7,000	0.5
1163 Building	3-Sided tank	Reinforced concrete & structural steel	56 (Width)	68	341,830 (~1,688 cubic yards*)	360,000 (~1,800 cubic yards*)	¾" (floor) & ½" and ¼" (walls)
33 Building	3-Sided tank	Reinforced concrete & structural steel	61 (Width)	66	171,864 (~849 cubic yards*)	181,000 (~900 cubic yards*)	¾" (floor) & ½" (walls)

* based on 7.5 gallons per cubic foot of water

C2.B.3 Description of Feed Systems, Safety Cutoff, Bypass System, and Pressure Controls
[R 299.9615(1) and 40 CFR §270.16(c)]

C2.B.3(a) Feed Systems
[R 299.9615(1) and 40 CFR §270.16(c)]

Aqueous waste tanks are filled from the top or side. Liquids can be pumped or pressure transferred into tanks V-303, V-401, V-403, V-404, and V-701. These liquid waste tanks, V-303, V-401, V-403, V-404 and V-701 are vented as they are filled. The displaced vapors from the tanks as the tanks are filled are passed to the Incinerator secondary combustion chamber (SCC) or to an activated carbon adsorption system. The vent system is shown on drawing B01-011-32PERMIT found in Attachment XIV.C3, Incineration or Thermal Treatment, of this operating license reapplication.

Loading and unloading operations occur strictly within 1163 Building itself. Access to 1163 Building is through a large access door on the south side of the building. Dump trucks or other

containers are loaded with waste via front-end loaders. Unloading of waste into 1163 Building usually occurs from hopper boxes, dumpsters, dump trucks or vacuum trucks.

Loading and unloading operations occur strictly within 33 Building itself. Access to 33 Building is through one of three large access doors on the west side of the building. Dump trucks or other containers are loaded with waste via front-end loaders. Unloading of waste into 33 Building usually occurs from hopper boxes, dumpsters, dump trucks or vacuum trucks. Incinerator ash is conveyed by two parallel drag-flight conveyors which remove the ash from the incinerator water bath and transport the material into the 33 Building ash-staging areas.

C2.B.3(b) Safety Cutoff or Bypass Systems
[R 299.9615(1) and 40 CFR §270.16(c)]

Level indicators (e.g., load cells, level transmitters, etc.) are used to monitor V-303, V-401, V-403, V-404, and V-701 tank levels and are connected to the Incinerator Complex process control computer (PCC). The level in these tanks is continuously monitored by the Incinerator Complex PCC. Overfill protection on these waste tanks consists of a high level alarm or equivalent. If the level indicator detects a high level in the tank, the high level alarm is activated and any transfer of material into the tank is stopped.

To prevent overfilling of the primary containment of 1163 Building and 33 Building, no wastes are allowed to be stacked higher than the top of the primary containment steel barrier walls. Most wastes are not stacked higher than the dividers used to segregate them from other wastes in the Building. The heights of the dividers used in the Buildings are lower than the primary containment steel barrier walls. Also, the nature of the wastes handled and the manner of their introduction into 1163 Building and 33 Building make overfilling these tanks a highly unlikely scenario.

C2.B.3(c) Pressure Controls
[R 299.9615(1) and 40 CFR §270.16(c)]

Tank venting for V-303, V-401, V-403, V-404, and V-701 is provided to prevent excessive pressure or vacuum build-up due to emptying, filling, thermal inbreathing and outbreathing rates. The tanks have an automatic control system to maintain pressure in the tank at approximately 2 psig. The normal “breathing” vents from the tanks go into a closed vent system. This vent system directs the vapors either to the incinerator SCC or to a carbon bed. Each tank is also equipped with a pressure relief device which would relieve pressure inside the tank in the event of a fire or uncontrolled reaction without rupturing the vessel.

1163 Building and 33 Building are open to atmosphere and therefore do not require vacuum or pressure relief controls.

C2.B.4 Diagram of Piping, Instrumentation, and Process Flow
[R 299.9615(1) and 40 CFR §270.16(d)]

The piping and instrument diagrams for tanks V-303 (B1-072-32), V-401 (B1-074-32), V-403 (B1-076-32), V-404 (B1-077-32), and V-701 (B1-050-32), are provided in Appendix C2-B of this Attachment.

C2.B.5 Characteristics of Waste
[R 299.9615(1) and 40 CFR §264.192(a)(2)]

See Appendix A of Attachment XIV.A2, Chemical and Physical Analysis, of this operating license reapplication, for a list of acceptable waste types that can be managed in tanks V-303, V-401, V-403, V-404 and V-701 (INCIN STORAGE) and 1163 Building and 33 Building tanks (1163/33 BLDGS).

C2.B.6 External Corrosion Protection
[R 299.9615(1) and 40 CFR §264.192(a)(3)]

(Check as appropriate)

External Corrosion Protection Required:

☐ External shell of metal tank will be in contact with soil or water.

☐ Any external metal components of the tank system will be in contact with soil or water.

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.B.6(a) Corrosion Potential Assessment
[R 299.9615(1) and 40 CFR §264.192(a)(3)(i) and (ii)]

C2.B.7 Protection from Vehicular Traffic
[R 299.9615(1) and 40 CFR §264.192(a)(4]

This section is not applicable as there are no underground tank systems.

C2.B.8 Foundation Load and Anchoring
[R 299.9615(1) and 40 CFR §§264.192(a)(5)(i) through (iii)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.C INSTALLATION OF NEW TANK SYSTEMS
[R 299.9615(1) and 40 CFR §§264.192(b) through (g)]

The tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building can be found in Appendix C2-C of this Attachment.

C2.C.1 Proper Handling Procedures
[R 299.9615(1) and 40 CFR §264.192(b)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.C.1(a) Installation Inspectors
[R 299.9615(1) and 40 CFR §264.192(b)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.C.1(b) Installation Inspection Procedures
[R 299.9615(1) and 40 CFR §264.192(b)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.C.1(c) Repairs
[R 299.9615(1) and 40 CFR §264.192(b)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.C.2 Backfilling Underground Tank or Components
[R 299.9615(1) and 40 CFR §264.192(c)]

This section is not applicable as there are no underground tanks or components.

C2.C.2(a) Backfill Material
[R 299.9615(1) and 40 CFR §264.192(c)]

C2.C.2(b) Backfill Placement
[R 299.9615(1) and 40 CFR §264.192(c)]

C2.C.3 Pre-Service Tank and Ancillary Equipment
[R 299.9615(1) and 40 CFR §264.192(d)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.C.3.a Tanks
[R 299.9615(1) and 40 CFR §264.192(d)]

C2.C.3(b) Piping
[R 299.9615(1) and 40 CFR §264.192(d)]

C2.C.3(c) Repairs
[R 299.9615(1) and 40 CFR §264.192(d)

C2.C.4 Ancillary Equipment Installation
[R 299.9615(1) and 40 CFR §264.192(e)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.C.5 Corrosion Protection Installation
[R 299.9615(1) and 40 CFR §264.192(f)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.C.6 Certification of Design and Installation
[R 299.9615(1) and 40 CFR §264.192(g)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.C.7 Description of Tank System Installation
[R 299.9615(1) and 40 CFR §270.16(f)]

This information can be found in the tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building located in Appendix C2-C of this Attachment.

C2.C.8 Tank Labels
[R 299.9615]

Each tank system is labeled, in accordance with the National Fire Protection Association (NFPA) Standard no. 704, Standard System for the Identification of the Hazards of Materials for Emergency Response, with the appropriate Health, Flammability, Instability and any applicable Special Hazard markings to identify the hazards of the material(s) stored in the tank system.

C2.D SECONDARY CONTAINMENT SYSTEMS AND RELEASE DETECTION
[R 299.9615(1) and 40 CFR §264.193(a)]

C2.D.1 Secondary Containment Implementation Schedule
[R 299.9615(1) and 40 CFR §264.193(a)]

The Incinerator Tank Farm tanks, V-301, V-302, V-303, V-401, V-402, V-403, V-404, V-701, V-101 and V-601, are contained in a diked area, which provides secondary containment for the liquid waste. The volume of the dike containment system presently provides more than sufficient secondary containment. The diking for the existing Incinerator Tank Farm tanks meets the requirements of 40 CFR 264.193. The containment system is shown on drawings B2-422-874008, B2-409-874008, and B2-410-874008 in Appendix C2-B of this Attachment.

The concrete foundation and walls of 1163 Building and 33 Building serve as the secondary containment for the primary containment, the welded steel plates, and meets the requirements of 40 CFR 264.193. See the engineering drawings in Appendix C2-A of this Attachment.

C2.D.2 Secondary Containment Type and Performance Criteria
[R 299.9615(1) and 40 CFR §264.193(b)]

(Check all that apply):

☒ *Liner external to the tank*

☐ *Vault*

☐ *Double-walled tank*

☐ *Device approved by the director*

C2.D.3 Design Parameters
[R 299.9615(1) and 40 CFR §264.193(c)]

The existing tanks, V-301, V-302, V-402, V-101 and V-601, share the same secondary containment system as the new tanks, V-303, V-401, V-403, V-404, and V-701. The tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building can be found in Appendix C2-C of this Attachment.

C2.D.3(a) Compatibility and Strength
[R 299.9615(1) and 40 CFR §264.193(c)(1)]

C2.D.3(b) Foundation Integrity
[R 299.9615(1) and 40 CFR §264.193(c)(2)]

C2.D.3(c) Leak Detection Capability
[R 299.9615(1) and 40 CFR §264.193(c)(3)]

The secondary containment for the Incinerator Tank Farm tanks is inspected daily for the presence of leaks, spills or accumulated precipitation. The secondary containment is also equipped with a level detection device that is connected to the Incinerator Complex PCC and will alarm in the control room to warn of an accumulation of liquid in the secondary containment.

Because the bottom (exterior) of the metal floor which comprises the tank shell (i.e., primary containment) is not visible for inspection, 1163 Building and 33 Building are equipped with leak detection systems. The leak detection systems consist of a permeable layer installed between the metal floor and the concrete foundation. Any liquid leaking through the metal floor of the tank shell will drain through the permeable layer to collection piping which slopes to collection points located on the exterior of the tanks. The collection points are equipped with a level detection device that is connected to the Incinerator Complex PCC and will alarm in the control room to warn of an accumulation of leaked material. 33 Building has an additional collection point that is equipped with an inspection port, which is visually inspected daily and provides for determination of any evidence of leaked material which would indicate a leak in the primary containment. These leak detection systems will provide notification within 24 hours in the event of a leak. If the leak is very small, however, it may take more than 24 hours to detect.

C2.D.3(d) Adequate Drainage
[R 299.9615(1) and 40 CFR §264.193(c)(4)]

The secondary containment for the Incinerator Tank Farm tanks is sloped to a trench which drains to a sump. The trench and sump will collect any liquids resulting from leaks, spills or precipitation. Spilled or leaked waste and accumulated precipitation are removed from the secondary containment, within 24 hours, by pumps or by other means.

1163 Building and 33 Building have leak detection systems integrated into their secondary containment, as described in section C2.D.3(c) above. If a leak is detected, the material would be removed from the leak detection system, and therefore from the secondary containment, within 24 hours.

C2.D.4 External Liner Requirements
[R 299.9615(1) and 40 CFR §264.193(e)(1)]

The existing tanks, V-301, V-302, V-402, V-101 and V-601, share the same secondary containment system as the new tanks, V-303, V-401, V-403, V-404, and V-701. The tank system integrity assessments for tanks V-303, V-401, V-403, V-404, V-701, 1163 Building and 33 Building can be found in Appendix C2-C of this Attachment.

C2.D.4(a) Capacity
[R 299.9615(1) and 40 CFR §264.193(e)(1)(i)]

The total volume of the secondary containment for the Incinerator Tank Farm tanks is approximately 38,000 gallons which is greater than 100% of the capacity of the largest tank within the containment.

Since the secondary containment for 1163 Building and 33 Building are their exterior concrete foundation and walls, they are, by design, capable of containing 100% of their capacity.

C2.D.4(b) Storm Water Control
[R 299.9615(1) and 40 CFR §264.193(e)(1)(ii)]

Run-on into the secondary containment of the Incinerator Tank Farm tanks is prevented by dike walls and contour sloping of the area which redirects precipitation into the Michigan Operations sewer system. In addition, the secondary containment also has sufficient excess capacity to contain precipitation from a 25-year, 24-hour rainfall event.

1163 Building and 33 Building are constructed with a concrete foundation and walls, structural steel, metal siding and a roof. These features will prevent run-on. In addition, the areas at the doorways into the Buildings are sloped to prevent run-on.

C2.D.4(c) Free from Cracks and Gaps
[R 299.9615(1) and 40 CFR §264.193(e)(1)(iii)]

The secondary containment for all tanks is inspected daily as outlined in Attachment XIV.A5, Inspection Schedule, of this operating license reapplication.

C2.D.4(d) Coverage Around Tank
[R 299.9615(1) and 40 CFR §264.193(e)(1)(iv)]

The secondary containment surrounds each tank system completely and covers all surrounding earth that is likely to come into contact with the waste should any waste be released from the tanks.

C2.D.5 Vault Systems Requirements
[R 299.9615(1) and 40 CFR §264.193(e)(2)]

This section is not applicable as vaults are not utilized for secondary containment.

C2.D.5(a) Capacity
[R 299.9615(1) and 40 CFR §264.193(e)(2)(i)]

C2.D.5(b) Stormwater Control
[R 299.9615(1) and 40 CFR §264.193(e)(2)(ii)]

C2.D.5(c) Joint Construction
[R 299.9615(1) and 40 CFR §264.193(e)(2)(iii)]

C2.D.5(d) Coating or Lining for Concrete
[R 299.9615(1) and 40 CFR §264.193(e)(2)(iv)]

C2.D.5(e) Prevention of Vapor Formation and Ignition
[R 299.9615(1) and 40 CFR §264.193(e)(2)(v)]

C2.D.5(f) Exterior Moisture Barrier
[R 299.9615(1) and 40 CFR §264.193(e)(2)(vi)]

C2.D.6 Double-walled Tank Requirements
[R 299.9615(1) and 40 CFR §264.193(e)(3)(i)]

This section is not applicable as double-walled tanks are not utilized for secondary containment.

C2.D.6(a) Integral Construction Design
[R 299.9615(1) and 40 CFR §264.193(e)(3)(i)]

C2.D.6(b) Corrosion Protection for Metal Tanks
[R 299.9615(1) and 40 CFR §264.193(e)(3)(ii)]

C2.D.6(c) Leak Detection System
[R 299.9615(1) and 40 CFR §264.193(e)(3)(iii)]

C2.D.7 Ancillary Equipment with Secondary Containment
[R 299.9615(1) and 40 CFR §264.193 (f)]

C2.D.7(a) Secondary Containment Type and Performance Criteria
[R 299.9615(1) and 40 CFR §264.193(f)]

C2.D.7(b) Design Parameters
[R 299.9615(1) and 40 CFR §264.193(f)]

C2.D.7(c) Exempted Ancillary Equipment and Inspections
[R 299.9615(1) and 40 CFR §264.193(f)]

The ancillary equipment associated with the Incinerator Tank Farm tanks generally includes pumps, piping, fittings and flanges. The portion of the ancillary equipment associated with these tanks, which is outside of the secondary containment, is pressurized aboveground piping systems. These systems are equipped with automatic shut-off devices that are visually inspected for leaks on a daily basis.

The ancillary equipment associated with 1163 Building and 33 Building tank systems includes bulk solids moving equipment and vehicles. The bulk solids moving equipment and vehicles do not have secondary containment but are visually inspected, prior to leaving the tank system, for signs of residual waste. If detected, the waste is removed from the equipment and vehicles, prior to leaving the tank, in a manner to prevent "track-out" of the waste.

Note: The pressed wastewater treatment plant solids conveyor (overhead conveyor) and other external ancillary equipment around the exterior of 1163 Building storage tank that were no longer in use were removed on June 18, 2012 as part of a minor license modification, Amendment 13.

C2.D.8 Requirements for Tank Systems That Are Not in Compliance With Secondary Containment
[R 229.9615(2)]

This section is not applicable as all tank systems are in compliance with the secondary containment requirements of 40 CFR 264.193.

C2.D.8(a) Aboveground Tanks
[R 229.9615(2)(a)]

C2.D.8(b) Underground Tanks
[R 229.9615(2)(a)]

C2.E VARIANCES FOR SECONDARY CONTAINMENT
[R 299.9615(1) and 40 CFR §264.193(g)]

(Check as appropriate)

☐ Technology-based Variance

☐ Risk-based Variance

This section is not applicable as there are no variances from the requirement for secondary containment.

C2.E.1 **Technology-based Variance**
[R 299.9615(1) and 40 CFR §264.193(g)]

C2.E.1(a) **Nature and Quantity of Wastes**
[R 299.9615(1) and 40 CFR §264.193(g)(1)(i)]

C2.E.1(b) **Design and Operation**
[R 299.9615(1) and 40 CFR §264.193(g)(1)(ii)]

C2.E.1(c) **Hydrogeologic Setting**
[R 299.9615(1) and 40 CFR §264.193(g)(1)(iii)]

C2.E.1(d) **Other Factors**
[R 299.9615(1) and 40 CFR §264.193(g)(1)(iv)]

C2.E.1(e) **Zone of Engineering Control**
[R 299.9615(1) and 40 CFR §264.193(g)(3)]

C2.E.2 **Risk-Based Variance**
[R 299.9615(1) and 40 CFR §264.193(g)(2)]

C2.E.2(a) **Waste Toxicity and Migration Potential**
[R 299.9615(1) and 40 CFR §264.193(g)(2)]

C2.E.2(b) **Site Hydrogeology and Land Uses**
[R 299.9615(1) and 40 CFR §264.193(g)(2)]

C2.E.2(c) **Soil Characteristics**
[R 299.9615(1) and 40 CFR §264.193(g)(2)]

C2.E.2(d) **Permanence of Potentially Adverse Heath and Environmental Effects**
[R 299.9615(1) and 40 CFR §264.193(g)(2)]

C2.E.2(e) **Groundwater and Surface Water Quality and Usage**
[R 299.9615(1) and 40 CFR §264.193(g)(2)]

C2.E.2(f) **Climate**
[R 299.9615(1) and 40 CFR §264.193(g)(2)]

C2.E.2(g) **Receptors**
[R 299.9615(1) and 40 CFR §264.193(g)(2)]

C2.E.3 **Variance Implementation Procedures**
[40 CFR §264.193(h)]

C2.F CONTROLS AND PRACTICES TO PREVENT SPILLS AND OVERFILLS
[R 299.9615(1) and 40 CFR §264.194(b)]

C2.F.1 Spill Prevention Controls
[R 299.9615(1) and 40 CFR §264.194(b)]

Controls and practices utilized to prevent spills from the tank systems include use of Incinerator Complex PCC to monitor tank system activity (e.g., pressures, temperatures, levels, etc.), use of procedures for transferring materials into and out of the tank systems, preventative maintenance, plant rounds and daily RCRA inspections.

C2.F.2 Overfill Prevention Controls
[R 299.9615(1) and 40 CFR §264.194(b)]

See sections C2.A.3(b) and C2.B.3(b) of this Attachment for overfill prevention controls.

C2.F.3 Freeboard Maintenance
[R 299.9615(1) and 40 CFR §264.194(b)]

Tanks V-101 and V-601 are uncovered tanks. These tanks are used for containment and are normally maintained empty. The level in these tanks is monitored by the Incinerator Complex PCC. The high level for these tanks, which alarms and triggers a stop of any transfers of material into the tanks, is set at ≥85%. Maintaining the tanks empty and alarming when the tank fills to ≥85% maintains sufficient freeboard to prevent overtopping by wave or wind action or by precipitation.

C2.G INSPECTIONS
[R 299.9615(1) and 40 CFR §264.195(a)]

See Attachment XIV.A5, Inspection Schedule, of this operating license reapplication, for details pertaining to the inspections performed on the tank systems.

C2.G.1 Schedule and Procedures for Overfill Control System Inspections
[R 299.9615(1) and 40 CFR §264.195(a)]

C2.G.2 Daily Inspections of Aboveground Portions of Tank Systems and Monitoring and Leak Detection Data
[R 299.9615(1) and 40 CFR §264.195(b)]

C2.G.3 Daily Inspection of Construction Materials, Local Areas, and Secondary Containment System for Erosion and Leakage
[R 299.9615(1) and 40 CFR §264.195(b)(3)]

C2.G.4 Inspection of Cathodic Protection Systems
[R 299.9615(1) and 40 CFR §264.195(c)]

C2.G.5 Inspection Requirements before Full Secondary Containment is Provided
[R 299.9615(1) and 40 CFR §264.193(i)]

C2.G.5(a) Nonenterable Underground Tanks
[R 299.9615(1) and 40 CFR §264.193(i)(1)]

C2.G.5(b) Other Than Nonenterable Underground Tanks
[R 299.9615(1) and 40 CFR §264.193(i)(2)]

C2.G.5(c) Ancillary Equipment
[R 299.9615(1) and 40 CFR §264.193(i)(3)]

C2.G.6 Reporting Requirements
[R 299.9615(1) and 40 CFR §264.193(i)(4)]

C2.H RESPONSE TO LEAKS OR SPILLS AND DISPOSITION OF LEAKING OR UNFIT-FOR-USE TANK SYSTEMS
[R 299.9615(1) and 40 CFR §264.196]

See Attachment XIV.A7, Contingency Plan, of this operating license reapplication, for details pertaining to the response to leaks or spills and disposition of leaking or unfit-for-use tank systems.

C2.H.1 Response Actions for Leaks and Spills
[R 299.9615(1) and 40 CFR §264.196(a)]

See section F.2., Spills/Material Releases, of Attachment XIV.A7 for spill and leak response actions.

C2.H.1(a) Waste Flow Stoppage
[R 299.9615(1) and 40 CFR §264.196(a)]

In the event of a spill or leak from a tank system, the transfer of any waste into the tank system will be stopped. If possible, the flow of waste from the tank system into the secondary containment will be stopped. Once the flow of waste has been stopped, an inspection of the tank system will be conducted to help determine the cause of the release.

C2.H.1(b) Waste Removal
[R 299.9615(1) and 40 CFR §264.196(b)]

See section F.2., Spills/Material Releases, and section G, Cleanup Procedures, of Attachment XIV.A7 for waste removal actions resulting from a spill or leak from a tank system.

C2.H.1(c) Visible Release Containment
[R 299.9615(1) and 40 CFR §264.196(c)]

See section F.2., Spills/Material Releases, and section G, Cleanup Procedures, of Attachment XIV.A7 for containment actions resulting from a spill or leak from a tank system.

C2.H.1(d) Repair, Replacement, or Closure
[R 299.9615(1) and 40 CFR §264.196(e)]

If the cause of a spill or leak did not damage the integrity of the tank system, the tank system will be returned to service as soon as the released waste is cleaned up and any repairs, if necessary, are made. If a release was from the primary tank system to secondary containment, the tank

system will be repaired prior to returning it to service. If a release was from any portion of the tank system's above-ground ancillary equipment, which does not have secondary containment, that portion of the ancillary equipment will be repaired prior to returning the tank system to service. If the repair of the tank system's above-ground ancillary equipment requires the replacement of a component, the new component will comply with the requirements of 40 CFR §265.192 and §265.193.

C2.H.1(e) Certification of Major Repairs
[R 299.9615(1) and 40 CFR §264.196(f)]

If the cause of a spill or leak requires any repairs that are extensive, the tank system will not be returned to service until it has obtained a certification by a qualified Professional Engineer in accordance with §270.11(d). The certification will be placed in the operating record and maintained until closure of the tank system.

C2.H.2 Required Notifications and Reports
[R 299.9615(1) and 40 CFR §264.194(d)]

See section C.2., External Contacts, of Attachment XIV.A7 for details regarding notifications. If a notification is made, a written follow-up report will be submitted to the Department of Environmental Quality - Office of Waste Management and Radiological Protection within 30 days of detection of the spill or leak.

C2.I CLOSURE AND POST CLOSURE REQUIREMENTS
[R 299.9615(1) and 40 CFR §270.14(b)]

See section A11.A.5(b), Closure of Tank Systems, of Attachment XIV.A11, Closure and Postclosure Care Plans, of this operating license reapplication, for details pertaining to the closure and postclosure care of 1163 Building and 33 Building tank systems. See section A11.A.5(f), Closure of Incinerators, of Attachment XIV.A11, Closure and Postclosure Care Plans, of this operating license reapplication, for details pertaining to the closure and postclosure care of the Incinerator Tank Farm Tank Systems, V-301, V-302, V-303, V-401, V-402, V-403, V-404, V-701, V-101, and V-601.

(Check as appropriate)

☐ Category A - *where decontamination is practical and secondary containment is provided*

☐ Category B - *where decontamination or removal is not practical and where secondary containment is provided and tank system will be closed as a landfill*

☐ Category C - *where decontamination is practical and where secondary containment is not provided*

☐ Category D - *where decontamination or removal is not practical, and where secondary containment is not provided, and tank system will be closed as a landfill*

C2.I.1 **Category A**
[R 299.9615(1) and 40 CFR §264.197]

C2.I.1(a) **Closure Plan**
[40 CFR §264.112, except 264.112(d)(1)]

C2.I.1(b) **Closure Activities**
[40 CFR §264.111 through 114 and R 299.9613(3)]

C2.I.1(c) **Cost Estimate for Closure**
[R 299.9702 and 40 CFR §264.142]

C2.I.1(d) **Financial Assurance for Closure**
[R 299.9703 and 40 CFR §264.143]

C2.I.2 **Category B**
[R 299.9615(1) and 40 CFR §264.197]

C2.I.2(a) **Closure Plan for Landfills**
[40 CFR §264.112, except 264.112(d)(1)]

C2.I.2(b) **Closure Activities as a Landfill**
[40 CFR §264.111 through 116, except 264.115 shall be replaced by R 299.9613(3)]

C2.I.2(c) **Closure Care for Landfills**
[40 CFR §264.310]

C2.I.2(d) **Closure Cost Estimate**
[R 299.9702 and 40 CFR §264.142]

C2.I.2(e) **Financial Assurance for Closure**
[R 299.9703 and 40 CFR §264.143]

C2.I.2(f) **Postclosure Plan**
[40 CFR §264.117 through 119 and R 299.9613(5)]

C2.I.2(g) **Postclosure Care for Landfills**
[40 CFR §264.310]

C2.I.2(h) **Postclosure Cost Estimate**
[R 299.9702 and 40 CFR §264.14]

C2.I.2(i) **Financial Assurance for Postclosure Care**
[R 299.9703 and 40 CFR §264.145]

C2.I.3 **Category C**
[R 299.9615(1) and 40 CFR §264.197]

C2.I.3(a) Closure Plan
[40 CFR §264.112, except 264.112(d)(1)]

C2.I.3(b) Closure Activities
[40 CFR §264.111 through 114 and R 299.9613(3)]

C2.I.3(c) Contingent Plans
[40 CFR §264.197]

C2.I.4 Category D
[R 299.9615(1) and 40 CFR §264.197]

C2.I.4(a) Contingent Plans
[40 CFR §264.197]

C2.I.4(b) Closure Activities as a Landfill
[40 CFR §264.111 through 116, except 264.115, shall be replaced by R 299.9613(3)]

C2.I.4(c) Closure Care for Landfills
[40 CFR §264.310]

C2.I.4(e) Financial Assurance for Closure
[R 299.9703 and 40 CFR §264.143]

C2.I.4(f) Postclosure Plan
[40 CFR §264.117 through 119 and R 299.9613(5)]

C2.I.4(g) Postclosure Care for Landfills
[40 CFR §264.310]

C2.I.4(h) Postclosure Cost Estimate
[R 299.9702 and 40 CFR §264.144]

C2.I.4(i) Financial Assurance for Postclosure Care
[R 299.9703 and 40 CFR §264.145]

C2.J SPECIAL REQUIREMENTS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES

[R 299.9615(1) and 40 CFR §270.16(j)]

Address the following as applicable:

C2.J.1 Ignitable or Reactive Wastes Precautions
[R 299.9615(1) and 40 CFR §264.198]

Wastes that are stored in any of the tank systems are managed such that they are protected from any material or conditions that would cause the waste to ignite or react. This is accomplished in several ways;

1. The use of a waste characterization process. Prior to the receipt of any on-site or off-site waste to the facility, the waste generator completes a waste characterization. During the

waste characterization process, waste materials are evaluated for ignitability, reactivity, and/or incompatibility using waste characterization data, process knowledge, in-house literature, other available published literature and/or results from lab testing as necessary. When an ignitable or reactive specie is encountered, it is evaluated as to whether or not there would be a significant risk to human health and the environment in handling it within a tank system. If a problem appears to exist, appropriate precautions are taken to prevent reactions which may:

- Generate extreme heat or pressure, fire or explosions, or violent reactions;
- Produce uncontrolled toxic or flammable mists, fumes, dusts or gases in sufficient quantities to pose a risk of fire or explosion or to threaten human health or the environment; or
- Damage the structural integrity of the tank system.

Examples of typical precautions that might be taken would include; diluting and/or mixing with another material to lessen the degree of ignitability or reactivity, and/or reacting further by the generator to lessen its inherent characteristics.

2. The site has a no smoking policy within the facility fence line. Signs indicating the no smoking policy are located at each access gate into the site.
3. The use of open flames, cutting or welding, spark producing equipment or other potential sources of ignition in an area that handles reactive and/or ignitable waste requires a hot work permit from trained personnel responsible for managing the areas.
4. The areas that handle ignitable or reactive waste are designed, constructed and maintained to minimize the potential for ignition of the waste. These practices are consistent with the requirements of NFPA 70, "National Electric Code", NFPA 497, "Recommended Practice for Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas", NFPA 30, "Flammable and Combustible Liquids Code" and other appropriate codes and standards.
5. The organic liquid waste tanks are grounded and provided with nitrogen that is used as an inert pad to prevent accumulation of a flammable vapor mixture in the tanks.

C2.J.2 Distance Requirements for Ignitable or Reactive Wastes
[R 299.9615(1) and 40 CFR §264.198(a) and (b)]

The existing tank spacing and location meet the guidelines of NFPA, Chapter 30, for maintaining a proper buffer zone for isolation for Class II, IIIA, and IIIB combustible liquids.

C2.J.3 Incompatible Wastes
[R 299.9615(1) and 40 CFR §264.199]

Wastes that are incompatible with other wastes already in a tank system or with the materials of construction of a tank system will not be managed in that tank system.

Each waste requested to be stored in a tank system is evaluated prior to storage for its effect, if any, upon other wastes stored in the tank system and the tank system's material of construction. This information is evaluated with the aid of the waste characterization and, if necessary, consultation with Dow's Reactive Chemicals and/or Materials Engineering experts. When a new waste is considered for storage, a comparison is made of the nature of that waste with the nature of all other wastes currently in storage and the material of construction to ensure compatibility. If a new waste is deemed incompatible with either the wastes in storage at the time or the tank system's material of construction, the waste will not be stored in that tank system. In the event insufficient information is available to adequately evaluate a waste for compatibility, the waste material in question will be managed as follows:

1. The waste will be isolated from all materials presently stored.
2. The waste generator will be notified of the status of the material with suggested treatment and disposal alternatives.
3. The waste will be treated or disposed of by the appropriate method.

APPENDIX C2-A – TANK SYSTEM ENGINEERING DRAWINGS

Drawing Number(s)	Tank Number(s)
A5-001-830235	V-301 & V-302
D-2933	V-402
B5-021-61178	V-101
Z5-013-760818	V-601
B5-422-874008	V-303
B5-420-874008	V-401, V-403 & V-404
B5-405-874008	V-701
B2-298-927122 B2-299-927122 B2-300-927122 B2-301-927122 B2-302-927122	1163 Building
B2-3202-960530 B2-4220-960530 B2-4220A-960530 B2-4221-960530 B2-4222-960530 B2-4223-960530 B2-4258M-960530	33 Building

MANUFACTURER	NO. UNITS	B/M NO.
		P. O. NO. 830235- M0601

FIELD ERECTED YES (NO) · NO. UNITS 2 TOTAL VOLUME * GAL

VESSEL SKETCH A5-001-830235

DESIGN DATA

Operating Pressure psig	+2.0 ; -1.0	
Operating Temperature °F	250°	
Liquid Specific Gravity	1.2	
Contents Lethal	Yes (No)	
Design Pressure psig	+20 ; -2.0	
Design Temperature °F	450°	
Hydrostatic Test psig	30	
Shell / Heads Corr. Allow. in.	1/2	1/2
Shell / Heads Joint Eff. %	CODE	CODE
Code: ASME	Stamp (Yes) No	
Radiograph: CODE	Stress Relieve: CODE	
National Board No. YES		
Type Supports: 4 LEGS		
Insulation: BY OTHERS 3" SHELL; 3½" HEADS		
Fireproofing:		
Sandblast: YES	Paint: YES	
Manhole 1 Hinged 2 Davited	Heat Panel Clips: YES (BY OTHERS)	
Platform Clips: YES / Ladder Clips: No	Insul. Rings: YES	
Pipe Supports: No	LIFTING LUGS: YES	
Wind Load:	Seismic:	
Wt. Empty lb	Wt Full of Water lb	

MATERIALS

Item	Thickness	Mat'l Class	Mat'l - Minimum Quality
Shell	3/4 in.	CARB. STL.	SA-537-CL1 NORMALIZED (SUPPLIED BY DOW, SEE ATTACHED SHT. FOR SHT. SIZES)
Heads	in.	"	SA-516-70 (FLANGED & DISHED)
Lining	in.		
BAFFLES	3/4 in.	C. STL.	SA-516-70
	in.		
Nozzle Necks			SA-53-A
Flanges			SA-105-GR. I
Coupling			
M.H. Cover			SA-516-70
Supports			"
Bolts/Stud's			SA-193-B7
Nuts			"
Gaskets			

NOZZLE SCHEDULE

Service	Mark	No.	Size	Rating	Face	Type	
INLET	A	1	6	150	R.F.	FLG'D.	(W/4" DIP PIPE)
SPARE	B	3	2				
SPARE	C	2	3				
TEMP.	D	2	2				
VENT	E	1	3				
AGITATOR	F	1	12				
AGITATOR	G	1	68	MFG'R.	STD.		
OUTLET	H	1	8	150	FLAT		(STUD 1"; DRILLED & TAPPED)
NITROGEN	J	1	1		R.F.		
RETURN	K	1	4				(W/DIP PIPE)
SPARE *	L	1	4				
MANWAY *	M	3	24	MFG'R.	STD.		
PRD	N	1	10	150	R.F.		
	P						
	Q						
	R						

*Nozzle to be Plugged or Blinded

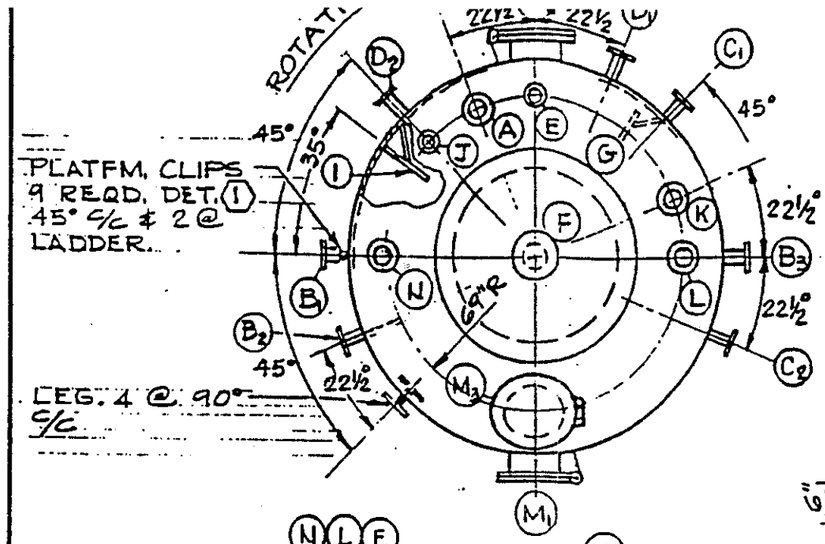
EQUIP. No.	DOW P.V. No.
V-201	69E71
V-202	69E72

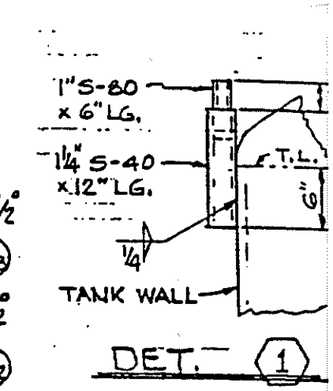
For Further Details, See Sheet No. A5-001-830235

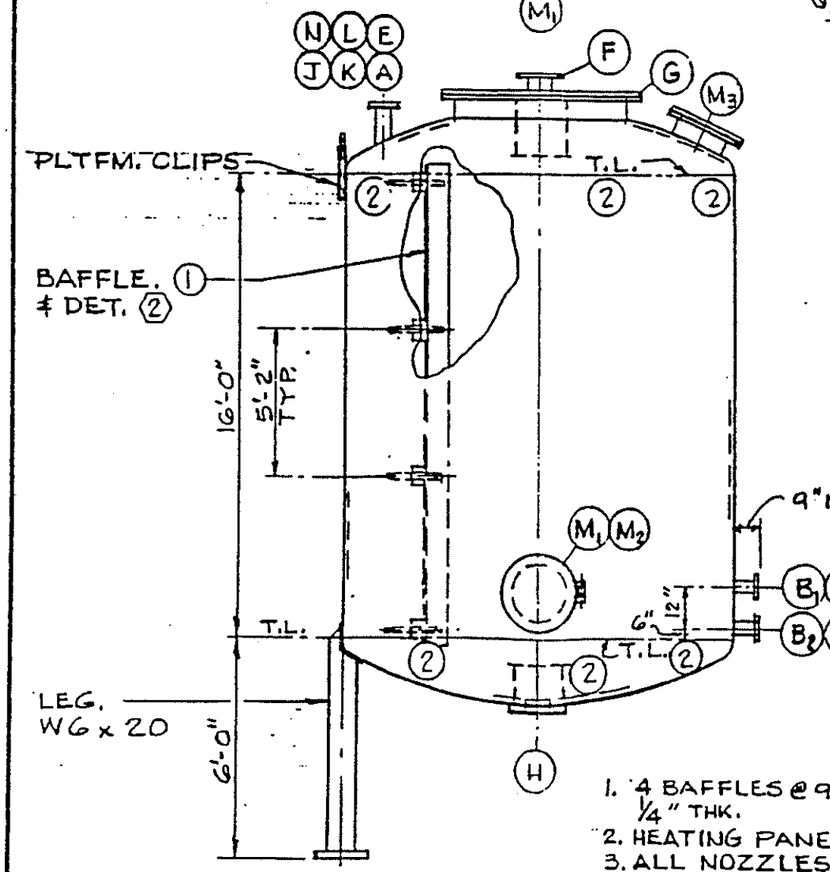
SPEC. BY ELS	THE DOW CHEMICAL COMPANY	V-302	V-301
CHECKED:	SERVICE	VERTICAL VESSEL SPECIFICATIONS	
APP'D: RCS	HOT TAR STORAGE TANK		
DATE: 9-23-83	REVISION DATE: A 7-11-83 B 9-8-83 C 9-23-83	SPEC. NO. A5-001-830235	

VENDOR TO COMPLETE ALL INFORMATION MARKED *

SHEET 1 OF 3

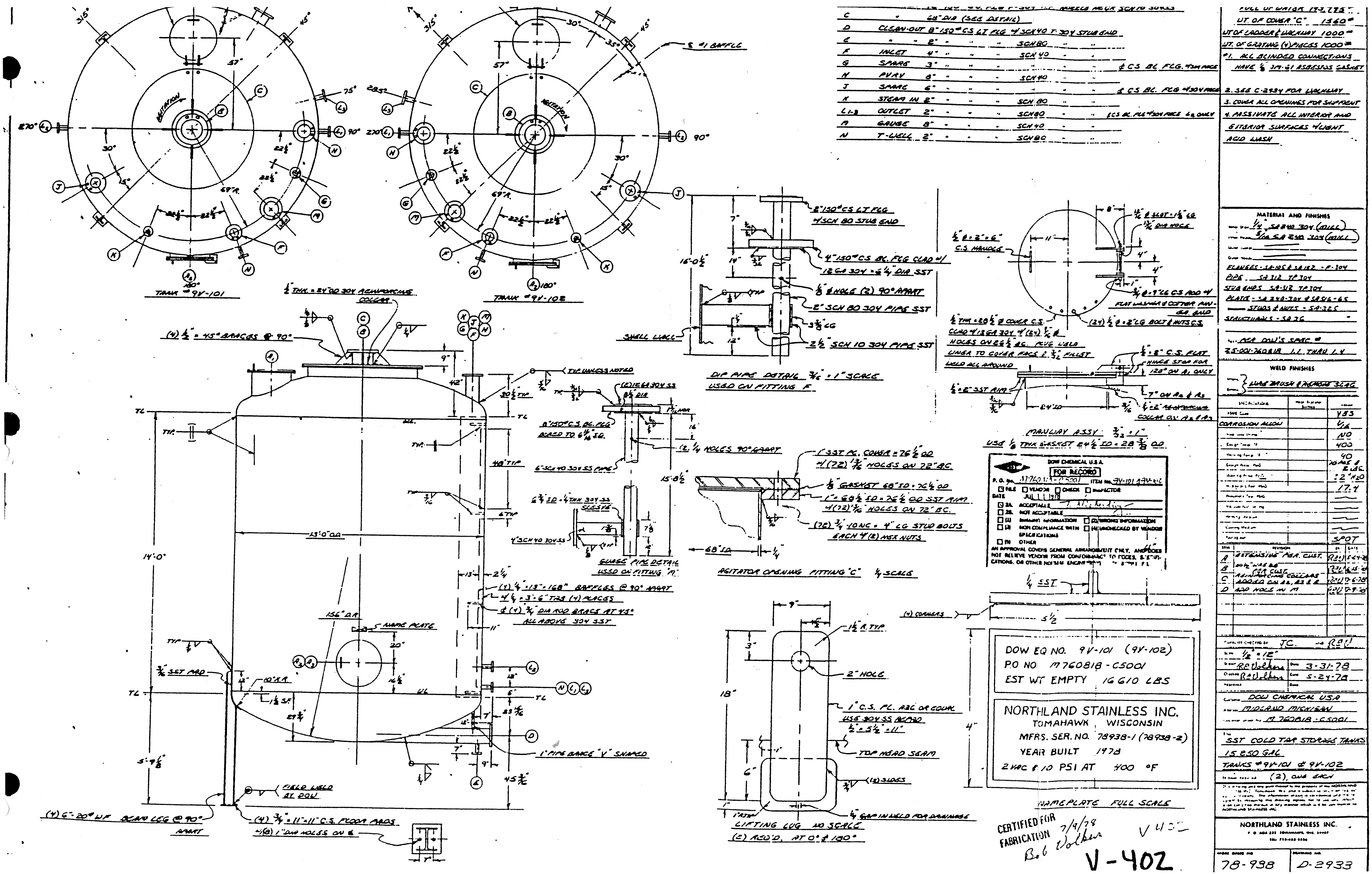






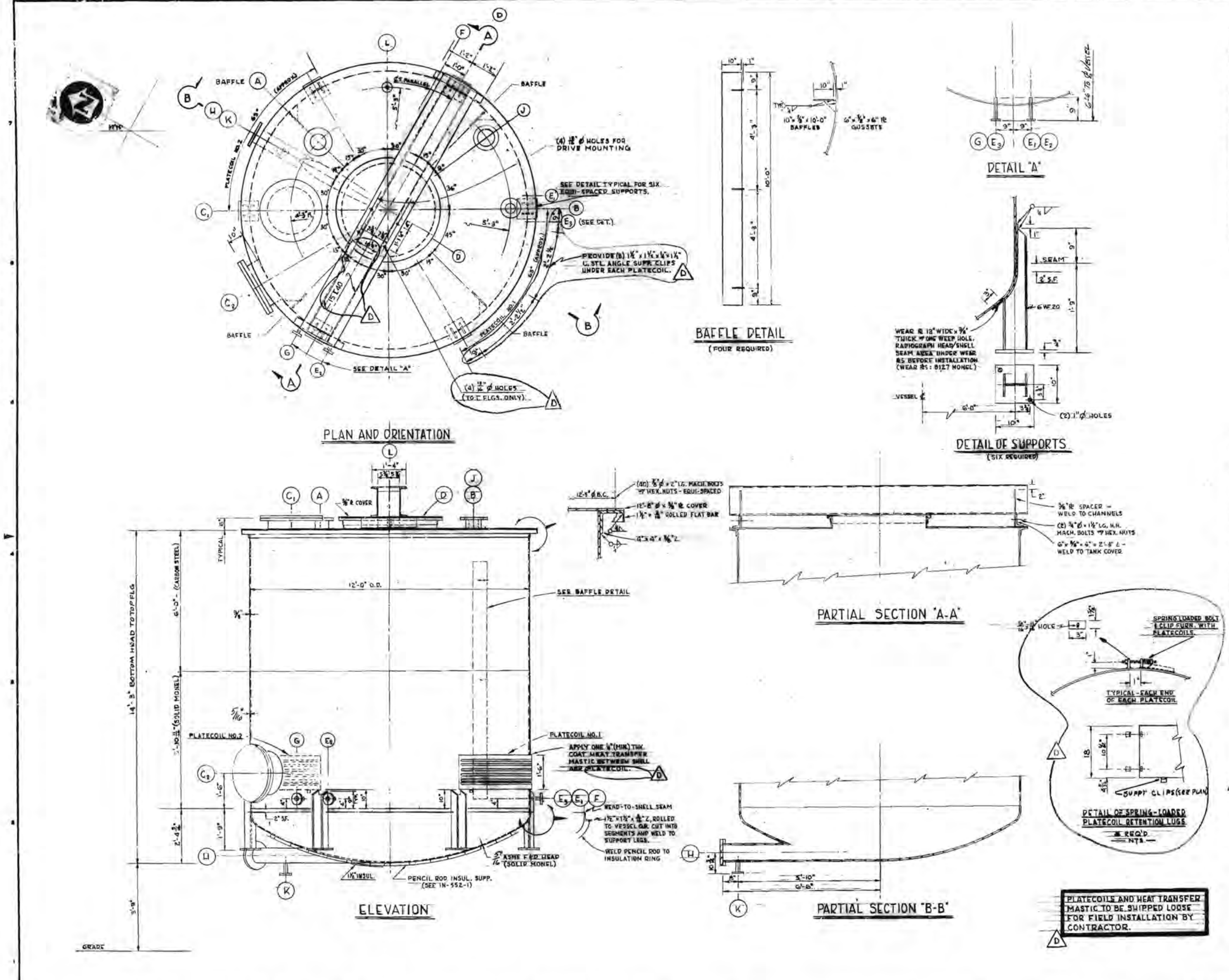
1. 4 BAFFLES @ 90° C/C. 13" WIDE x 196" LG. ¼" THK.
2. HEATING PANEL LOCATIONS (BY OTH
3. ALL NOZZLES (EXCEPT H) ≠ MANWAY TO PROTECT 9" MIN.

MADE: ELS	THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN	SKETCH NUMBER
CHECKED: RCS	PROJECT NEWT 703 BLDG. HOT TAR STORAGE TANK V-301, V-302	A5-001-830235
APP'D: -		PAGE 2 OF 3
DATE: 9-83	REVISION DATE: 9-23-83	


TANK #9V-101
TANK #9V-102
DIP PIPE DETAIL 3/16" = 1" SCALE
USED ON FITTING F
AGITATOR OPENING FITTING "C" 1/4 SCALE
MANWAY ASSY 3/32" = 1"
LIFTING LUG NO SCALE
(2) REQ'D. AT 0° & 180°
NAMEPLATE FULL SCALE
DOW EQ NO. 9V-101 (9V-102)
P.O NO M760818-C5001
EST WT EMPTY 16610 LBS
NORTHLAND STAINLESS INC.
TOMAHAWK, WISCONSIN
MFRS. SER. NO. 78938-1 (78938-2)
YEAR BUILT 1978
2 VAC & 10 PSI AT 400 °F
MATERIAL AND FINISHES
WELD FINISHES
DOW CHEMICAL U.S.A.
FOR RECORD
DOW CHEMICAL USA
MIDLAND MICHIGAN
M760818-C5001
SST COLD TAR STORAGE TANKS
15,850 GAL
TANKS #9V-101 & 9V-102
(2), ONE EACH
NORTHLAND STAINLESS INC.
78-938
D-2933
CERTIFIED FOR FABRICATION 7/4/78
Bob Volker
V-402

THIS DRAWING IS THE PROPERTY OF THE DOW CHEMICAL COMPANY AND THE INFORMATION CONTAINED HEREON MUST BE TREATED AS CONFIDENTIAL AND NOT REVEALED TO THIRD PARTIES, NOR MAY THE DRAWINGS BE REPRODUCED IN WHOLE OR PART, EXCEPT BY EXPRESS PERMISSION OF THE COMPANY.

DRAWING NUMBER B5-21-61178



• DESIGN DATA

DESIGN PRESSURE	ATMOSPHERIC
OPERATING PRESSURE	ATMOSPHERIC
DESIGN TEMPERATURE	400 °F.
OPERATING TEMPERATURE	220 °F.
CORROSION ALLOWANCE	CARBON STEEL: 1/8" MONEL: 1/16"
CONSTRUCTION	ASME, SECTION VIII, 1965 EDITION
CODE STAMP	ON PANEL COILS ONLY
RADIOGRAPH	UNDER WEAR PLATES ONLY
STRESS RELIEVE	NO
TEST	FILL FULL OF WATER (HOLD 4 HRS.)
CAPACITY	10,675 GAL.
WEIGHT EMPTY	14,500 LBS.
WEIGHT FULL OF WATER	94,500 LBS.
OPERATING WEIGHT	100,500 LBS.
SPECIFIC GRAVITY OF LIQUID	1.2
INSULATION THICKNESS	2"
PANEL COILS @ 150-PSIG & 365°F CODE STAMPED (ASME VIII)	

• SCHEDULE OF OPENINGS

SERVICE	MK	REQ'D	SIZE	RATING	FACE	TYPE	NOZZLE	MATERIAL
VENT	A	1	8"	150#	R.F.	S.O.	SCH. 40	PIPE, A53 A OR B ~ FLANGE, A181-1
LEVEL	B	1	5"	150#	R.F.	S.O.	SCH. 40	PIPE, A53 A OR B ~ FLANGE, A181-1
MANHOLE	C_1	1	24"	125#	R.F.	S.O.	SCH. 20	NECK, A53 A OR B/A516 GR.60 PL ~ FLANGE, A181-1
MANHOLE	C_2	1	24"	125#	R.F.	S.O.	.375 PL	NECK, B127 FACE OLD FLG. 7 1/8" B127 FACE
AGITATOR	D	1	48"	125#	F.F.	S.O.	.375" PL	NECK, A516-GR.60 ~ FLANGE, A181-1 OR A105
INLET	E	3	1½"	150#	R.F.	S.O.	SCH. 40	PIPE, B165 ~ FLANGE A-181-1 (92-104)
RECYCLE	F	1	4"	150#	R.F.	S.O.	SCH. 40	PIPE, B165 ~ FLANGE A-181-1 (92-104)
OUTLET	G	1	1½"	150#	R.F.	S.O.	SCH. 80	PIPE, B165 ~ FLANGE A-181-1 (92-104)
CLEAN-OUT	H	1	8"	150#	F.F.	L.J.	SCH. 40	NECK, B165 ~ FLANGE A-181-1 (92-104)
						& A-181-1 BLIND		WITH 1/8" B127, ANNEALED FACING
GAUGING	J	1	8"	150#	R.F.	S.O.	SCH. 40	PIPE, A53 A OR B ~ FLANGE, A181-1
DRAIN	K	1	2"	150#	R.F.	S.O.	SCH. 80	PIPE, B165 ~ FLANGE A-181-1 (92-104)
SPARE	L	1	1½"	150#	R.F.	S.O.	SCH. 80	PIPE A53A OR B ~ FLANGE, A-181-1 & BLIND

● LAP JOINTS MAY BE SUBSTITUTED, USING A181 GR. 1 OR 2 FLANGES
●● LIGHT WEIGHT A.S.A.-TYPE DRILLED TO CONFORM WITH AMERICAN STANDARD FOR 125# C.I. FLANGES. USE FULL FACE GASKETS.

• MATERIALS

SHELL - TOP 6'-0" SECTION	ASTM A516-64 GR. 60
SHELL - BOTTOM SECTION	ASTM B-127 (MONEL 400)
BOTTOM HEAD, ASME F&D	ASTM B-127 (MONEL 400)
SHELL AND AGITATOR OPENING COVERS	ASTM A516-64 GR. 60
BAFFLES, INCLUDING GUSSETS	ASTM B127, ANNEALED
STRUCTURAL SHAPES	ASTM A-36
MISCELLANEOUS PLATE	ASTM A516-64 GR. 60
GASKETS	JM-61, OR EQUAL
PAINT	97-247 SP
HEAT TRANSFER MASTIC	CHEMEX NO. 1, OR EQUAL
* THERMAL INSULATION	CALCIUM SILICATE
PLATECOILS STYLE 80, RIGHT HAND, FRT., SINGLE EMBOSSED, 18" WIDE x 71" LONG ROLLED TO 6'-0 ¼" RADIUS AND FURNISHED WITH STD. SPRING-LOADED LI-E LUG ASSEMBLIES WITH "A" DIMENSION = 6".	CARBON STEEL, 12 GA.
BOLTING	BOLTS, A307 NUTS, A194 CL. 2H

• REFERENCE DRAWINGS and STANDARDS

* THERMAL INSULATION - GENERAL SPECIFICATIONS	IN-02E-1
WELDED INSULATION SUPPORT AND TIE RING DETAIL	IN-332-1
INORGANIC ZINC COATING	97-247 SP
TOLERANCES	92-302
NAME PLATE	92-391
NONFERROUS NOZZLE FLANGE JOINT DESIGN	92-104

* INSULATION TO BE FIELD INSTALLED BY OTHERS.

5524C-61178

5524-61178

Printed 10-12-67

CODE 707

SCALE ½" = 1'

REVISIONS: 6-15-67 ADDED: CODE STAMP REQUIREMENT FOR PANEL COIL. ... 7-28-67 RELOC. AGITATOR MOUNT, NOZZ. "L", "B", "G", E_2 ~ CHGD. ... 10-12-67 RELOC. NOZZ. J, ADDED NOZZ. F, AND CHANGED ... ADDED PLATECOIL SUPPORT CLIPS, DETAILED PLATECOIL ... ANCHOR CLIPS, AND NOTE RE: PLATE COIL INSTALLATION ... ADD C BOLT HOLES & TAGGED CHANNELS.

REFERENCE DRAWINGS

APPROVALS — THE DOW CHEMICAL COMPANY: DESIGNED BY G.V. BAIN 5-4-67; DRAWN BY G.V. BAIN 5-4-67; CHECKED BY 5-18-67; APPROVED BY 5-28-67. CONTRACTOR.

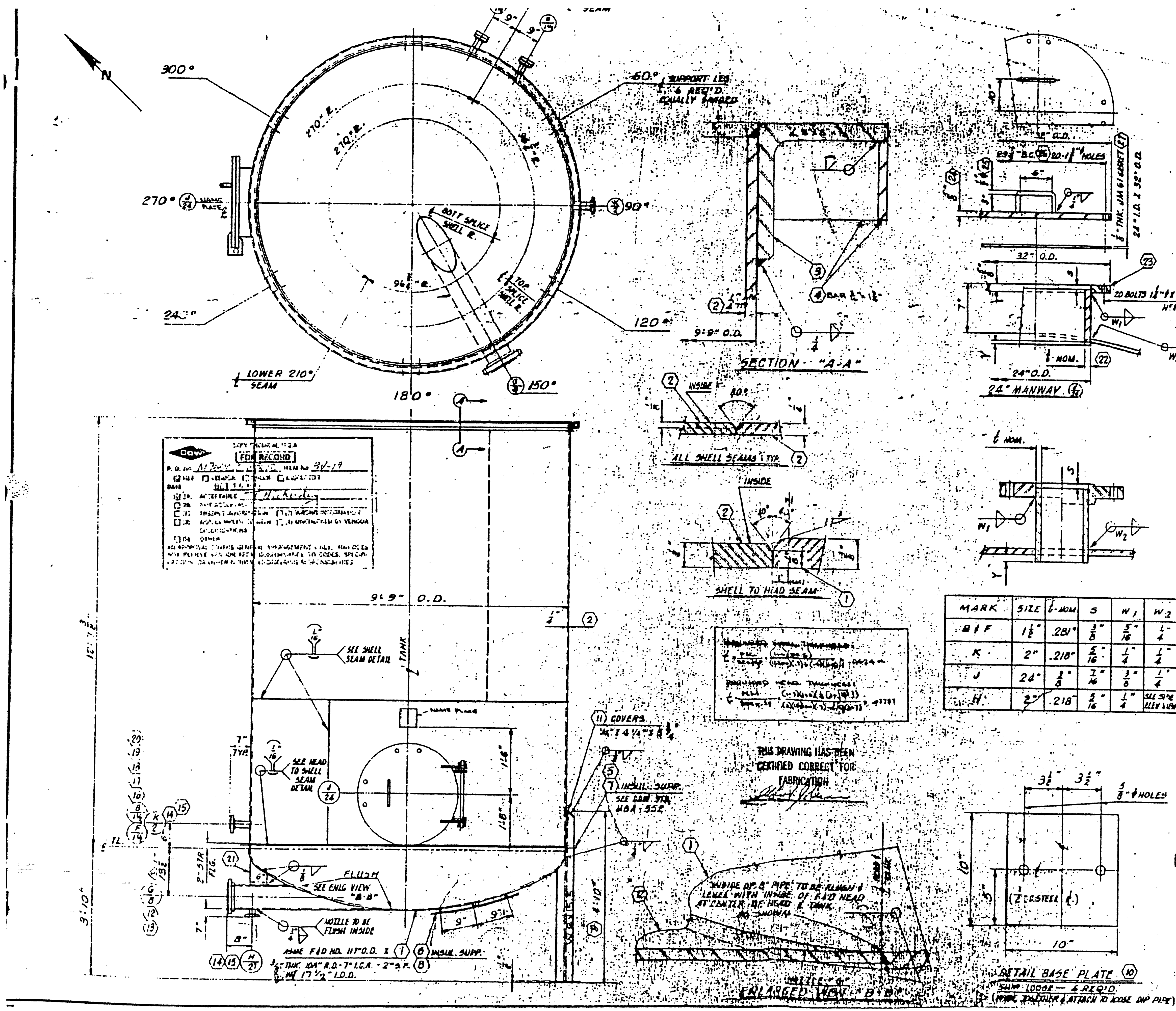
THE DOW CHEMICAL COMPANY
MIDLAND MICHIGAN

WASTE CONTROL — BUILDING 707

TAR BURNING FEED TANK TK-3

JOB NUMBER 61178

DRAWING NUMBER B5-021-61178



NOZZLE SCHEDULE

MARK	REQ'D	SIZE	RATING	FACING	SERVICE	REMARKS
B	1	1½"	150#	R.F.	SIDE INLET	SCH. 80 PIPE W/ BLD FLG
F	1	1½"	150#	R.F.	SIDE OUTLET	SCH. 80 PIPE W/ BLD FLG
G	1	6"	150#	R.F.	CLEAN OUT	SCH. 40 PIPE
H	1	2"	150#	R.F.	CLEAN OUT	SCH. 80 PIPE
J	1	24"	—	[illegible]	MANWAY	HINGED & BLD. FLG.
K	1	2"	150#	R.F.	[illegible]	SCH. 80 PIPE

MARK	SIZE	t-NOM	S	W1	W2	Y
B & F	1½"	.281"	3/8"	5/16"	1/4"	5/8"
K	2"	.218"	5/16"	1/4"	1/4"	1/2"
J	24"	3/8"	7/16"	3/4"	1/4"	5/8"
H	2"	.218"	5/16"	1/4"	SEE SIDE ELEV VIEW	1/2"

V-601

MANWAY HINGES

OPERATING PRESSURE PSIG 0 (ATMOS)
OPERATING TEMPERATURE °F. 80
LIQUID SPECIFIC GRAVITY 0.90
DESIGN PRESSURE PSIG 1.0
DESIGN TEMPERATURE °F 400
HYDROSTATIC TEST PSIG 1.5 (BY DOW)
HEADS CORR. ALLOW. - 0 MAT'L. SA 285 C
SHELL CORR. ALLOW - 0 MAT'L. SA 285 C
FLANGES SA 105 NOZZLES SA 53 B
SUPPORTS SA 36 BOLTS & NUTS A 307 B
GASKETS JM 61 or EQUAL
MANWAY COVER & FLANGE SA-285 C
BLIND FLANGES SA 105
WT OF 9M-150 TOP HEAD = 2270 LBS (PROVIDED AND INSTALLED BY DOW)
EMPTY WT. INCL. TOP HEAD 9,125 LBS.

WELDING TO BE DONE IN ACCORDANCE WITH ASME CODE SECT. VIII, DIV. I BY ASME QUALIFIED WELDERS.

SAND BLAST & PAINT WITH (CARBOZINC 11) ALL OUTSIDE SURFACES PER DOW SPEC. M8-901.

NAMEPLATE PER S-NR.

ALL BOLT HOLES TO STRADDLE NORMAL ℄'S

INSULATION RING AT BOTTOM TANGENT LINE & SUPPORT ARC ACROSS BOTTOM HEAD PER DOW STD. MBA-552.

TEST BY FILLING WITH WATER & HOLDING FOR MIN. OF THIRTY MINUTES.

DIP PIPE PROVIDED PER DWG 3219-51.

P.O. NO. M760818C-5012 DOW REF. DWG. Z5-013-760818 1 THRU 8

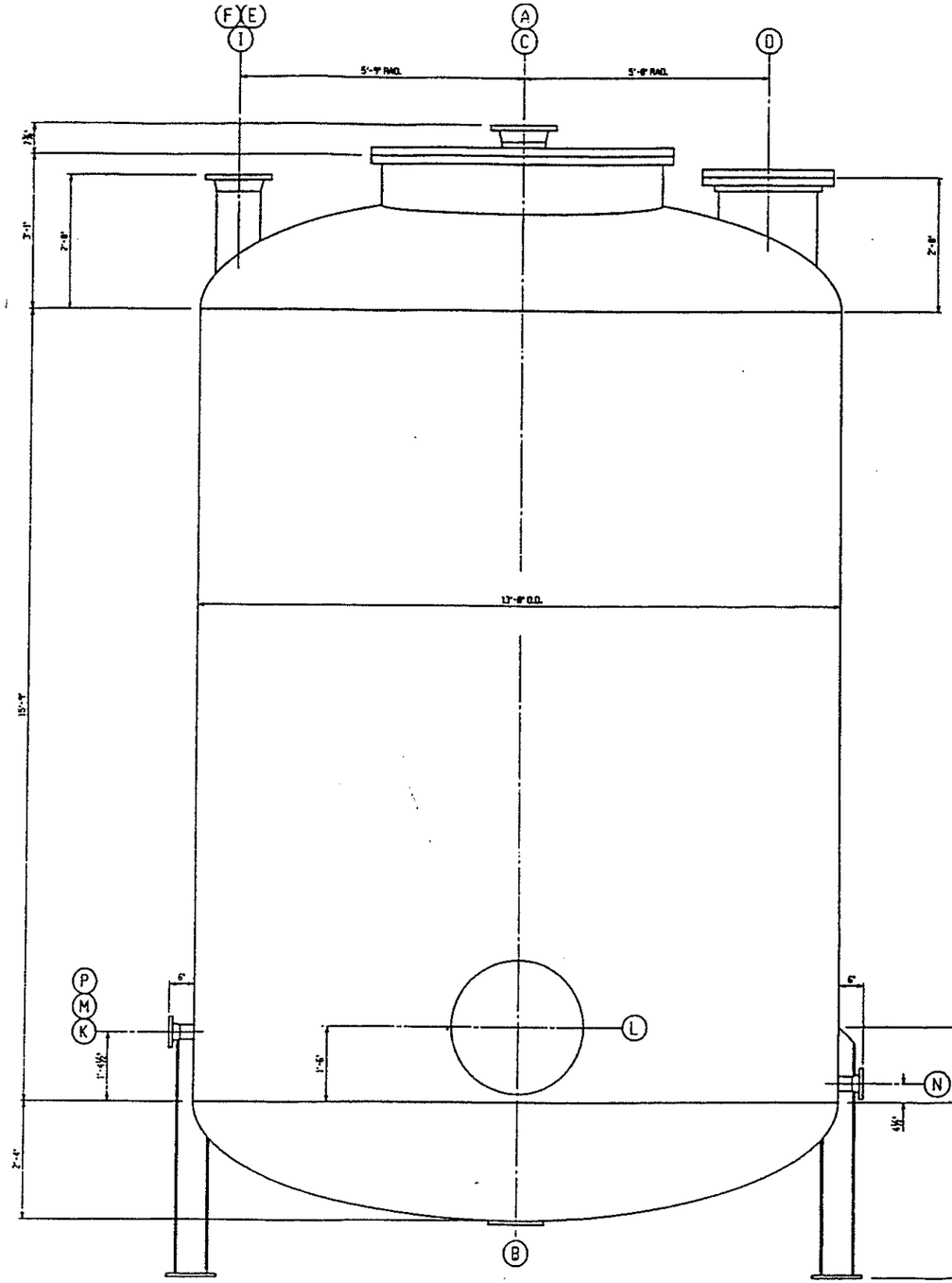
OCT 6 1978

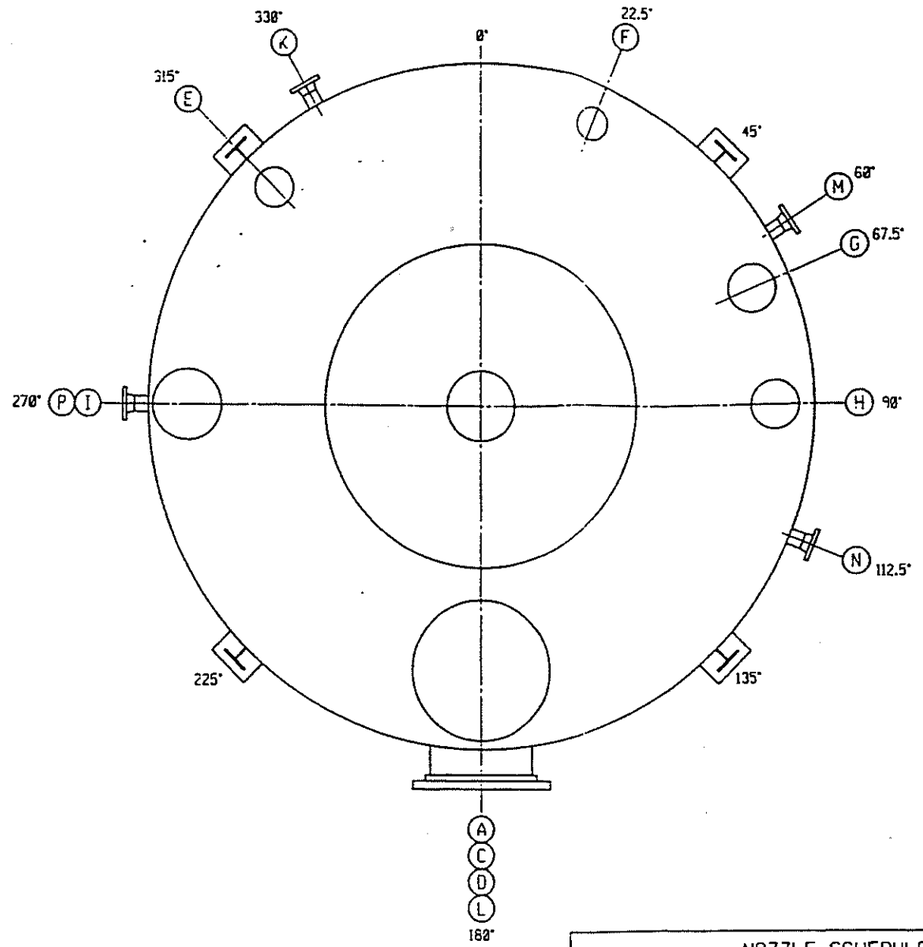
REV.	DATE	DESCRIPTION
3	10-5-78	REV. PER CUST. APPROVAL. 10-5-78
2	10/2/78	13½" DIM. [illegible] G WAS 16⅝" I.D.O. WAS 19 [illegible]
1	9-29-78	REV. PER CUST APPROVAL PRINT DATED 9-27-78

FUEL OIL STORAGE TANK
ONE - OT TK. 9'-9" × 12'-8" (105 ...)
THE DOW CHEMICAL COMPANY

CONT. NO. 3219

THE YOUNGSTOWN STEEL TANK CO.
YOUNGSTOWN, OHIO





DESIGN PRESSURE: 25 PSIG.
DESIGN TEMP.: 400 °F.
SHELL MATERIAL: SA-516-70
HEAD MATERIAL: SA-516-70
SHELL THICKNESS: .5"
HEAD MATERIAL: .625"

NOZZLE SCHEDULE

FLANGE					NECK		
MATERIAL	MARK	SIZE	RATING	TYPE	MATERIAL	THICKNESS	SERVICE
SA-105	A	10"	150#	LWN	SA-105	1.00"	AGITATOR
SA-105	B	8"	150#	STUDDING OUTLET			OUTLET
SA-516-70	C	68"	——	——	SA-516-70	.5"	AGITATOR
SA-105	D	24"	150#	RF-SO	SA-516-70	.5"	MANWAY
SA-105	E	4"	150#	LWN	SA-105	.75"	RETURN
SA-105	F	3"	150#	LWN	SA-105	.62"	VENT
SA-105	G	6"	150#	LWN	SA-105	.88"	INLET
SA-105	H	6"	150#	LWN	SA-105	.88"	SPARE
SA-105	I	10"	150#	LWN	SA-105	1.00"	PRD
SA-105	J	1"	150#	LWN	SA-105	.50"	N2
SA-105	K	2"	150#	LWN	SA-105	.53"	TEMP.
SA-105	L	24"	150#	RF-SO	SA-516-70	.5"	MANWAY
SA-105	M	3"	150#	LWN	SA-105	.62"	SPARE
SA-105	N	3"	150#	LWN	SA-105	.62"	SPARE
SA-105	P	2"	150#	LWN	SA-105	.53"	SPARE

REVISION	BY	CHK	APP	DATE

REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

DESIGNED	GLAQUIN TANK 01/88
DRAWN	A. KAMINSKI 03/94
CHECKED	
APPROVED	
FINAL APPR.	
MTL. REQ.	

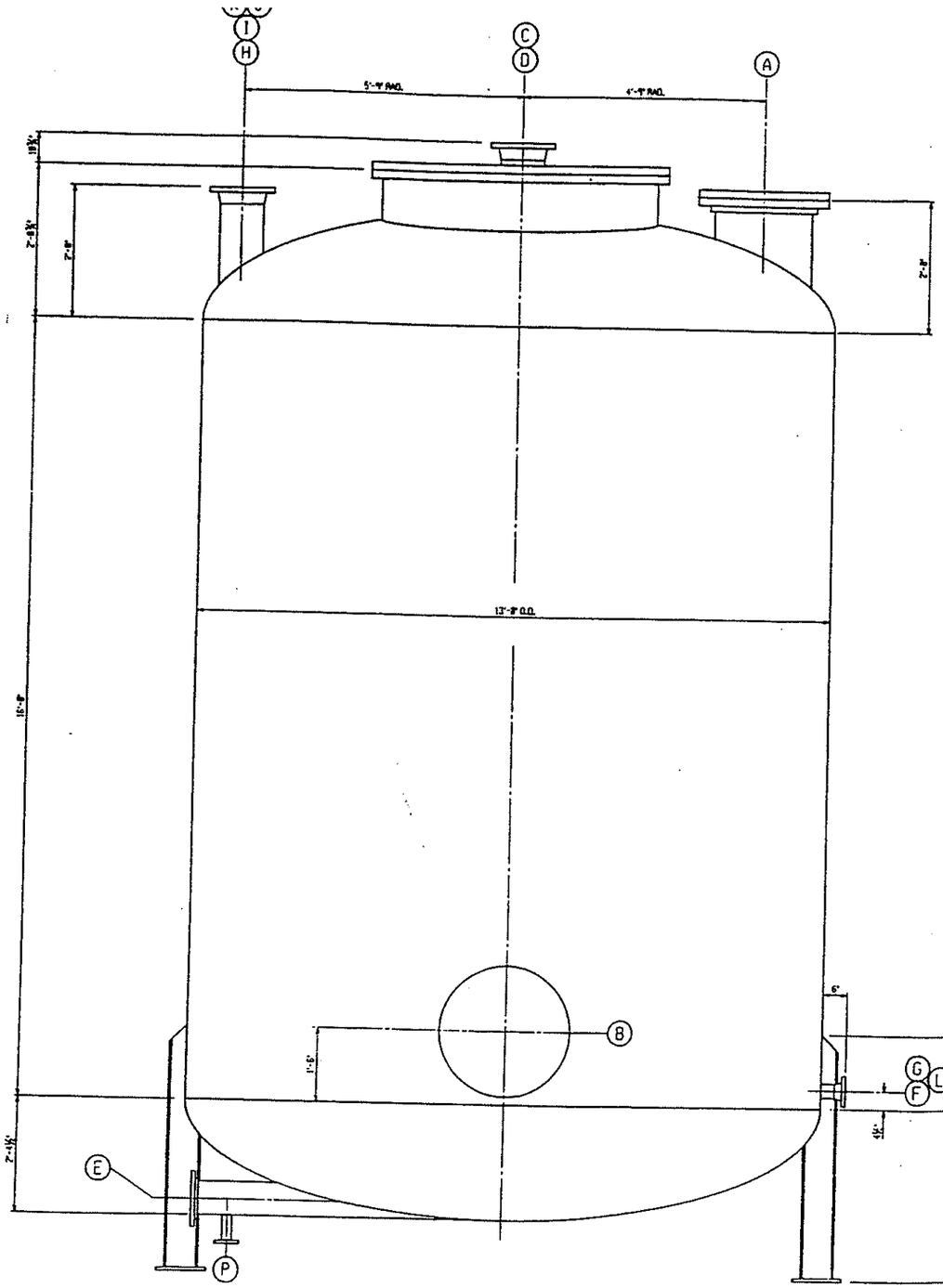
CHECKED — PLANT NO.

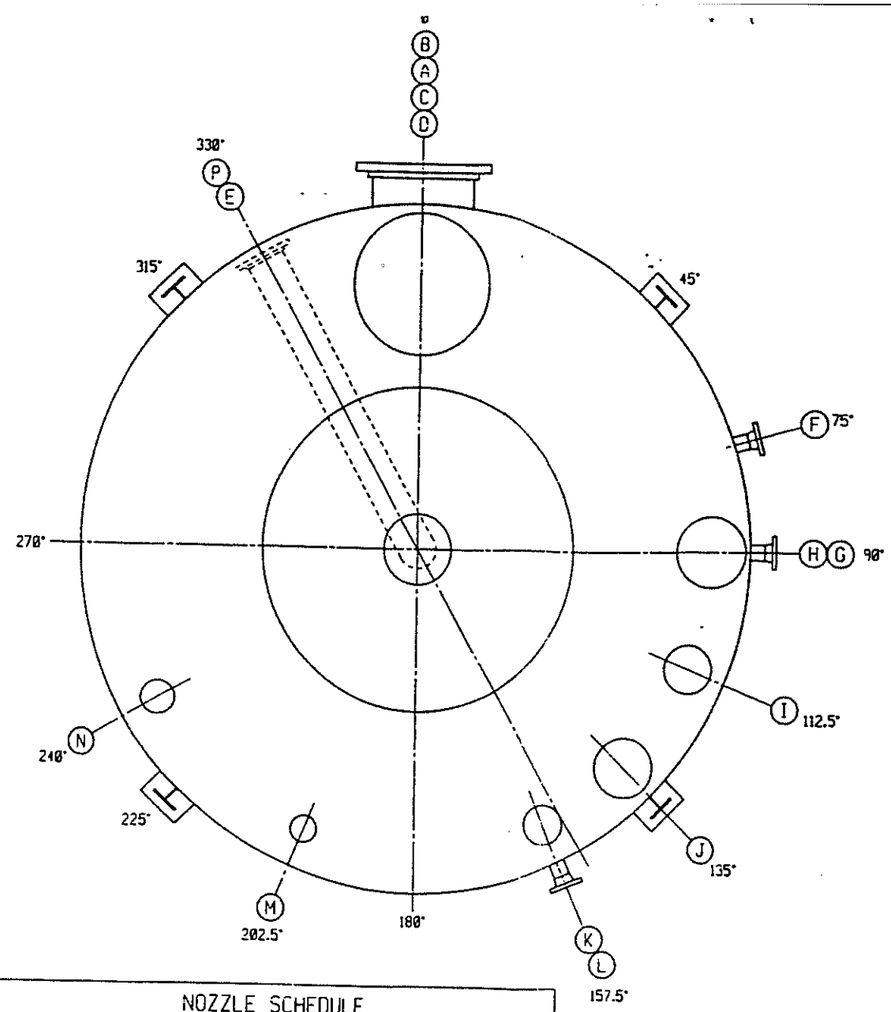
THE DOW CHEMICAL COMPANY
MICHIGAN DIVISION — MIDLAND, MICHIGAN
INCINERATION COMPLEX — 703 BLDG

HOT TAR TANK
PV #77604 EQ. #V-303

PROJECT NUMBER	SCALE	DRAWING NUMBER	REV.
874##H	3/4"=1'-0"	85-422-874008	0

PIP





NOZZLE SCHEDULE								
INT'L PROJ. REQ'D	FLANGE					NECK		
	MATERIAL	MARK	SIZE	RATING	TYPE	MATERIAL	THICKNESS	SERVICE
1" MIN.	SA-105	A	24"	150#	RF SO	SA-240-316L	.625"	MANWAY
FLUSH	SA-105	B	24"	150#	RF-SO	SA-240-316L	.375"	MANWAY
FLUSH	SA-105	C	10"	150#	RF-SO	SA-312-316L	SCH. 40	AGITATOR
1" MIN	SA-516-70	D	68"	——	MFG.	SA-240-316L	.625"	ACCESS
FLUSH	SA-105	E	8"	150#	LJ-SE	SA-312-316L	SCH. 40	OUTLET
¼" MIN.	SA-105	F	3"	150#	LJ-SE	SA-312-316L	SCH. 40	SPARE
¼" MIN.	SA-105	G	3"	150#	LJ-SE	SA-312-316L	SCH. 40	SPARE
NONE	SA-105	H	10"	150#	LJ-SE	SA-312-316L	SCH. 40	PRO
½" MIN.	SA-105	I	6"	150#	LJ-SE	SA-312-316L	SCH. 40	SPARE
¾" MIN.	SA-105	J	8"	150#	LJ-SE	SA-312-316L	SCH. 40	INLET
½" MIN.	SA-105	K	4"	150#	LJ-SE	SA-312-316L	SCH. 40	INLET
¼" MIN.	SA-105	L	2"	150#	LJ-SE	SA-312-316L	SCH. 80	T.W.
¼" MIN.	SA-105	M	2"	150#	LJ-SE	SA-312-316L	SCH. 80	N2
¼" MIN.	SA-105	N	3"	150#	LJ-SE	SA-312-316L	SCH. 40	VENT
FLUSH	SA-105	P	2"	150#	LJ-SE	SA-312-316L	SCH. 80	CLEAN-OUT

DESIGN PRESSURE: 25 PSIG.
DESIGN TEMP.: -20/100 °F
SHELL MATERIAL: SA-240-316L
HEAD MATERIAL: SA-240-316L
SHELL THICKNESS: .25"
HEAD MATERIAL: .375"

REVISION	BY	CHK	APP	DATE	REV. NUMBER
REVISION	BY	CHK	APP	DATE	

DRAWING ISSUE RECORD

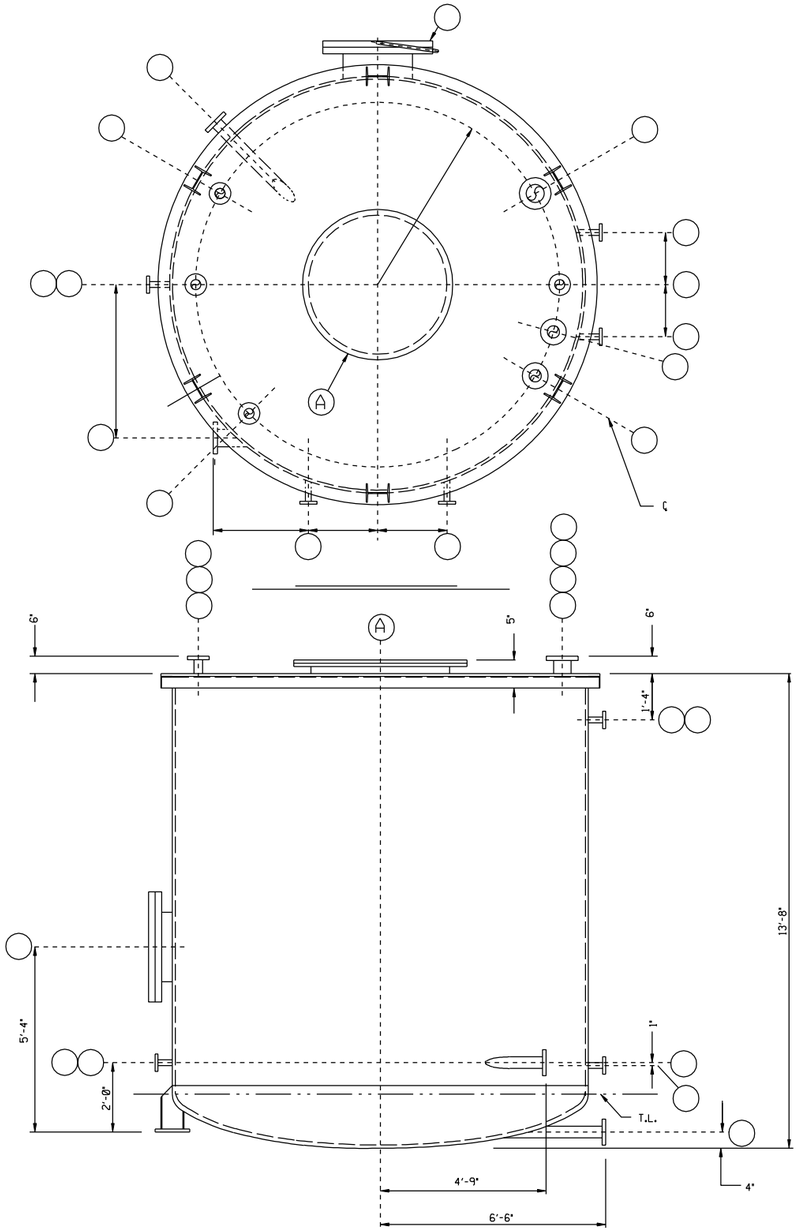
DRAWN	GLADWIN TANK	01/88
	A. KAMINSKI	03/94
CHECKED		
APPROVED		
FIELD ENGR.		
APPR. ENGR.		

THE DOW CHEMICAL COMPANY
MICHIGAN DIVISION — MIDLAND, MICHIGAN
INCINERATION COMPLEX — 703 BLDG

COLD TAR TANK
EQ.# V-401, V-403, V-404

85-420-874008

PID

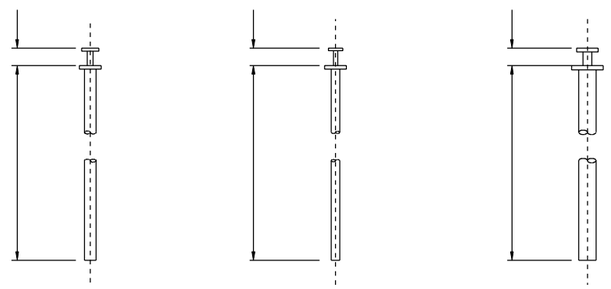


ELEVATION VIEW

SCALE:1/2"=1'-0"
(FOR TRUE ORIENTATION SEE PLAN VIEW)

NOZZLE SCHEDULE

MK	SIZE	RATING	FACE	TYPE	NOZZLE MAT'L.	DIP PIPES & BL. FLG'S.
A	48"	125#	FF	SO	.375 STEEL PLATE	.375 STL. PLATE BL. FLG. COVER
B	4"	150#	RF	SO	SCH. 40 STEEL	
C	3"	150#	RF	SO	SCH. 40 STEEL	1 1/2"-SCH. 40 STL. PIPE
D	6"	150#	RF	SO	SCH. 40 STEEL	3"-SCH. 40 STL. PIPE
E	4"	150#	RF	SO	SCH. 40 STEEL	2"-SCH.40 STL. PIPE
F	3"	150#	RF	SO	SCH. 40 STEEL	1 1/2"-SCH. 40 STL. PIPE
G	3"	150#	RF	SO	SCH. 40 STEEL	1 1/2"-SCH. 40 STL. PIPE
H	3"	150#	RF	SO	SCH. 40 STEEL	150# BLIND FLG.
J	2"	150#	RF	SO	SCH. 40 STEEL	
K	4"	150#	RF	SO	SCH. 40 STEEL	
L	2"	150#	RF	SO	SCH. 40 STEEL	
M	2"	150#	RF	SO	SCH. 40 STEEL	
N	2"	150#	RF	SO	SCH. 40 STEEL	
P	2"	150#	RF	SO	SCH. 40 STEEL	
R	2"	150#	RF	SO	SCH. 40 STEEL	



REV. MARK	REVISION	BY	CHK	APP	DATE

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF

DATE ISSUED FOR

DESIGNED	B. DOUGLAS	2/87
DRAWN		
CHECKED		
APPROVED		
PROJ. ENGR.		
MFG. REP.		

STATUS | PLANT NO.
P.E. SEAL

THE DOW CHEMICAL COMPANY
MICHIGAN DIVISION — MIDLAND, MICHIGAN
INCINERATION COMPLEX — 703

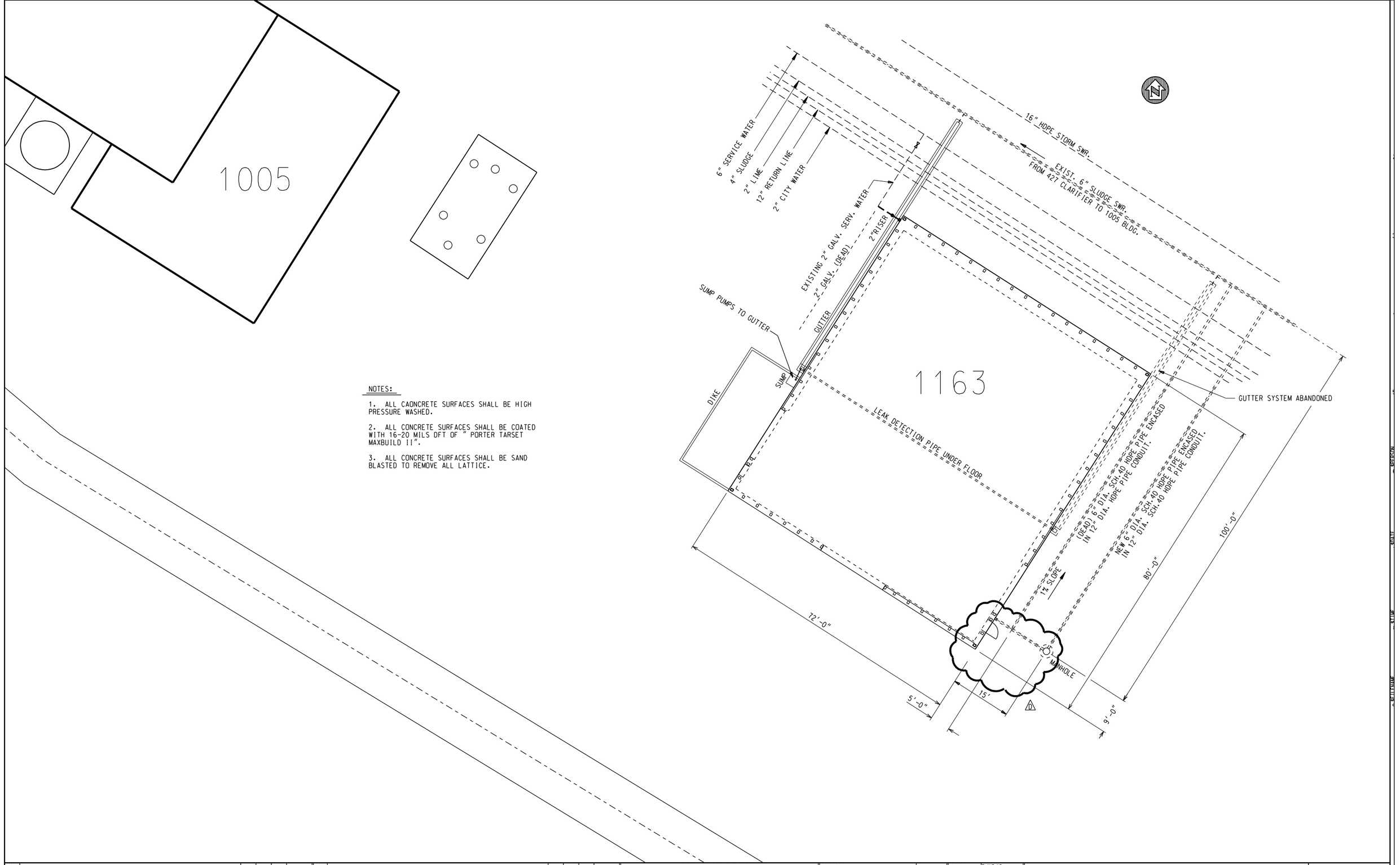
V-701 AQUEOUS WASTE TANK

874008	SCALE 1/2" = 1'-0"	B5-405-874008	REV.

PRINTED | VER.

PIP

$PERSON $DATE $TIME $FILENAME $INSTRUCTIONS



NOTES:

1. ALL CAONCRETE SURFACES SHALL BE HIGH PRESSURE WASHED.

2. ALL CONCRETE SURFACES SHALL BE COATED WITH 16-20 MILS DFT OF " PORTER TARSET MAXBUILD II".

3. ALL CONCRETE SURFACES SHALL BE SAND BLASTED TO REMOVE ALL LATTICE.

REV. MARK	REVISION	BY	CHK	APP	DATE
A	REDRAWN FROM B2-273-874008	DLS			3/95
B	REVISED PER AS-BUILT	LEG			5/96
C	REVISED TITLE BLOCK	LEG	KC		6/02
D	REMOVED OFFICE SHED	DLS	DLS	DLS	05/04

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED	D.R. NEDEAU	3/88
DRAWN	D.R. NEDEAU	3/88
CHECKED	D.F. DEWILT	3/88
APPROVED	STEVE LAWRENCE	4/88
PROJ. ENGR.	.	.
MFG. REP.	.	.

STATUS | PLANT NO.

P.E. SEAL

THE DOW CHEMICAL COMPANY

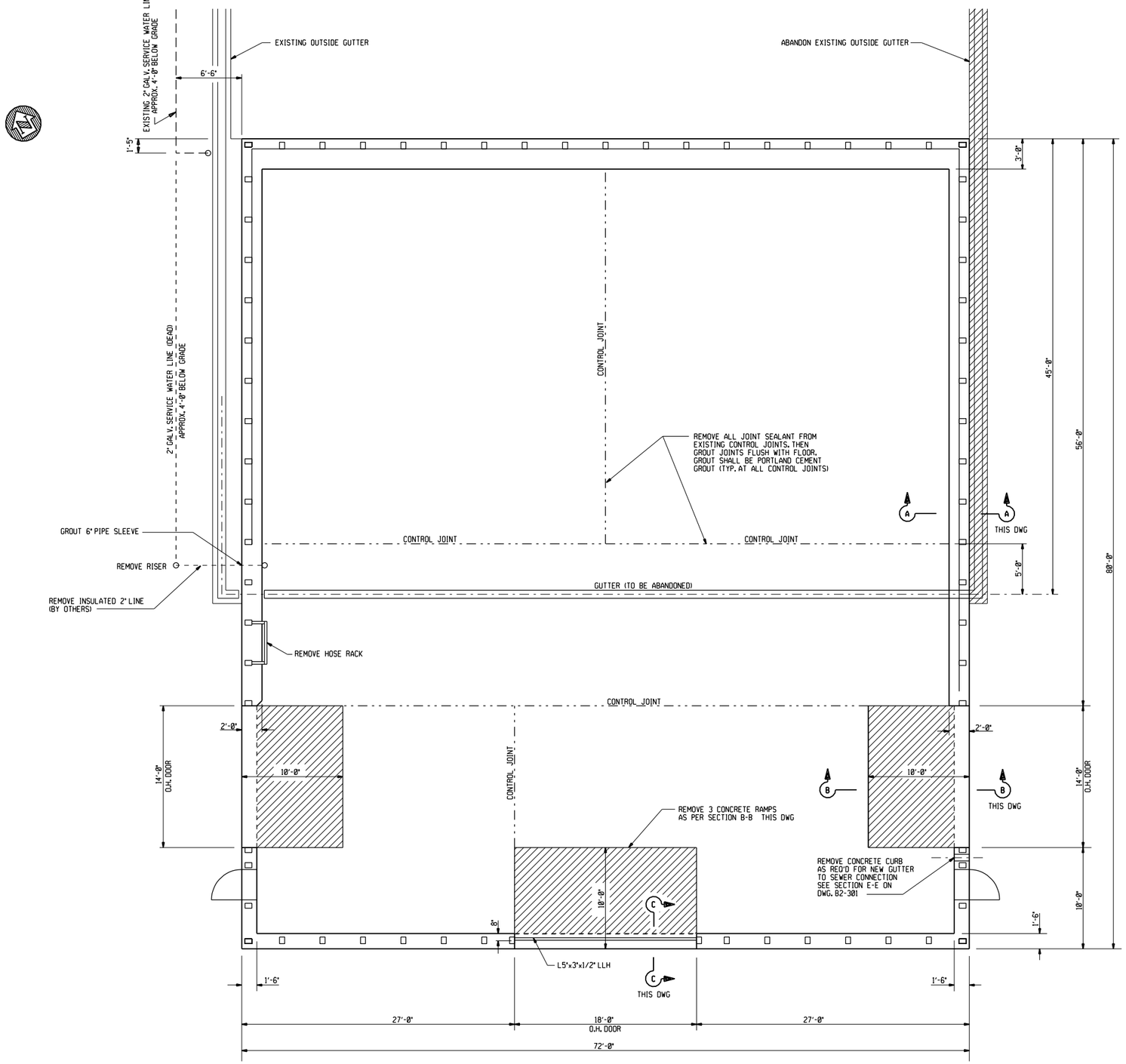
MICHIGAN DIVISION — MIDLAND, MICHIGAN

ASH MASHALLING BLDG — 1163 BLDG

1163 BUILDING
CONTAINMENT & LEAK DETECTION RENOVATION
SITE LOCATION PLAN

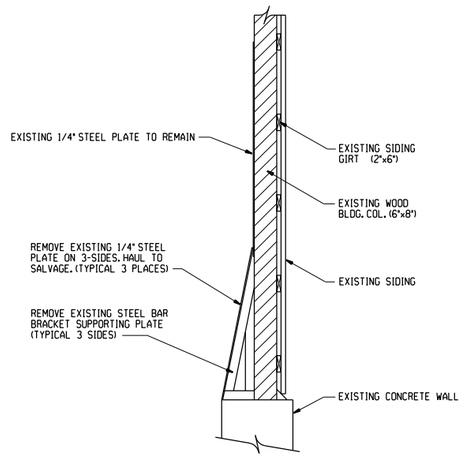
PROJECT NUMBER	SCALE		REV.
927122	1"=10'-0"	B2-298-927122	D

2 UND



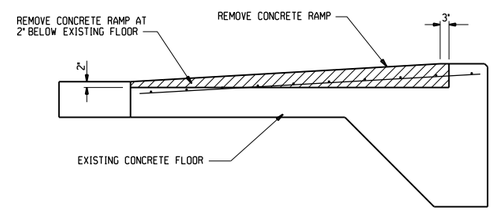
DEMOLITION PLAN

SCALE: 3/16" = 1'-0"



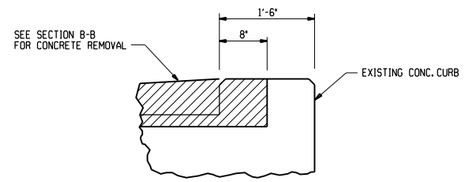
SECTION A-A

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



SECTION B-B

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



SECTION C-C

SCALE: 1" = 1'-0"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	CHANGED DWG NO. FROM B2-274-874008 TO B2-299-927122 AND CONVERTED DRAWING TO MICROSTATION FORMAT	LEG			2/93
B	NOTED THAT GUTTERS OUTSIDE BLDG WHERE ABANDONED	LEG			5/96
C	REVISED TITLE BLOCK	LEG	KC		6/02

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED	D.R. NEDEAU	03/88
DRAWN	D.R. NEDEAU	03/88
CHECKED	J. BATAL	03/88
APPROVED	J. BATAL	03/88
PROJ. ENGR.	D. DEWILDT	03/88
MFG. REP.	S. LAWRENCE	03/88

STATUS | PLANT NO.

P.E. SEAL

THE DOW CHEMICAL COMPANY

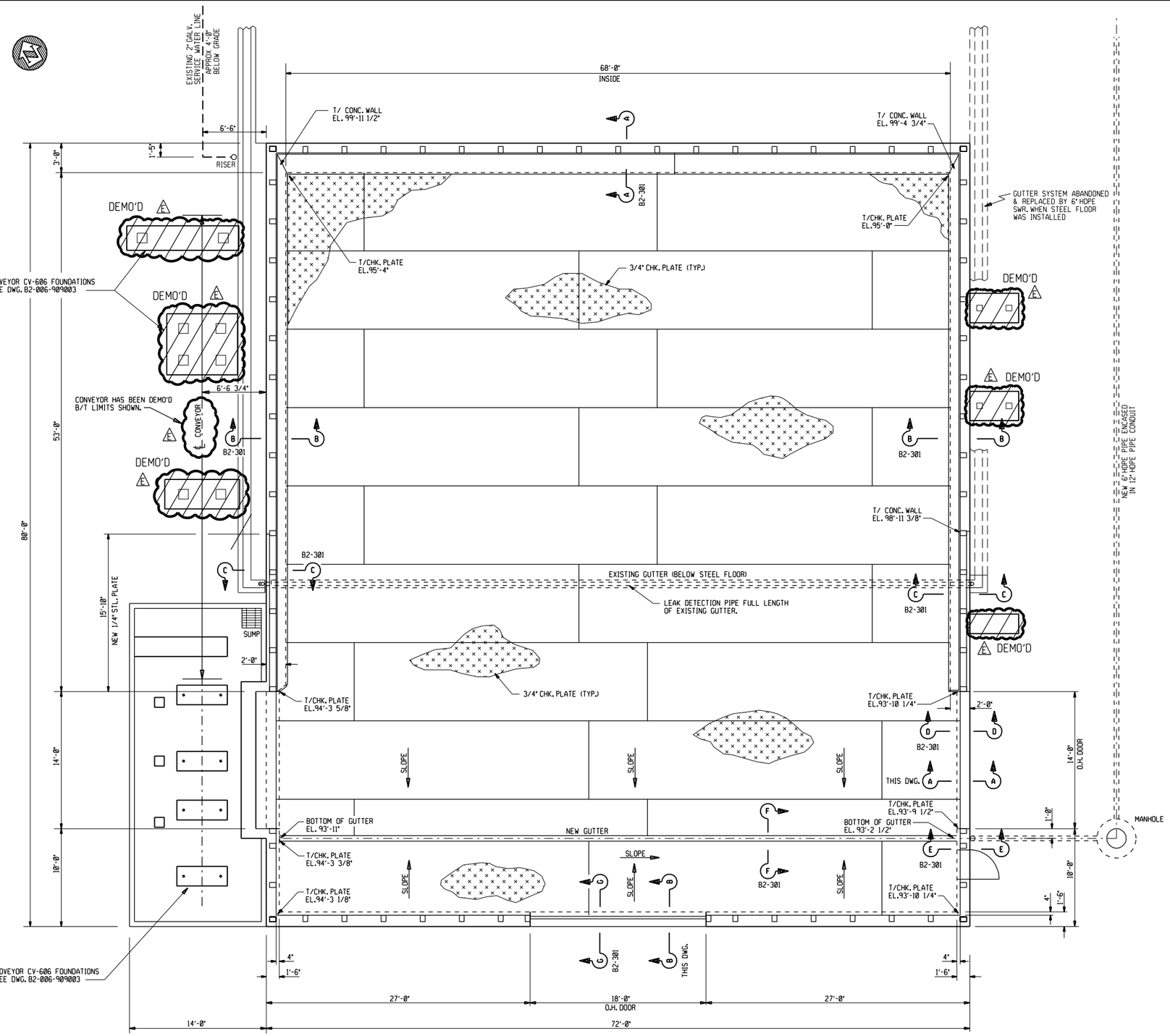
MICHIGAN DIVISION — MIDLAND, MICHIGAN

ASH MARSHALING BLDG. — 1163 BLDG

1163 BUILDING
CONTAINMENT & LEAK DETECTION RENOVATION
DEMOLITION PLAN & SECTIONS

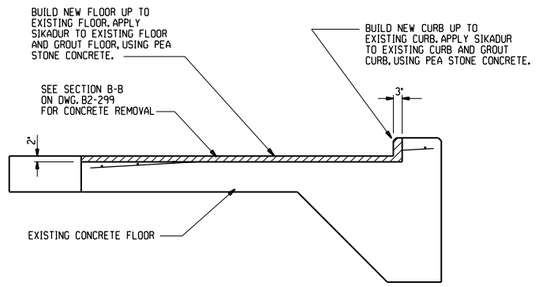
PROJECT NUMBER	SCALE		REV.
927122	AS NOTED	B2-299-927122	C

2 DEM



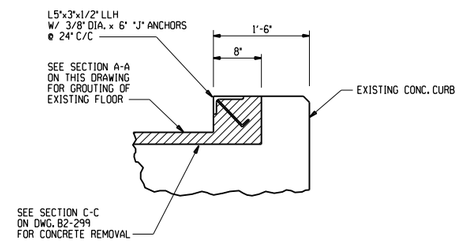
FLOOR PLAN

SCALE: 3/16" = 1'-0"



SECTION A-A

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



SECTION B-B

SCALE: 1" = 1'-0"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	CHANGED DWG NO. FROM B2-275-874008 TO B2-300-927122 AND CONVERTED TO MICROSTATION FORMAT	LEG			2/93
B	ADDED CONVEYOR FOOTINGS AND AS-BUILT SEWER & GUTTERS	LEG			5/96
C	REVISED TITLE BLOCK	LEG	KC		6/02
D	REMOVED OFFICE SHED	DS	DS	DS	5/04
E	DEMO AS-BUILTS	KRH	DS	SB	01/13

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED	D.R. NEDEAU	03/88
DRAWN	D.R. NEDEAU	03/88
CHECKED	J. BATAL	03/88
APPROVED	J. BATAL	03/88
PROJ. ENGR.	D. DEWILDT	03/88
MFG. REP.	S. LAWRENCE	03/88

STATUS | PLANT NO.
P.E. SEAL

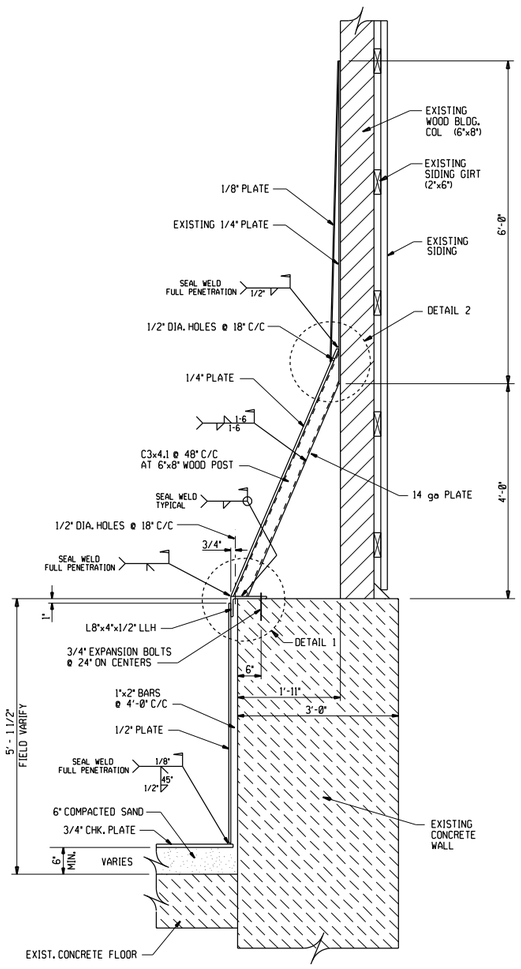
THE DOW CHEMICAL COMPANY
MICHIGAN DIVISION — MIDLAND, MICHIGAN
ASH MARSHALING BLDG. — 1163 BLDG

1163 BUILDING
CONTAINMENT & LEAK DETECTION RENOVATION
FLOOR PLAN

PROJECT NUMBER	SCALE	REV.
927122	AS NOTED	E

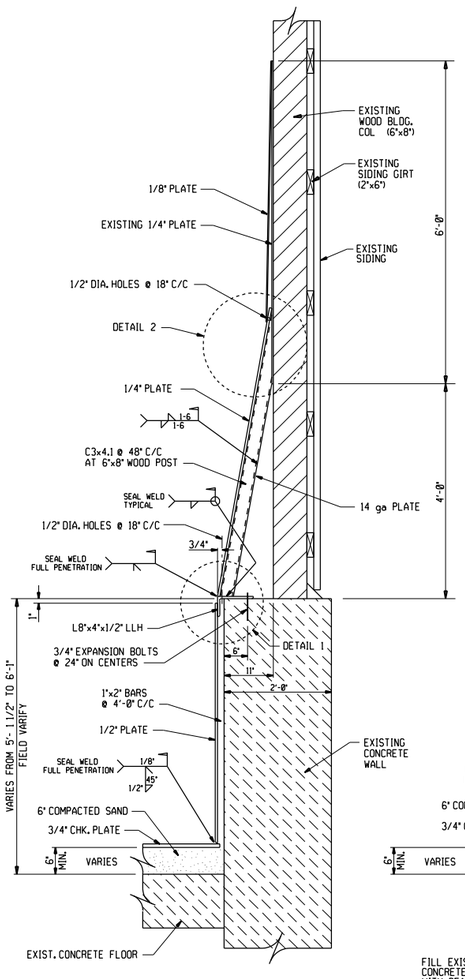
B2-300-927122

2 BLD



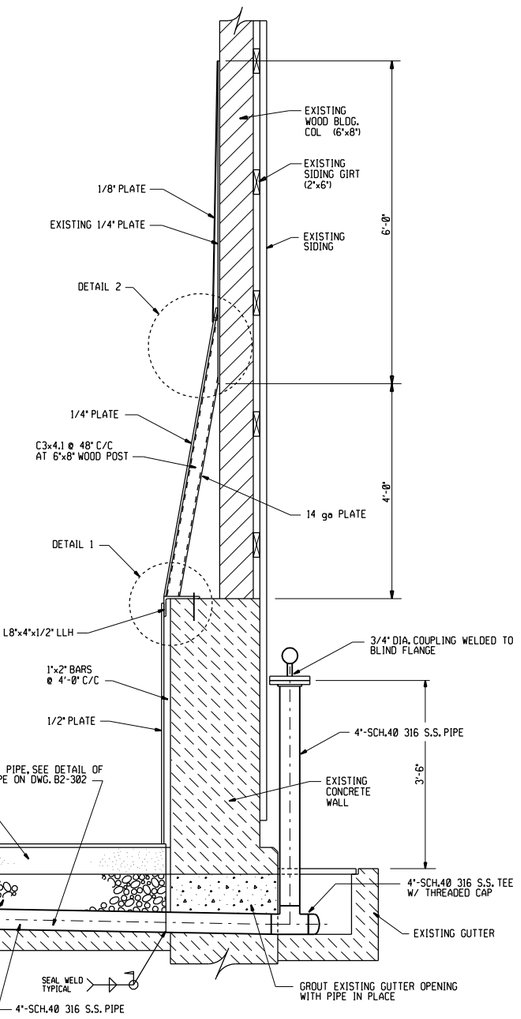
SECTION A-A

SCALE: 3/4" = 1'-0"



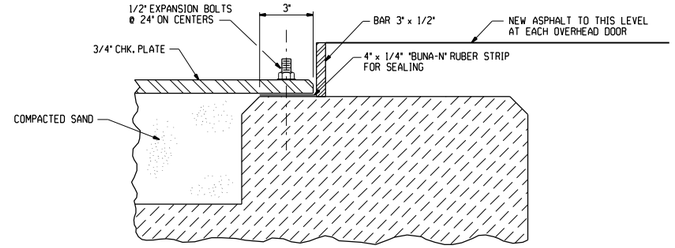
SECTION B-B

SCALE: 3/4" = 1'-0"



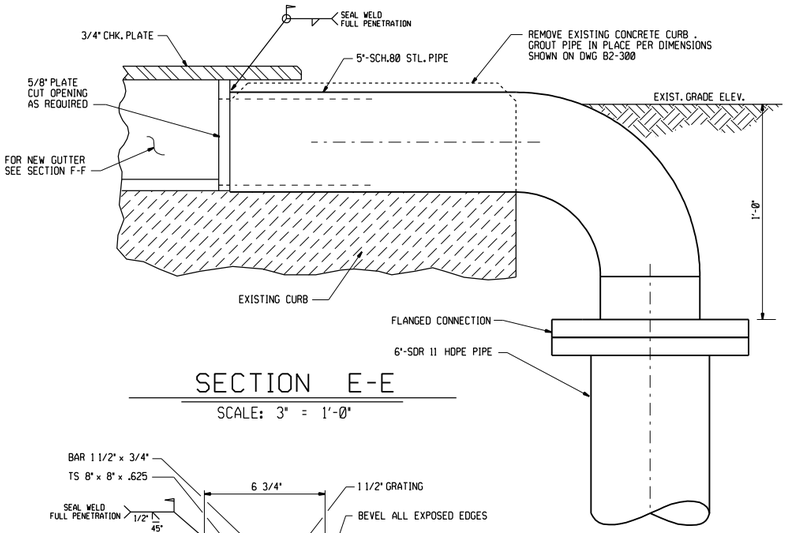
SECTION C-C

SCALE: 3/4" = 1'-0"



SECTION D-D

SCALE: 3" = 1'-0"

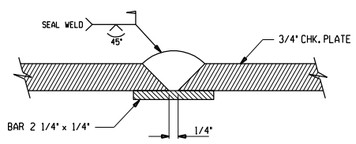


SECTION E-E

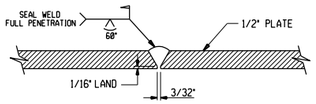
SCALE: 3" = 1'-0"

SECTION F-F

SCALE: 3" = 1'-0"



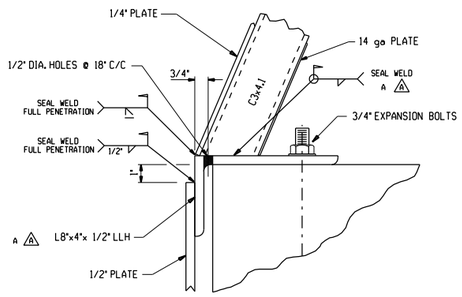
FOR 3/4" CHK. PLATE



FOR 1/2" PLATE

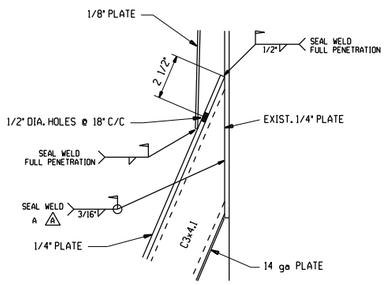
TYPICAL SPLICE DETAIL

SCALE: 6" = 1'-0"



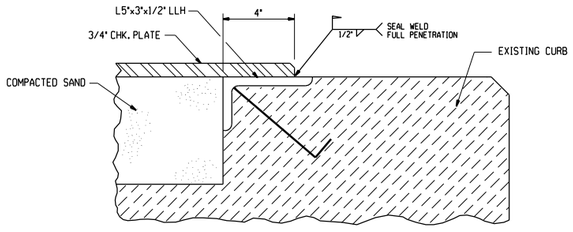
DETAIL 1

SCALE: 3" = 1'-0"



DETAIL 2

SCALE: 3" = 1'-0"



SECTION G-G

SCALE: 3" = 1'-0"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	CHANGED DWG NO. FROM B2-276-874008 TO B2-301-927122 & CONVERTED DRAWING TO MICROSTATION FORMAT	LEG			2/93
B	CORRECTED BLDG. NO. IN TITLE BLOCK TO 1163 BLDG.	LEG			5/93
C	REVISED TITLE BLOCK	LEG			6/02

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF	DATE ISSUED FOR

DESIGNED	D.R. NEDEAU	03/88
DRAWN	D.R. NEDEAU	03/88
CHECKED	J. BATAL	03/88
APPROVED	J. BATAL	03/88
PROJ. ENGR.	O. DEWILDT	03/88
MFG. REP.	S. LAWRENCE	03/88

STATUS | PLANT NO.

P.E. SEAL

THE DOW CHEMICAL COMPANY

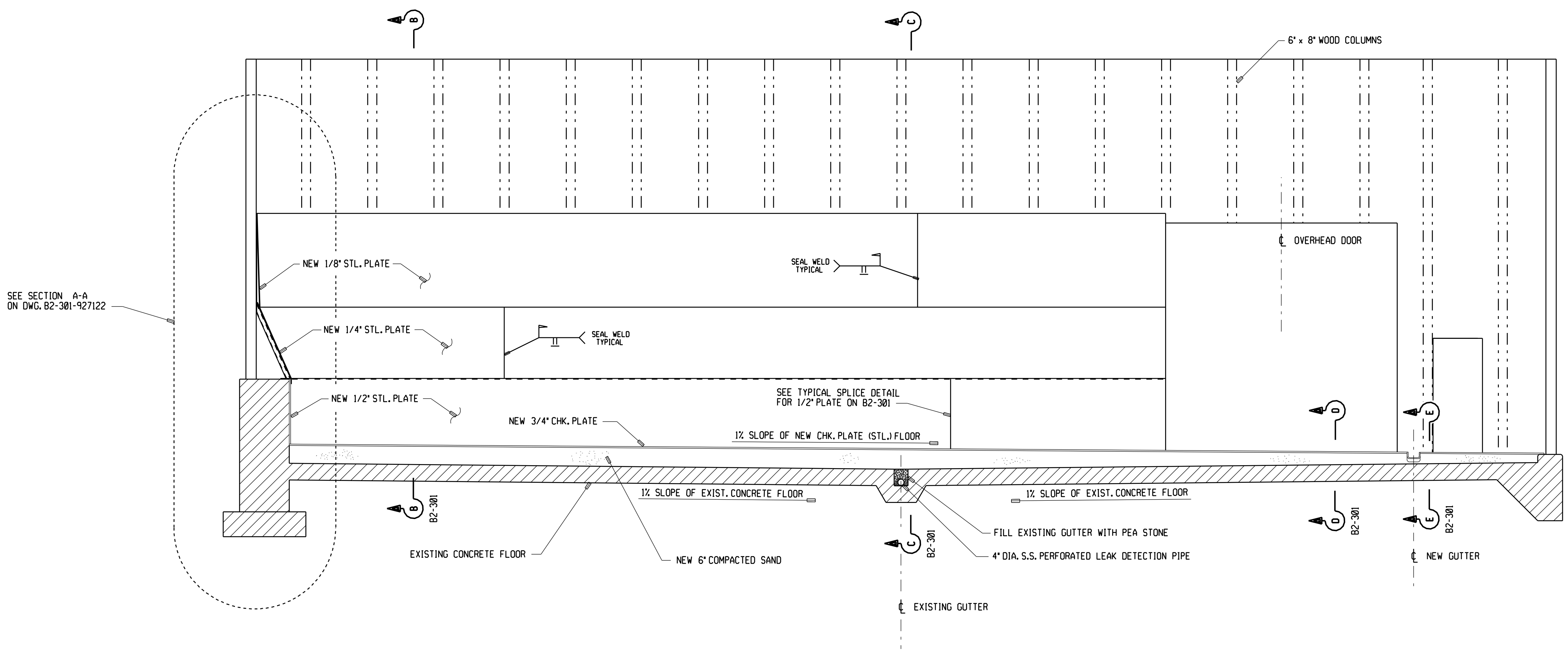
MICHIGAN DIVISION — MIDLAND, MICHIGAN

ASH MARSHALING BLDG. — 1163 BLDG

1163 BUILDING
CONTAINMENT & LEAK DETECTION RENOVATION
FOUNDATION SECTIONS AND DETAILS

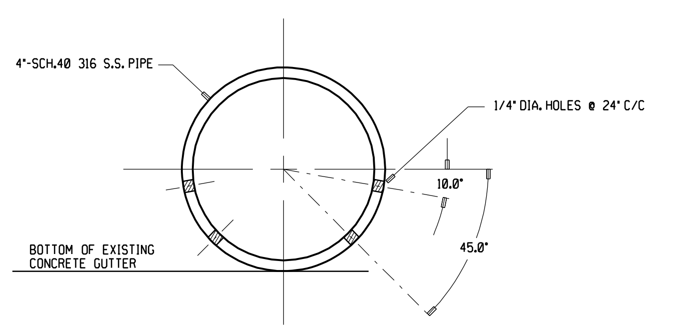
PROJECT NUMBER	SCALE		REV.	
927122	AS NOTED	B2-301-927122	C	2 FDN

PRINTED | VER



BUILDING CROSS SECTION LOOKING EAST

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



DETAIL OF LEAK DETECTION PIPE

SCALE: 6" = 1'-0"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	CHANGED DWG NO. FROM B2-277-874008 TO B2-302-927122 & CONVERTED DRAWING TO MICROSTATION FORMAT	LEG			2/93
B	REVISED TITLE BLOCK	LEG	KC		6/02

DESIGNED	D.R. NEDEAU	03/88
DRAWN	D.R. NEDEAU	03/88
CHECKED	J. BATAL	03/88
APPROVED	J. BATAL	03/88
PROJ. ENGR.	D. DEWILDT	03/88
MFG. REP.	S. LAWRENCE	03/88

DRAWING ISSUE RECORD — ISSUE NO. | REV | MATERIAL OR JOB SPEC | DATE ISSUED FOR: BID | FAB | CONST | REF

STATUS | PLANT NO. | P.E. SEAL

THE DOW CHEMICAL COMPANY
MICHIGAN DIVISION — MIDLAND, MICHIGAN
ASH MARSHALING BLDG. — 1163 BLDG

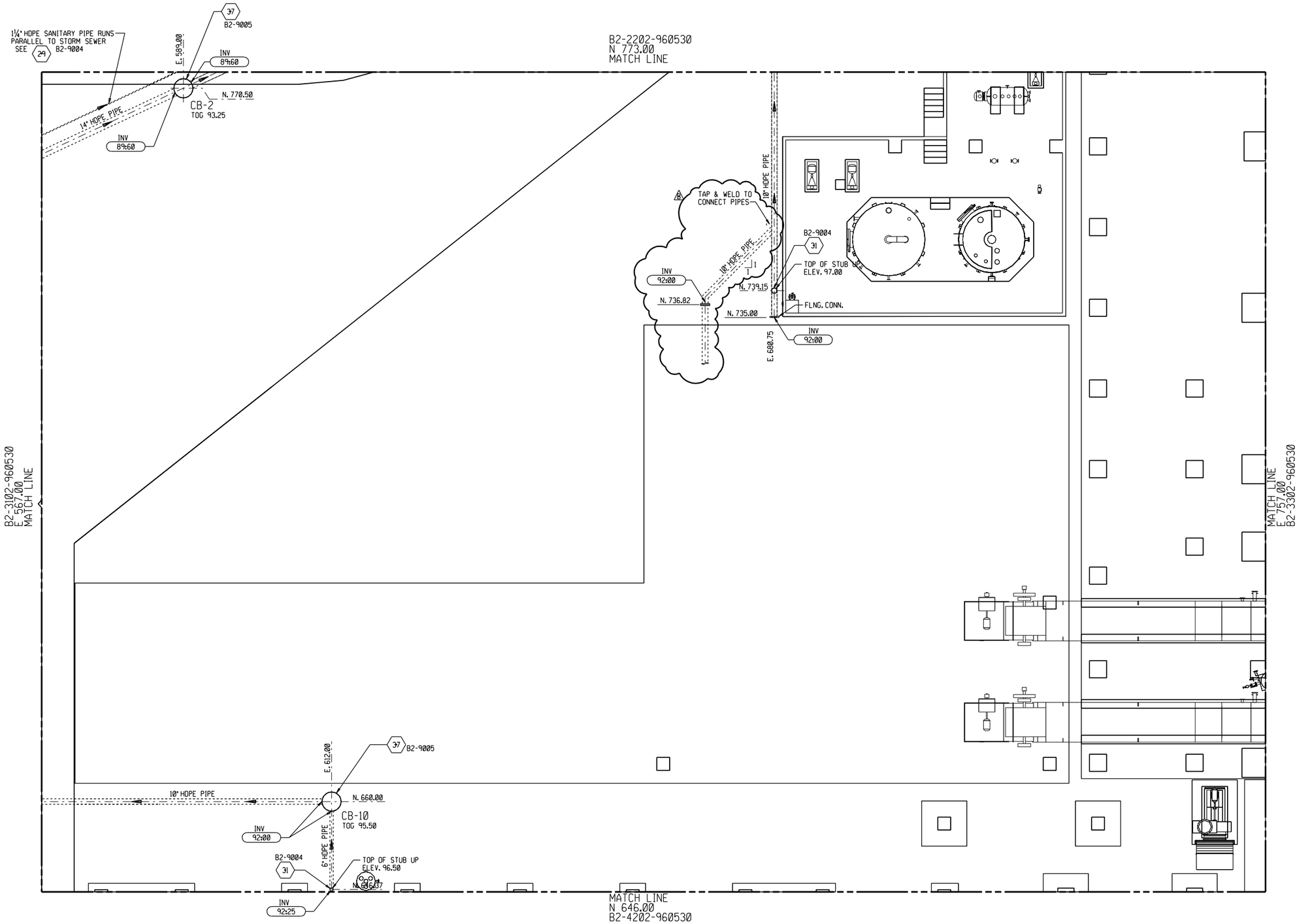
1163 BUILDING
CONTAINMENT & LEAK DETECTION RENOVATION
CROSS-SECTIONS

PROJECT NUMBER	SCALE		REV.
927122	AS NOTED	B2-302-927122	B

2 FDN

PRINTED | VER.

$PERSON $DATE $TIME $FILENAME $INSTRUCTIONS



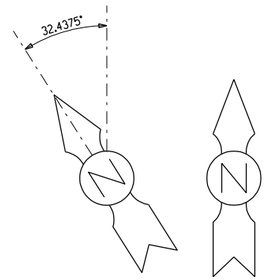
NOTES:

1. FOR GENERAL NOTES AND CIVIL LEGEND, SEE DWG B2-1000-960530.
2. FOR PAVING AND DRAINAGE OVERALL, SEE DWG B2-1004-960530.

LEGEND:

- DIRECTION OF FLOW
- 94:00 FINISHED GRADE ELEVATION
- INV 82:25 PIPE INVERT OR TRENCH FLOW LINE ELEVATION
- × 81.46 EXISTING GRADE ELEVATION
- SLOPE GRADE OR PAVING SLOPE
- P.P. POWER POLE

1100	1200	1300	1400
2100	2200	2300	2400
3100	3200	3300	3400
4100	4200	4300	4400
5100	5200	5300	5400



REV. MARK	REVISION	BY	CHK	APP	DATE
A	STUB UP RELOCATED & GENERAL REVISION	DPP	HG	HG	8/09/01
B	ADDED 10" HDPE PIPE, FLG & WELD & TAP CONN.	AJC	HD	HD	06/02

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	DATE ISSUED FOR: BID	FAB	CONST	REF
5	A	S1601-960530	11/01/01			
4	A	S1301-960530			09/13/01	
3	A	S1301-960530				08/15/01
2	A	S1101A-960530			8/07/01	
6	B	S1301C-960530			06/10/02	

DESIGNED	H. DELGADO	04/01
DRAWN	D.P. PATEL	05/01
CHECKED	J. MAO	05/01
APPROVED	HENRY DELGADO	06/00
PROJ. ENGR.	MICHAEL VAN HERK	06/00
MFG. REP.	A POTOFF	06/00

STATUS | PLANT NO.

P.E. SEAL

THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

830 INCINERATOR UPGRADE — 32 BLDG

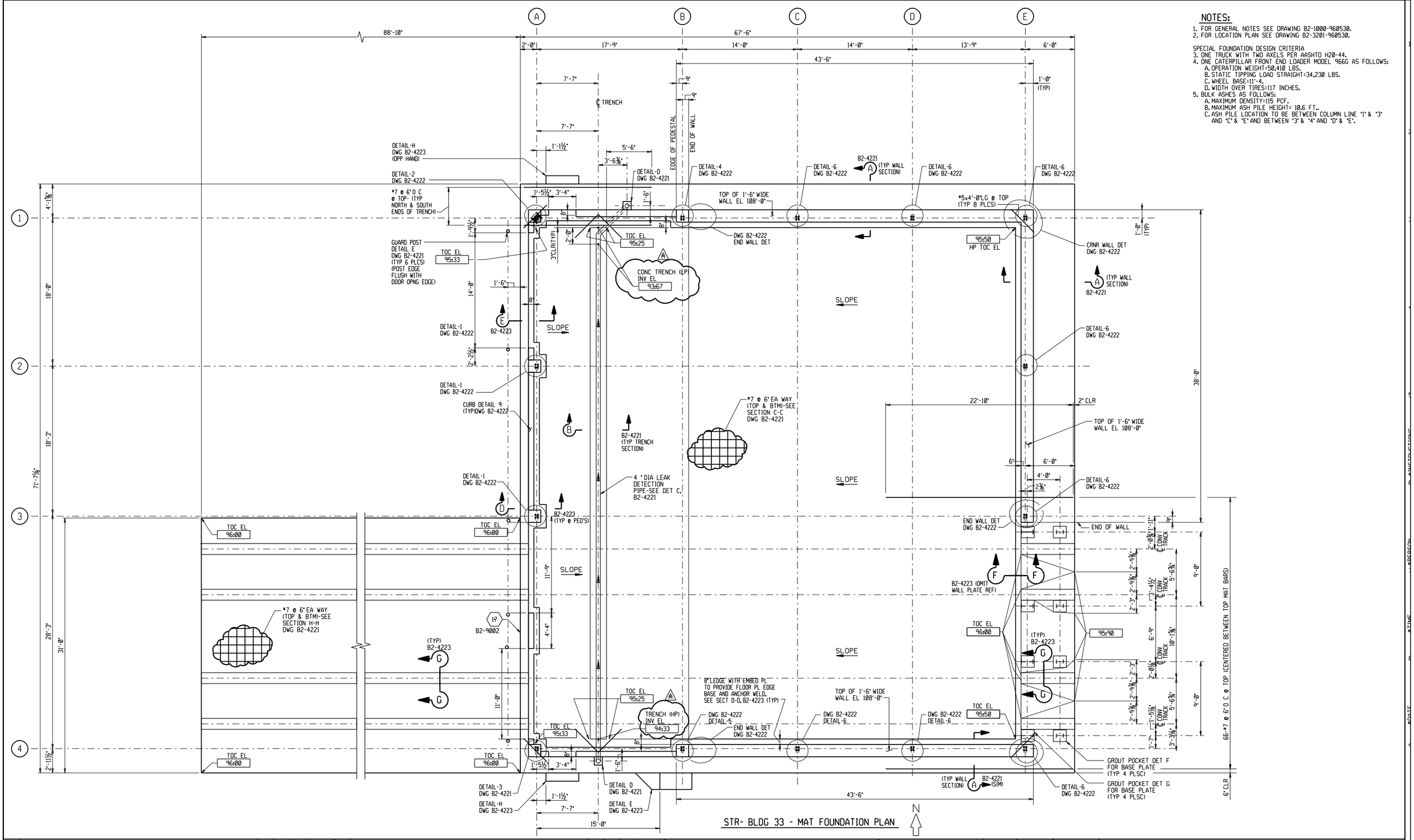
PAVING AND DRAINAGE
LOCATION PLAN
GRID 3200

CHARGE NUMBER	SCALE		REV.
960530	1/8"=1'-0"	B2-3202-960530	B

NOTES:

1. FOR GENERAL NOTES SEE DRAWING B2-1000-960530.
2. FOR LOCATION PLAN SEE DRAWING B2-3201-960530.

SPECIAL FOUNDATION DESIGN CRITERIA
3. ONE TRUCK WITH TWO AXELS PER AASHTO H20-44.
4. ONE CATERPILLAR FRONT END LOADER MODEL 966G AS FOLLOWS:
   A. OPERATION WEIGHT=50,410 LBS.
   B. STATIC TIPPING LOAD STRAIGHT=34,230 LBS.
   C. WHEEL BASE=11'-4.
   D. WIDTH OVER TIRES=117 INCHES.
5. BULK ASHES AS FOLLOWS:
   A. MAXIMUM DENSITY=115 PCF.
   B. MAXIMUM ASH PILE HEIGHT= 10.6 FT..
   C. ASH PILE LOCATION TO BE BETWEEN COLUMN LINE "1" & "3" AND "C" & "E" AND BETWEEN "3" & "4" AND "D" & "E".



STR- BLDG 33 - MAT FOUNDATION PLAN

REV. MARK	REVISION	BY	CHK	APP	DATE
A	REVISED TRENCH INVERT ELEVATIONS.	AJC	EB	HD	10/28/02

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			
2	A	FIELD CHANGE			10/28/02	
1	-	S1301C-960530			06/10/02	

DESIGNED E BAKER	06/02	STATUS
DRAWN AJ CROW	06/02	P.E. SEAL
CHECKED H DELGADO	06/02	PLANT NO.
APPROVED H. DELGADO	06/02	
PROJ. ENGR. M. VAN HERK	06/02	
MFG. REP. A. POTOFF	06/02	

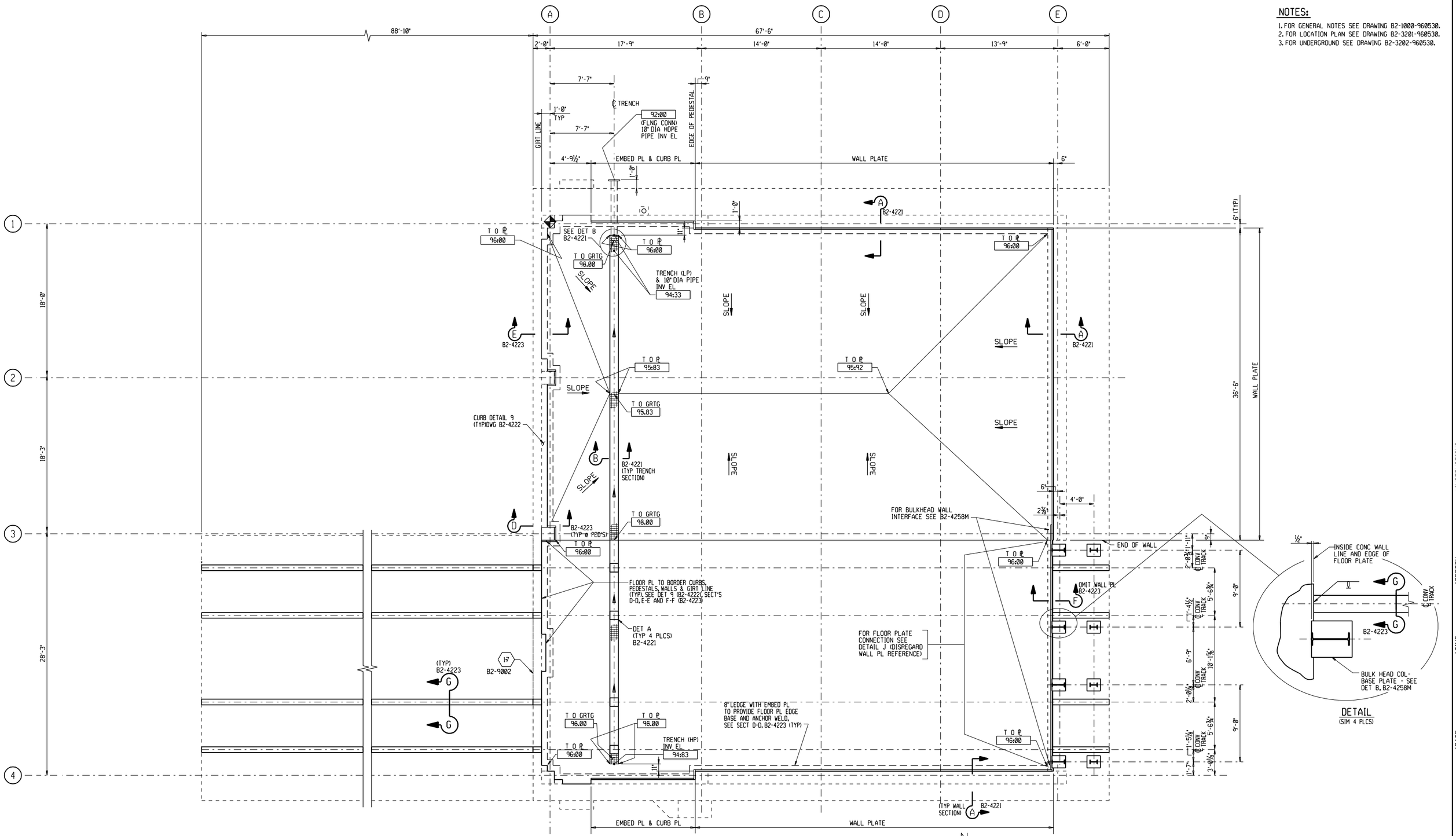
DOW ENGINEERING COMPANY
MICHIGAN OPERATIONS — MIDLAND, MICHIGAN
830 INCINERATOR UPGRADE — 32 BLDG
STR-BLDG 33
FOUNDATION PLAN

CHARGE NUMBER	SCALE		REV.
960530	3/16" = 1'-0	B2-4220-960530	A

PRINTED

NOTES:

1. FOR GENERAL NOTES SEE DRAWING B2-1000-960530.
2. FOR LOCATION PLAN SEE DRAWING B2-3201-960530.
3. FOR UNDERGROUND SEE DRAWING B2-3202-960530.



STR- BLDG 33 - FLOOR & WALL PLATE PLAN

REV. MARK	REVISION	BY	CHK	APP	DATE

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
1	-	S1301C-960530			06/10/02	

DATE ISSUED FOR

DESIGNED	E. BAKER	06/02
DRAWN	AJ CROW	06/02
CHECKED	H DELGADO	06/02
APPROVED	H. DELGADO	06/02
PROJ. ENGR.	M. VAN HERK	06/02
MFG. REP.	A. POTOFF	06/02

STATUS | PLANT NO.

P.E. SEAL

DOW ENGINEERING COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

830 INCINERATOR UPGRADE — 32 BLDG

STR-BLDG 33
FLOOR AND WALL PLATE PLAN

CHARGE NUMBER	SCALE		REV.
960530	3/16" = 1'-0	B2-4220A-960530	

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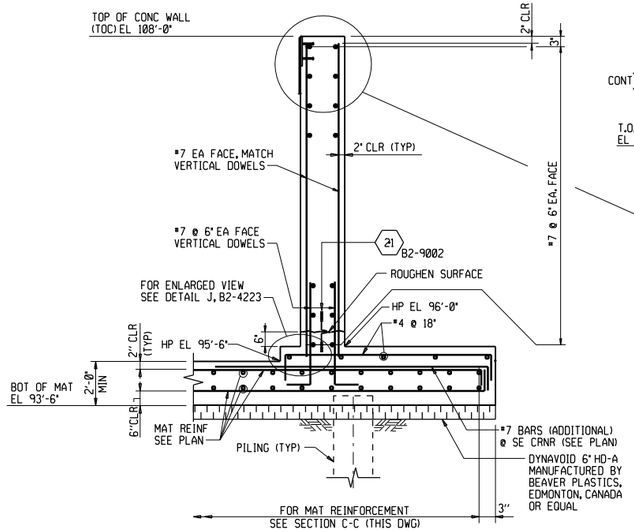
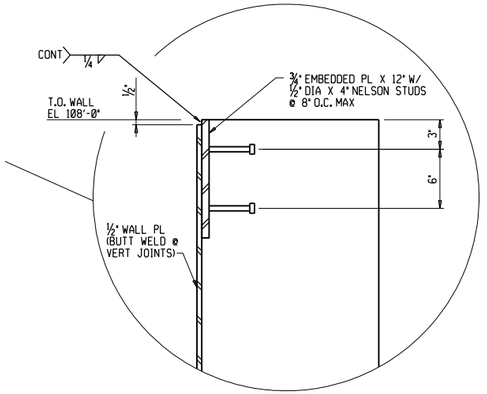


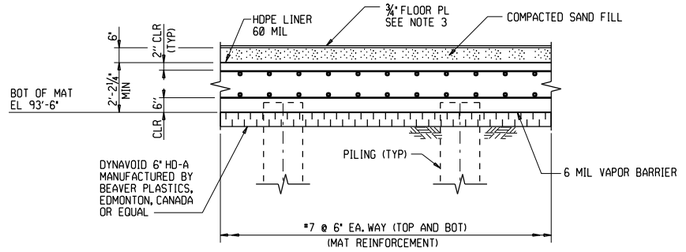
TYPICAL WALL SECTION

SECTION A-A

B2-4220



SPECIAL NOTE:
COMPACTED SAND IS TO PROVIDE NO DEFLECTION ON FLOOR PLATE. IF SAND LAYER IS DISTURBED DURING WELDING, IT SHALL BE RECOMPACTED BEFORE SETTING PLATE. SAND SHALL NOT CONTAIN MORE THAN 200 PPM CHLORIDE.



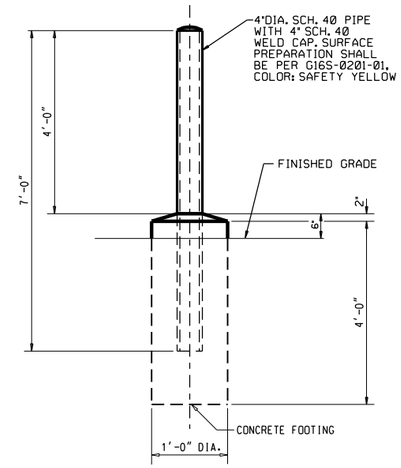
TYPICAL MAT SECTION

SECTION C-C

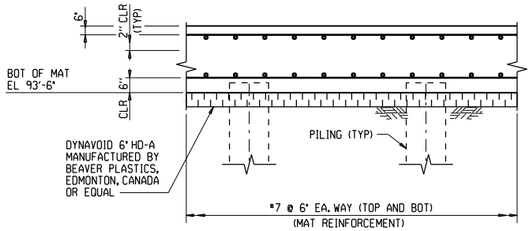
B2-4220

NOTES:

1. FOR NOTES SEE DRAWING B2-4220-960530.
2. 2" HEAVY DUTY GRATING TO BE IKG BORDEN STYLE HW TYPE C10A OR APPROVED EQUAL.
3. FLOOR PLATE AND WALL PLATE SHALL NOT BE GALVINIZED.



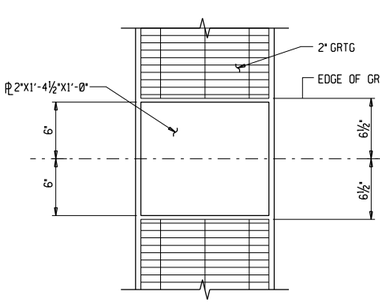
GUARD POST DETAIL E



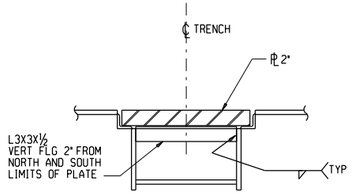
TYPICAL MAT SECTION

SECTION H-H

B2-4220



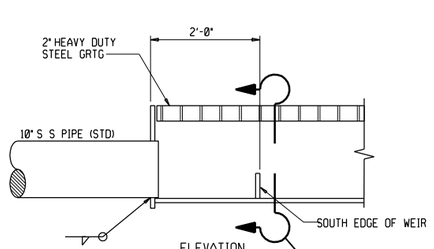
PLAN



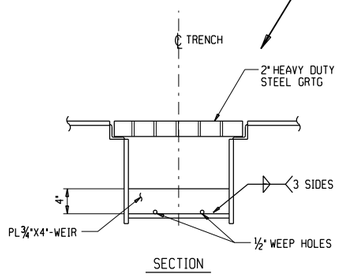
SECTION

DETAIL A

NTS B2-4220



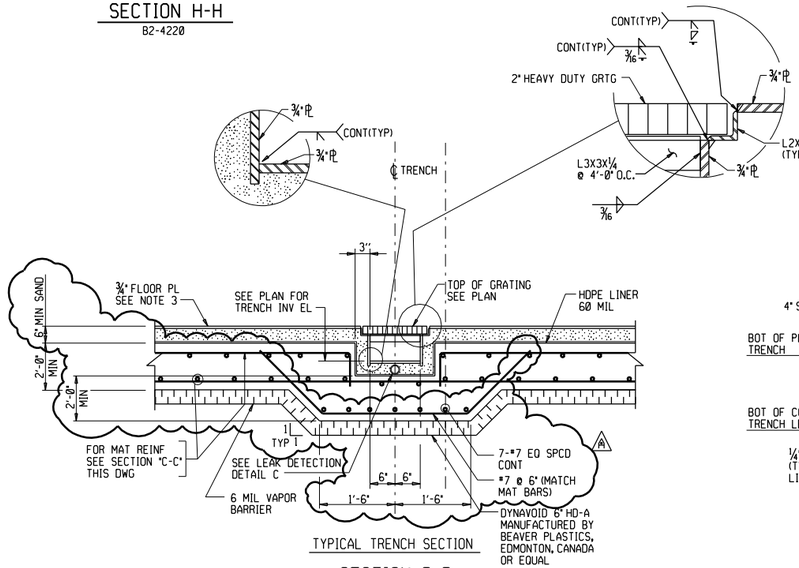
ELEVATION
(LOOKING EAST)



SECTION

DETAIL B

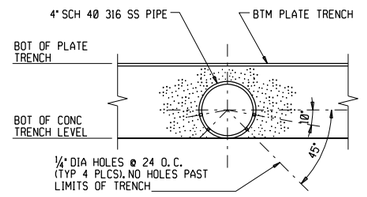
NTS B2-4220



TYPICAL TRENCH SECTION

SECTION B-B

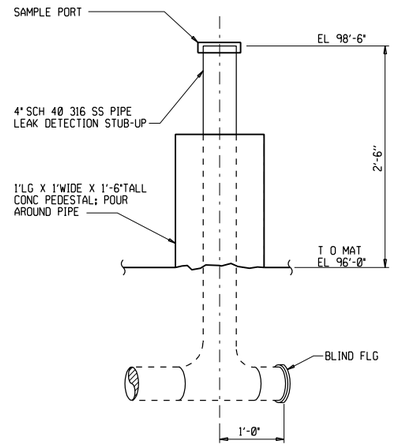
B2-4220



SECTION

LEAK DETECTION DETAIL C

B2-4220



ELEVATION

LEAK DETECTION DETAIL D

B2-4220

REV. MARK	REVISION	BY	CHK	APP	DATE
A	REVISED TRENCH SECTION B-B.	AJC	EB	HD	04/28/02

ISSUE NO.	REV	MATERIAL OR JOB SPEC	DATE ISSUED FOR: BID	FAB	CONST	REF
2	A	FIELD			10/28/02	
1	-	S1301C-960530			06/10/02	

DESIGNED	E BAKER	05/02
DRAWN	AJ CROW	05/02
CHECKED	H DELGADO	05/02
APPROVED	H. DELGADO	05/02
PROJ. ENGR.	M. VAN HERK	05/02
MFG. REP.	A. POTOFF	05/02

STATUS | PLANT NO. | P.E. SEAL

THE DOW CHEMICAL COMPANY
MICHIGAN OPERATIONS — MIDLAND, MICHIGAN
830 INCINERATOR UPGRADE — 32 BLDG

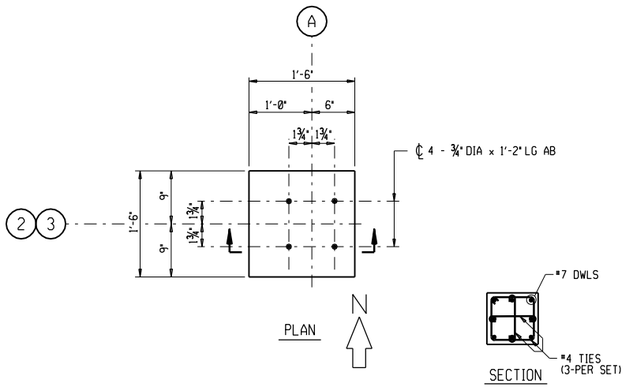
STR-BLDG 33
SECTIONS AND DETAILS

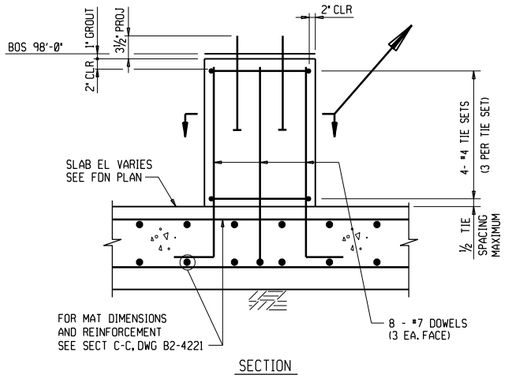
CHARGE NUMBER	SCALE		REV.
960530	3/8" = 1'-0"	B2-4221-960530	A

PRINTED | VER.

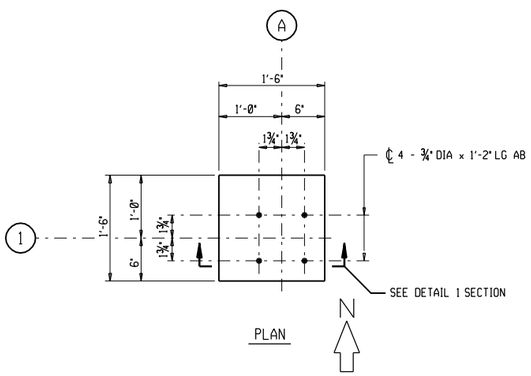
NOTES:

1. FOR NOTES SEE DRAWING B2-2320-960530.

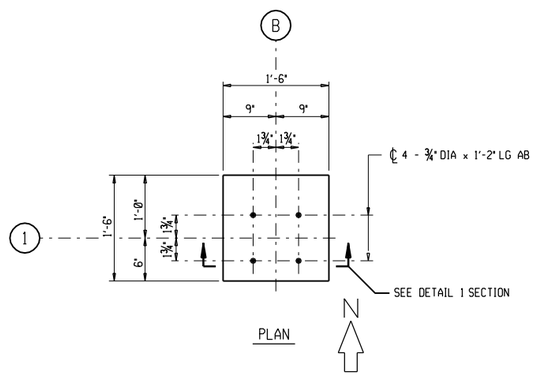




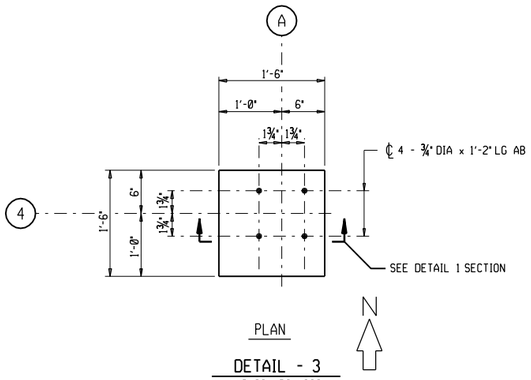
DETAIL - 1
(TYP 2 PLCS) B2-4220



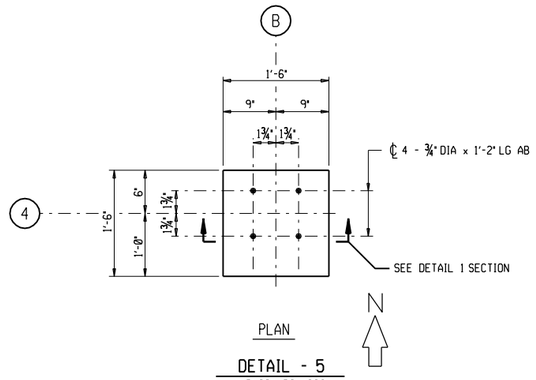
DETAIL - 2
(1 PLCS) B2-4220



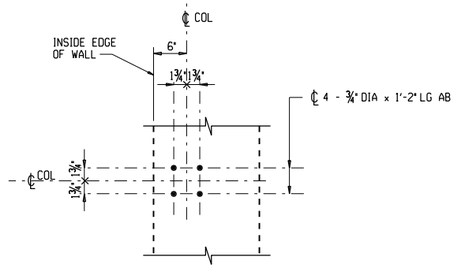
DETAIL - 4
(1 PLCS) B2-4220

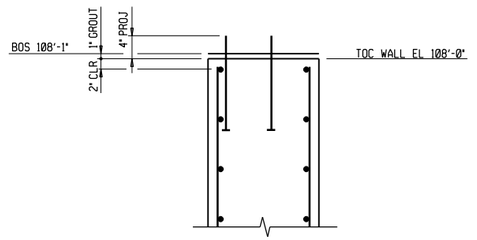


DETAIL - 3
(1 PLCS) B2-4220

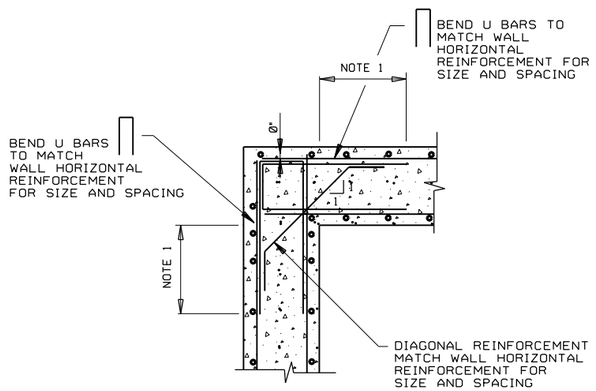


DETAIL - 5
(1 PLCS) B2-4220





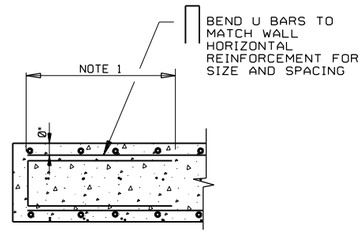
DETAIL - 6
(8 PLCS) B2-4220



NOTE:

1. TENSION LAP SPLICE DEVELOPMENT LENGTH

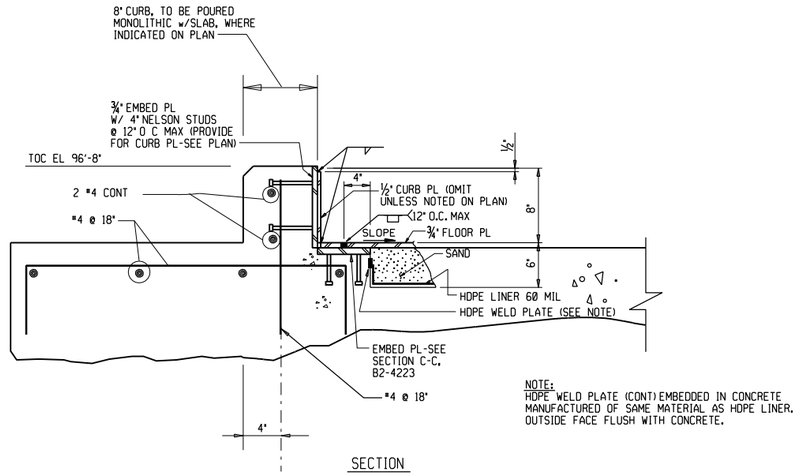
CORNER WALL DETAIL 7



NOTE:

1. TENSION LAP SPLICE DEVELOPMENT LENGTH

END OF CONCRETE WALL DETAIL 8



CURB DETAIL 9
(TYP 2 PLCS) B2-4220

REV. MARK	REVISION	BY	CHK	APP	DATE

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
1	-	S1301C-960530			06/10/02	

DATE ISSUED FOR

DESIGNED	E BAKER	05/02
DRAWN	AJ CROW	05/02
CHECKED	H DELGADO	05/02
APPROVED	H. DELGADO	06/02
PROJ. ENGR.	M. VAN HERK	06/02
MFG. REP.	A. POTOFF	06/02

STATUS | PLANT NO.

P.E. SEAL

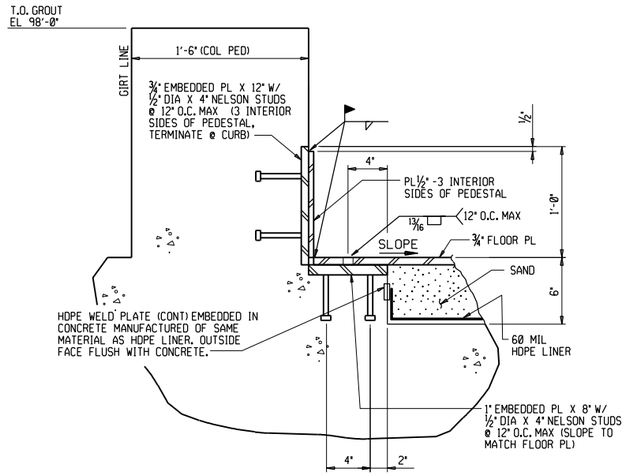
THE DOW CHEMICAL COMPANY
MICHIGAN OPERATIONS — MIDLAND, MICHIGAN
830 INCINERATOR UPGRADE — 32 BLDG

STR-BLDG 33
SECTIONS AND DETAILS

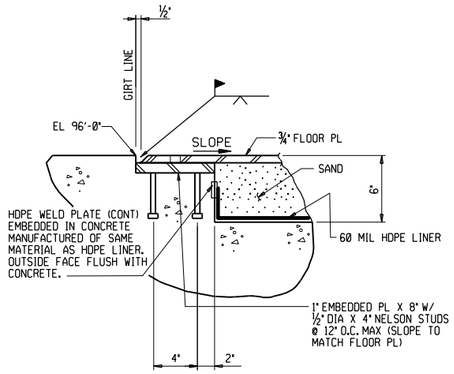
CHARGE NUMBER	SCALE		REV.
960530	NONE	B2-4222-960530	

NOTES:

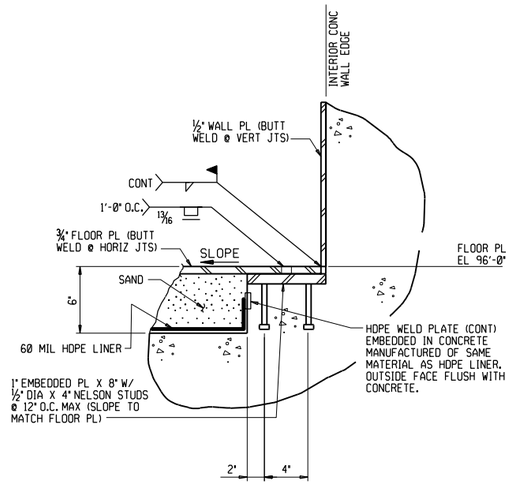
1. FOR NOTES SEE DRAWING B2-4220-960530.



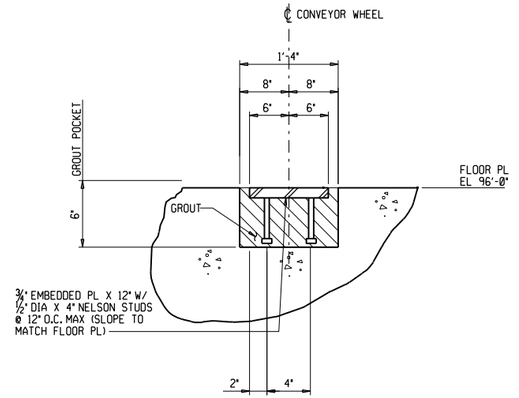
SECTION D-D
B2-4220



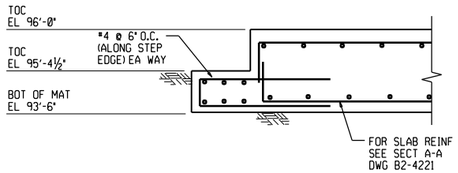
SECTION E-E
B2-4220



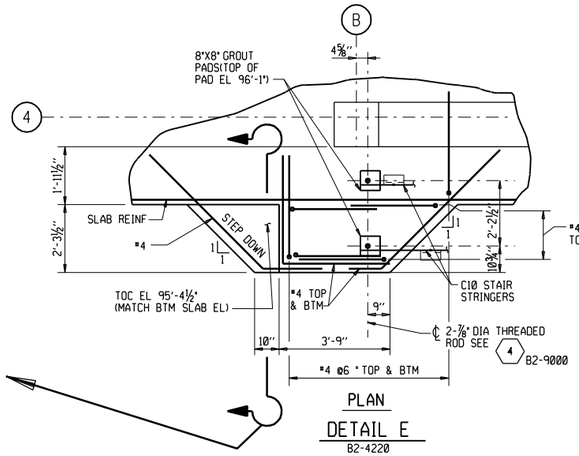
DETAIL J
B2-4220



SECTION G-G
B2-4220

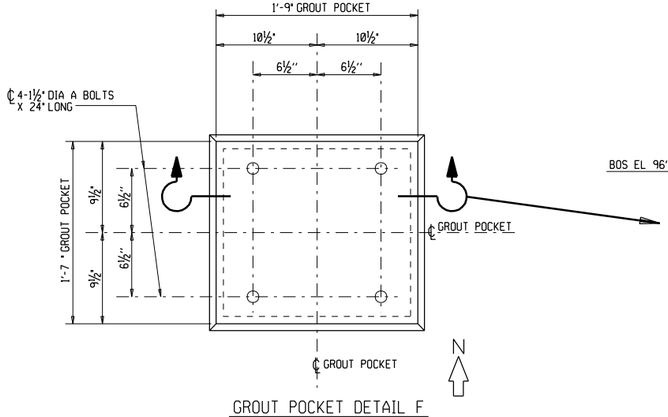


SECTION

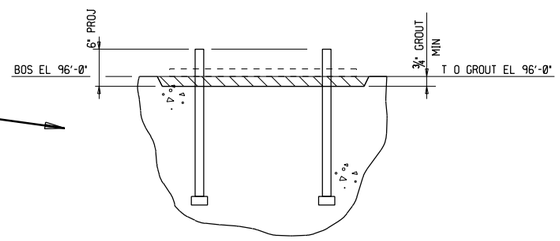


PLAN

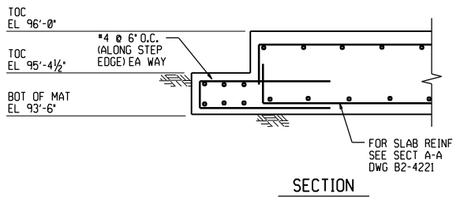
DETAIL E
B2-4220



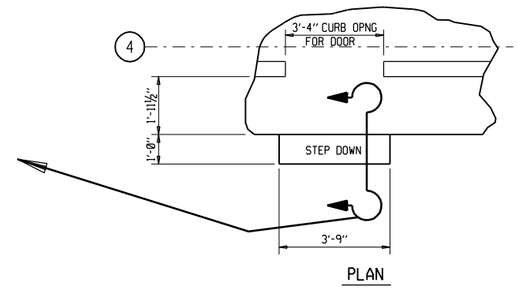
GROUT POCKET DETAIL F



SECTION

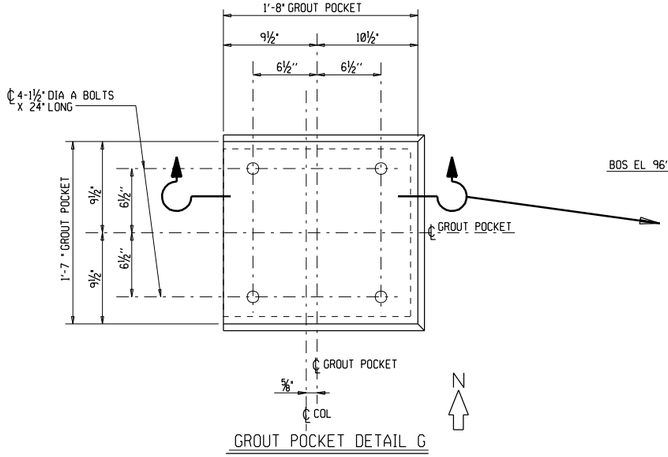


SECTION

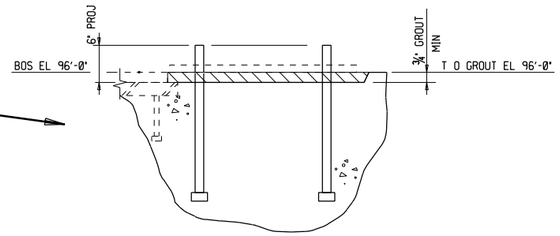


PLAN

DETAIL H
B2-4220 (TYP 2 PLCS)



GROUT POCKET DETAIL G



SECTION

REV. MARK	REVISION	BY	CHK	APP	DATE

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF	DATE ISSUED FOR
1	-	S1301C-960530			06/10/02		

DESIGNED	E BAKER	05/02
DRAWN	AJ CROW	05/02
CHECKED	H DELGADO	05/02
APPROVED	H. DELGADO	06/02
PROJ. ENGR.	M. VAN HERK	06/02
MFG. REP.	A. POTOFF	06/02

STATUS | PLANT NO.

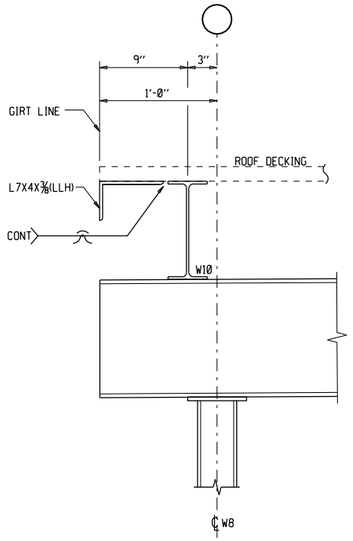
P.E. SEAL

THE DOW CHEMICAL COMPANY
MICHIGAN OPERATIONS — MIDLAND, MICHIGAN
830 INCINERATOR UPGRADE — 32 BLDG

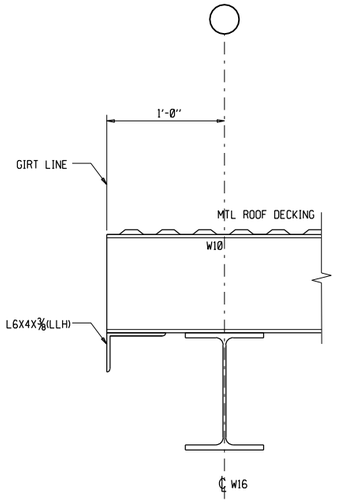
STR-BLDG 33
SECTIONS AND DETAILS

CHARGE NUMBER	SCALE		REV.
960530	3/8" = 1'-0"	B2-4223-960530	

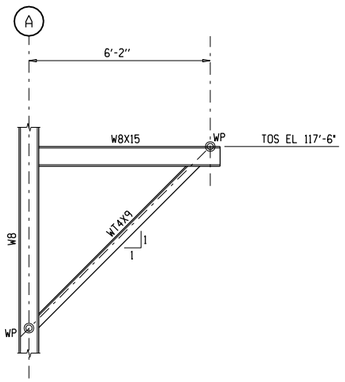
PRINTED | VER



SECTION A-A
SCALE: 1½"=1'-0"

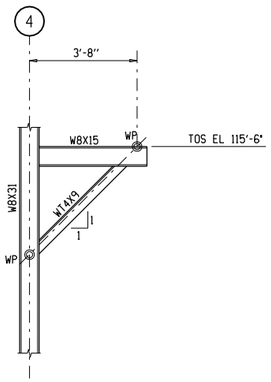


SECTION B-B
SCALE: 1½"=1'-0"



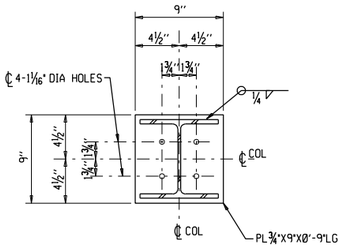
ELEVATION
(LOOKING NORTH)

DETAIL STR-BLDG_33.MSC-001, 002 & 003

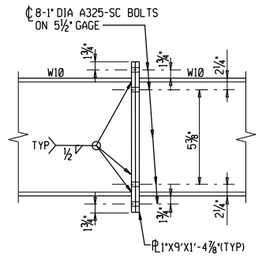


ELEVATION
(LOOKING WEST)

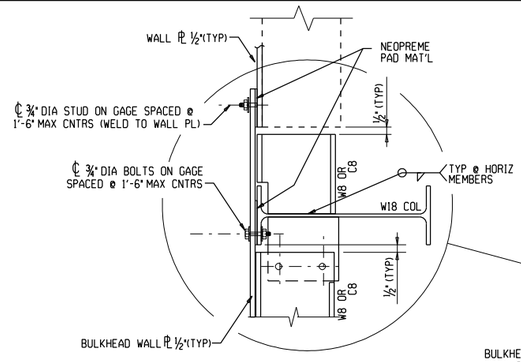
DETAIL STR-BLDG_33.MSC-004 & 005

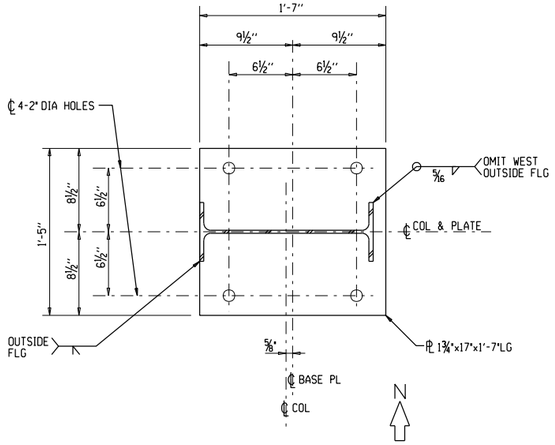


BASE PLATE DETAIL A

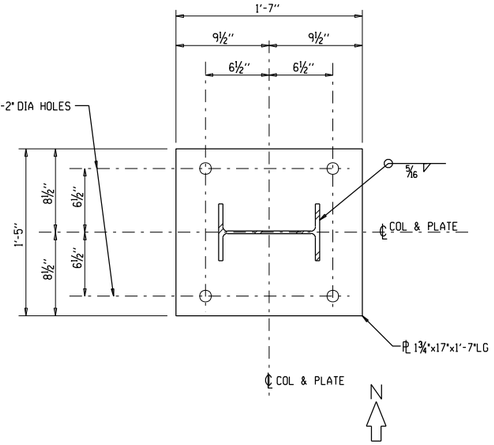


RAFTER SPLICE DETAIL

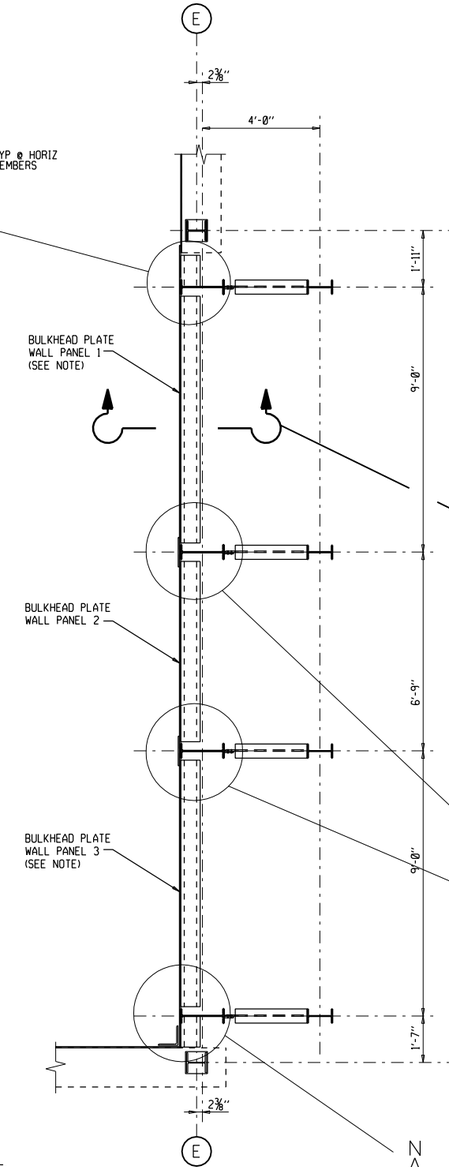




BASE PLATE DETAIL B

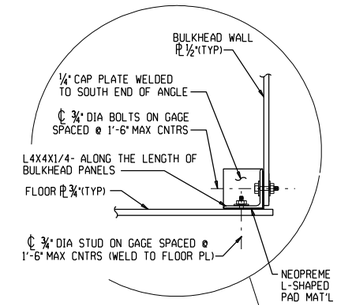


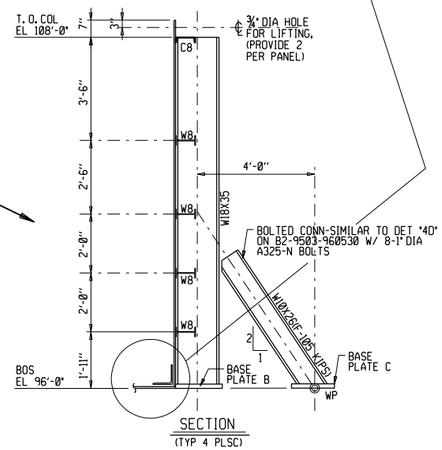
BASE PLATE DETAIL C



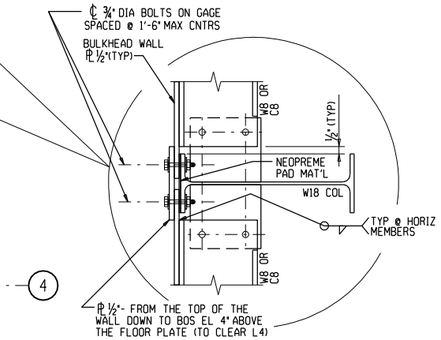
NOTE:
BULKHEAD PANELS TO BE REMOVED
PRIOR TO ASH CONVEYOR REMOVAL.

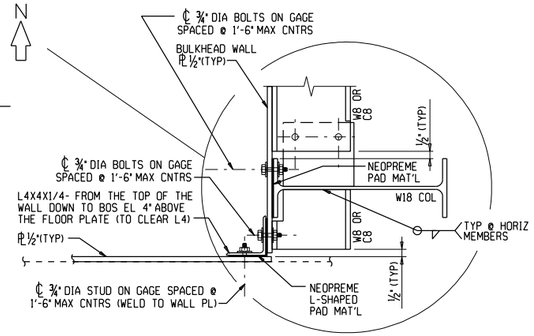
PLAN OF BULKHEAD STEEL WALL





SECTION
(TYP 4 PLSC)





REV. MARK	REVISION	BY	CHK	APP	DATE

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			
2	-	S1301C-960530				06/10/02
1	-	S1501F-960530			05/24/02	

DESIGNED	EVERETT BAKER	04/02
DRAWN	AJ CROW	04/02
CHECKED	EVERETT BAKER	04/02
APPROVED	H. DELGADO	04/02
PROJ. ENGR.	M. VAN HERK	04/02
MFG. REP.	A. POTOFF	04/02

STATUS | PLANT NO.

P.E. SEAL

THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

830 INCINERATOR UPGRADE — 32 BLDG

STR-BLDG 33
STEEL DETAILS

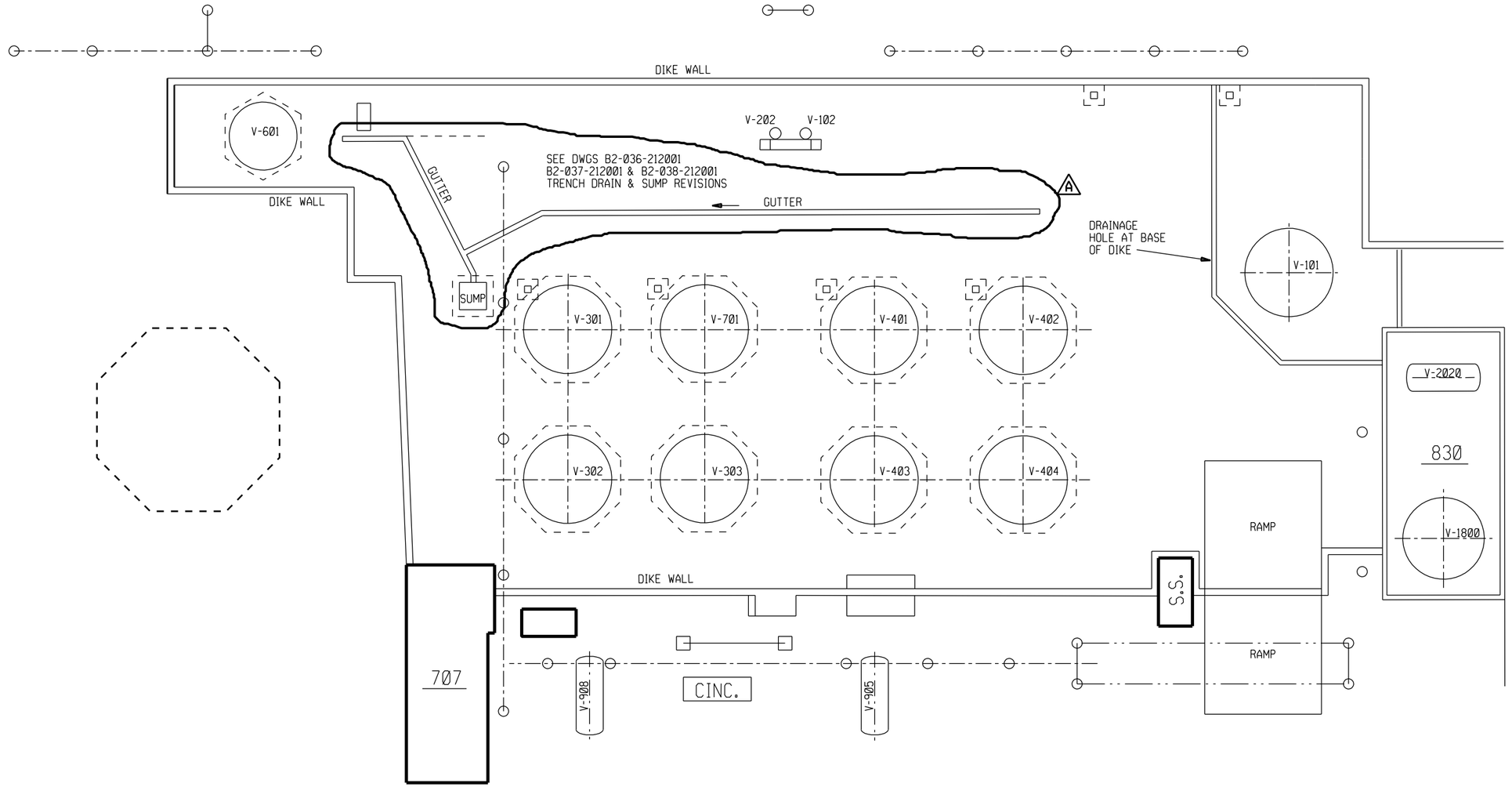
CHARGE NUMBER	SCALE		REV.
960530	3/4" = 1'-0"	B2-4258M-960530	

PRINTED | VER.

A B C D E F G H J K

APPENDIX C2-B – TANK SYSTEM DRAWINGS

Drawing Number(s)	Drawing Description
B2-422-874008	Liquid Waste Tank Containment Plan
B2-409-874008 B2-410-874008	Liquid Waste Tank Containment Section & Details
B1-050-32	V-701 P&ID
B1-054-32	V-601 P&ID
B1-070-32	V-301 P&ID
B1-071-32	V-302 P&ID
B1-072-32	V-303 P&ID
B1-074-32	V-401 P&ID
B1-075-32	V-402 P&ID
B1-076-32	V-403 P&ID
B1-077-32	V-404 P&ID
B1-103-32	V-101 P&ID



PLAN - LIQUID WASTE TANK CONTAINMENT

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

REV. MARK	REVISION	BY	CHK	APP	DATE
A	NOTED REVISIONS TO TRENCHS & SUMP				

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED		
DRAWN L.E. GIRARDIN	6/09	
CHECKED AL POTOFF	6/09	
APPROVED		
PROJ. ENGR.		
MFG. REP.		

STATUS PLANT NO.

P.E. SEAL

THE DOW CHEMICAL COMPANY

MICHIGAN DIVISION MIDLAND, MICHIGAN

INCINERATION COMPLEX 1261

LIQUID WASTE TANK CONTAINMENT PLAN

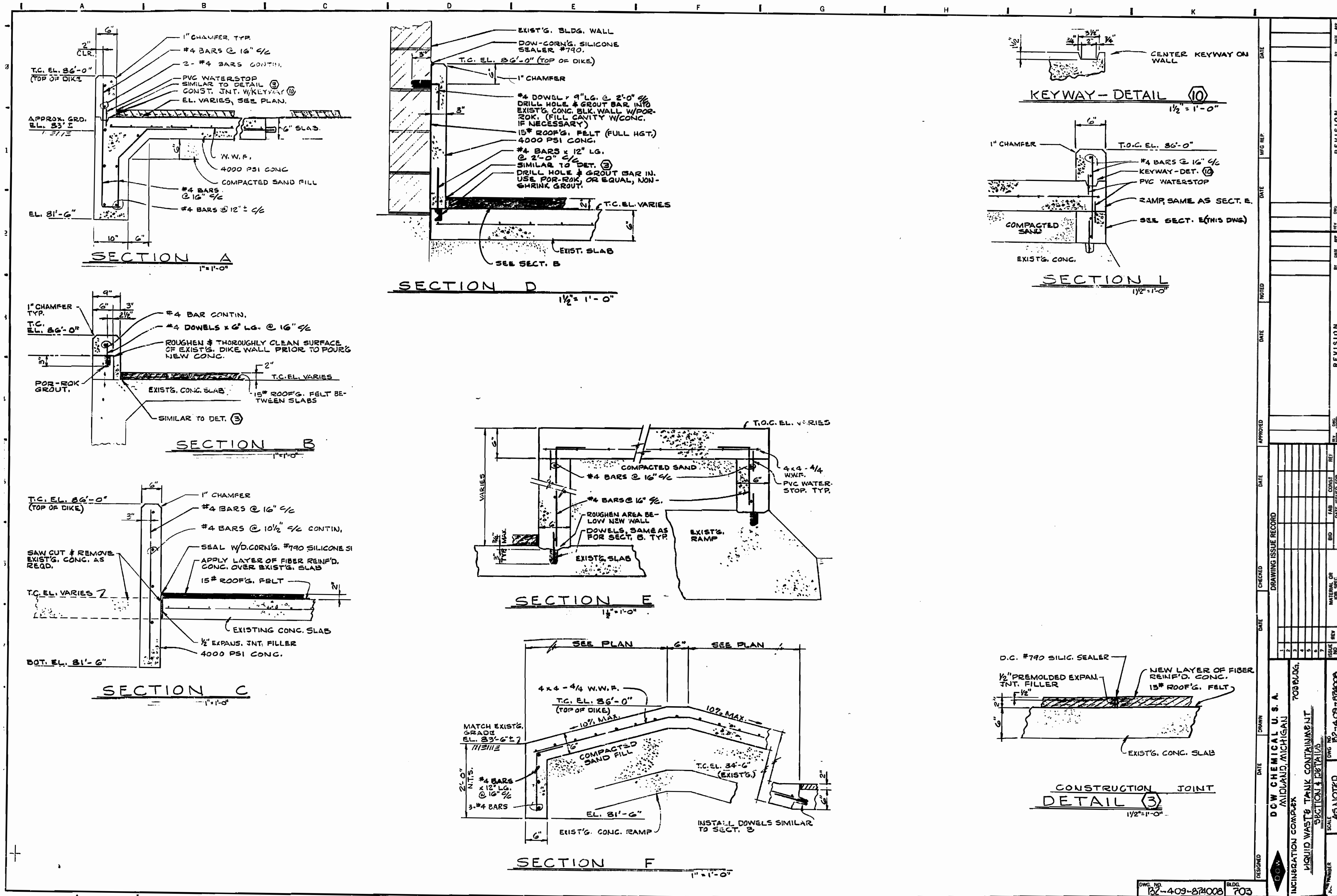
PROJECT NUMBER	SCALE	REV.
874008	1/8" = 1'-0"	A

B2-422-874008

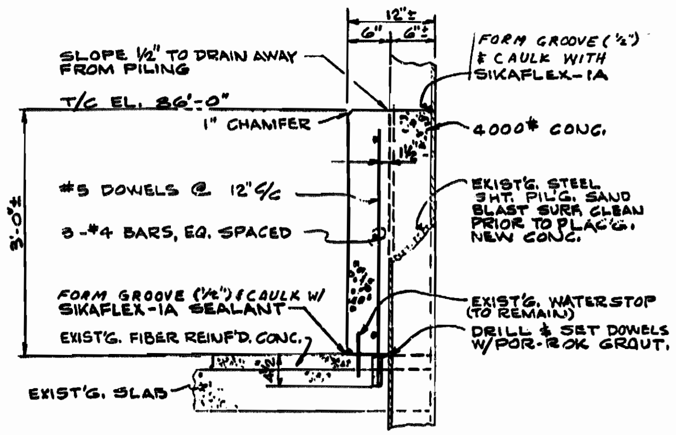
2 PLN

PRINTED VER.

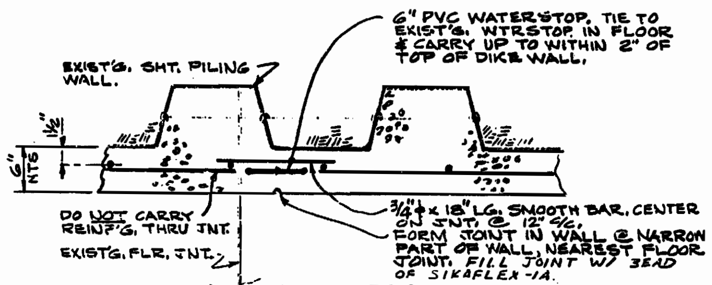
$PERSON $DATE $TIME $FILENAME $INSTRUCTIONS



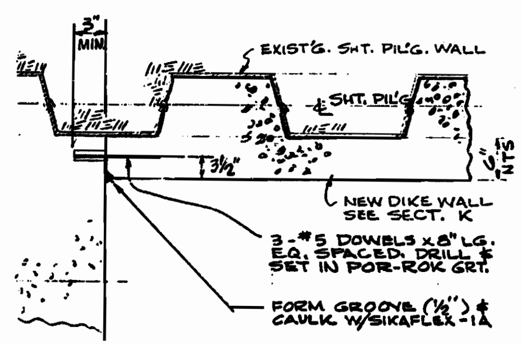
SECTION A
1"=1'-0"
1" CHAMFER, TYP.
#4 BARS @ 16" c/c
2 - #4 BARS CONTIN.
PVC WATERSTOP SIMILAR TO DETAIL 3
CONST. JNT. W/KEYWAY 10
EL. VARIES, SEE PLAN.
T.C. EL. 86'-0" (TOP OF DIKE)
APPROX. GRD. EL. 83'±
6" SLAB
W.W.F.
4000 PSI CONC.
COMPACTED SAND FILL
#4 BARS @ 16" c/c
#4 BARS @ 12"± c/c
EL. 81'-6"
SECTION D
1½"= 1'-0"
EXIST'G. BLDG. WALL
DOW-CORN'G. SILICONE SEALER #790.
T.C. EL. 86'-0" (TOP OF DIKE)
1" CHAMFER
#4 DOWEL x 9" LG. @ 2'-0" c/c DRILL HOLE & GROUT BAR INTO EXIST'G. CONC. BLK. WALL W/POR-ROK. (FILL CAVITY W/CONC. IF NECESSARY)
15# ROOF'G. FELT (FULL HGT.)
4000 PSI CONC.
#4 BARS x 12" LG. @ 2'-0" c/c
SIMILAR TO DET. 3
DRILL HOLE & GROUT BAR IN. USE POR-ROK, OR EQUAL, NON-SHRINK GROUT.
T.C. EL. VARIES
EXIST. SLAB
SEE SECT. B
KEYWAY - DETAIL 10
1½" = 1'-0"
CENTER KEYWAY ON WALL
SECTION L
1½"=1'-0"
1" CHAMFER
T.O.C. EL. 86'-0"
#4 BARS @ 16" c/c
KEYWAY - DET. 10
PVC WATERSTOP
RAMP, SAME AS SECT. E.
SEE SECT. E (THIS DWG)
COMPACTED SAND
EXIST'G. CONC.
SECTION B
1"=1'-0"
1" CHAMFER TYP.
T.C. EL. 86'-0"
#4 BAR CONTIN.
#4 DOWELS x 6" LG. @ 16" c/c
ROUGHEN & THOROUGHLY CLEAN SURFACE OF EXIST'G. DIKE WALL PRIOR TO POUR'G NEW CONC.
T.C. EL. VARIES
POR-ROK GROUT.
EXIST'G. CONC. SLAB
15# ROOF'G. FELT BETWEEN SLABS
SIMILAR TO DET. 3
SECTION E
1½"=1'-0"
T.O.C. EL. VARIES
COMPACTED SAND
#4 BARS @ 16" c/c
4x4 - 4/4 W.W.F.
PVC WATERSTOP. TYP.
ROUGHEN AREA BELOW NEW WALL
DOWELS, SAME AS FOR SECT. B. TYP.
EXIST'G. RAMP
EXIST'G. SLAB
VARIES
SECTION C
1"=1'-0"
T.C. EL. 86'-0" (TOP OF DIKE)
1" CHAMFER
#4 BARS @ 16" c/c
#4 BARS @ 10½" c/c CONTIN.
SEAL W/D.CORN'G. #790 SILICONE SEALER
SAW CUT & REMOVE EXIST'G. CONC. AS REQD.
APPLY LAYER OF FIBER REINF'D. CONC. OVER EXIST'G. SLAB
15# ROOF'G. FELT
T.C. EL. VARIES
EXISTING CONC. SLAB
½" EXPANS. JNT. FILLER
4000 PSI CONC.
BOT. EL. 81'-6"
SECTION F
1" = 1'-0"
SEE PLAN
SEE PLAN
4x4 - 4/4 W.W.F.
T.C. EL. 86'-0" (TOP OF DIKE)
10% MAX.
10% MAX.
MATCH EXIST'G. GRADE EL. 83'-6"±
COMPACTED SAND FILL
T.C. EL. 84'-6" (EXIST'G.)
2'-0" N.T.S.
#4 BARS x 12" LG. @ 16" c/c
3-#4 BARS
EL. 81'-6"
EXIST'G. CONC. RAMP
INSTALL DOWELS SIMILAR TO SECT. B
CONSTRUCTION JOINT DETAIL 3
1½"=1'-0"
D.C. #790 SILIC. SEALER
½" PREMOLDED EXPAN. JNT. FILLER
NEW LAYER OF FIBER REINF'D. CONC.
15# ROOF'G. FELT
EXIST'G. CONC. SLAB
DRAWING ISSUE RECORD
REVISION
DOW CHEMICAL U.S.A.
MIDLAND, MICHIGAN
703 BLDG.
INCINERATION COMPLEX
LIQUID WASTE TANK CONTAINMENT
SECTION & DETAILS
AS NOTED
132-409-874008
DWG. NO. 132-409-874008
BLDG. 703
BRUNING 59690-A



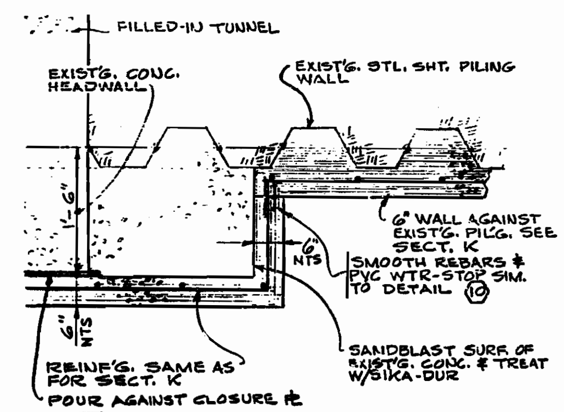
SECTION K
1" = 1'-0"



(10) — WALL JOINT
1½" = 1'-0"



(11) — JOINT
1½" = 1'-0"



(12) — HEADWALL JOINT
1" = 1'-0"

REVISION

REVISION

DRAWING ISSUE RECORD

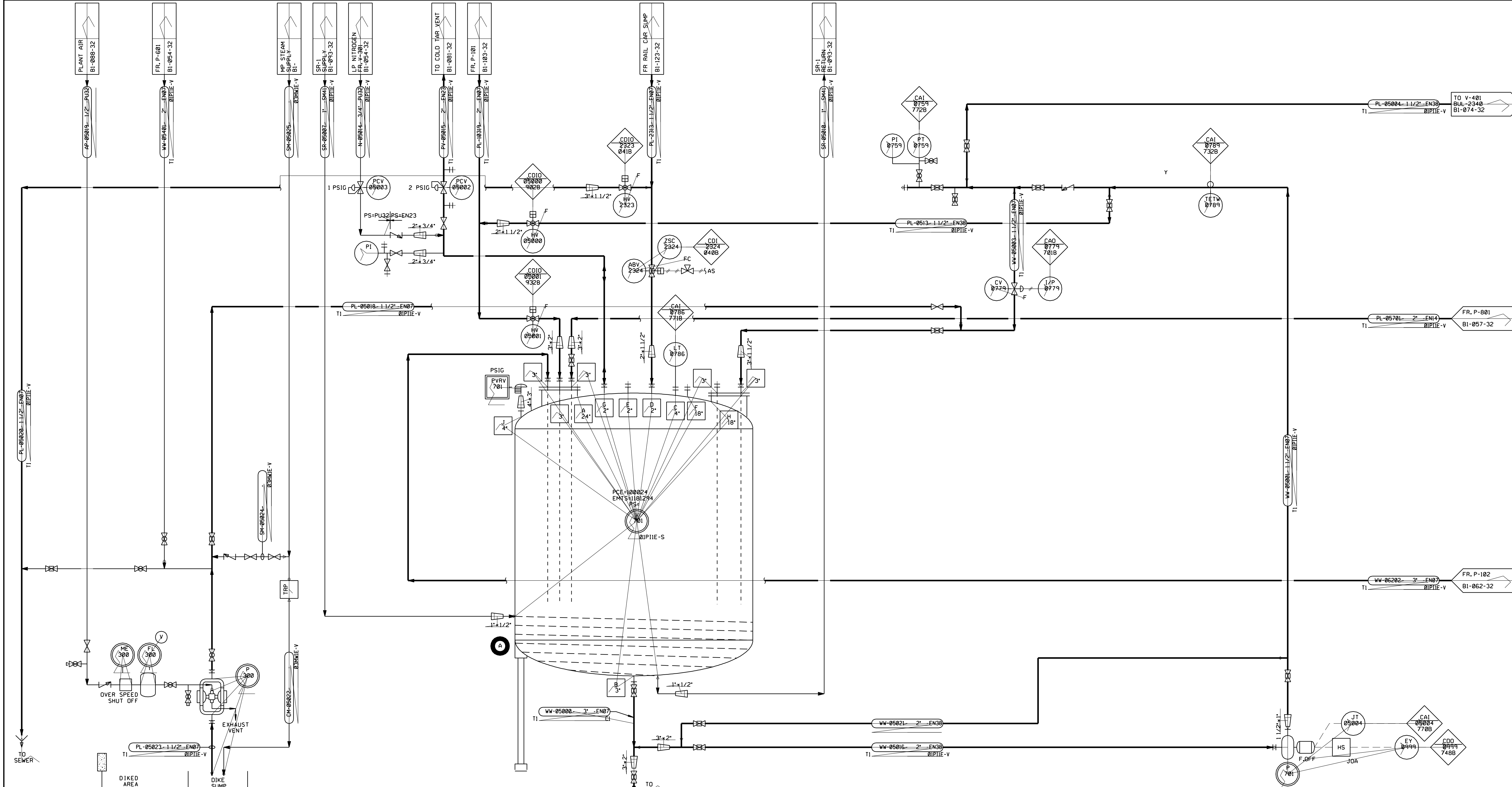
DOW CHEMICAL U.S.A.
MIDLAND, MICHIGAN

INCINERATION COMPLEX 703 BLDG.
LIQUID-WASTE TANK CONTAINMENT
SECTION & DETAILS

SCALE AS NOTED
DWG. NO. B2-410-874008

DWG. NO. B2-410-874008 BLDG. 703

BRUNING 59690-4A



1/2" COPPER TUBING WITH 1.5" CENTER SPACING ON BOTTOM 18" OF TANK SHELL.

UNLESS OTHERWISE NOTED ALL MOD I/O ON THIS DRAWING IS ON SYSTEM:B

LAST LINE NO. USED: 05025

LAST INST. NO. USED: 05004

UNLESS OTHERWISE NOTED, ALL ITEMS ON THIS DRAWING ARE: EXISTING

UNLESS OTHERWISE NOTED, ALL BRANCH CONNECTIONS ON THIS DRAWING ARE: 3/4"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	4TH PASS - 2ND UPDATE	DJF			03/28/01
B	4TH PASS - 3RD UPDATE	CMC			06/14/01
C	4TH PASS - 4TH UPDATE	KP			10/08/01
D	4TH PASS - 5TH UPDATE	RG			04/22/02
E	4TH PASS - 6TH UPDATE	RAM			02/06/03
F	GENERAL REVISIONS PER AS-BUILT	LJM			04/05/04
G	GENERAL REVISIONS PER AS-BUILT.	JJC			10/12/04
H	GENERAL REVISIONS PER AS-BUILT.	NRK			02/01/05
I	GENERAL REVISIONS PER AS-BUILT.	SR			09/22/06
J	GENERAL REVISIONS PER AS-BUILT.	SK			08/24/07
K	GENERAL REVISIONS PER AS-BUILT.	TPS			06/27/08
L	GENERAL REVISIONS PER AS-BUILT	LJM			08/23/13

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED
DRAWN
CHECKED TEAM CHECKED
APPROVED D.HADLEY/S.SYLVESTER
PROJ. ENGR. MIKE VAN HERK
MFG. REP. ALAN POTOFF

STATUS
PLANT NO.
P.E. SEAL

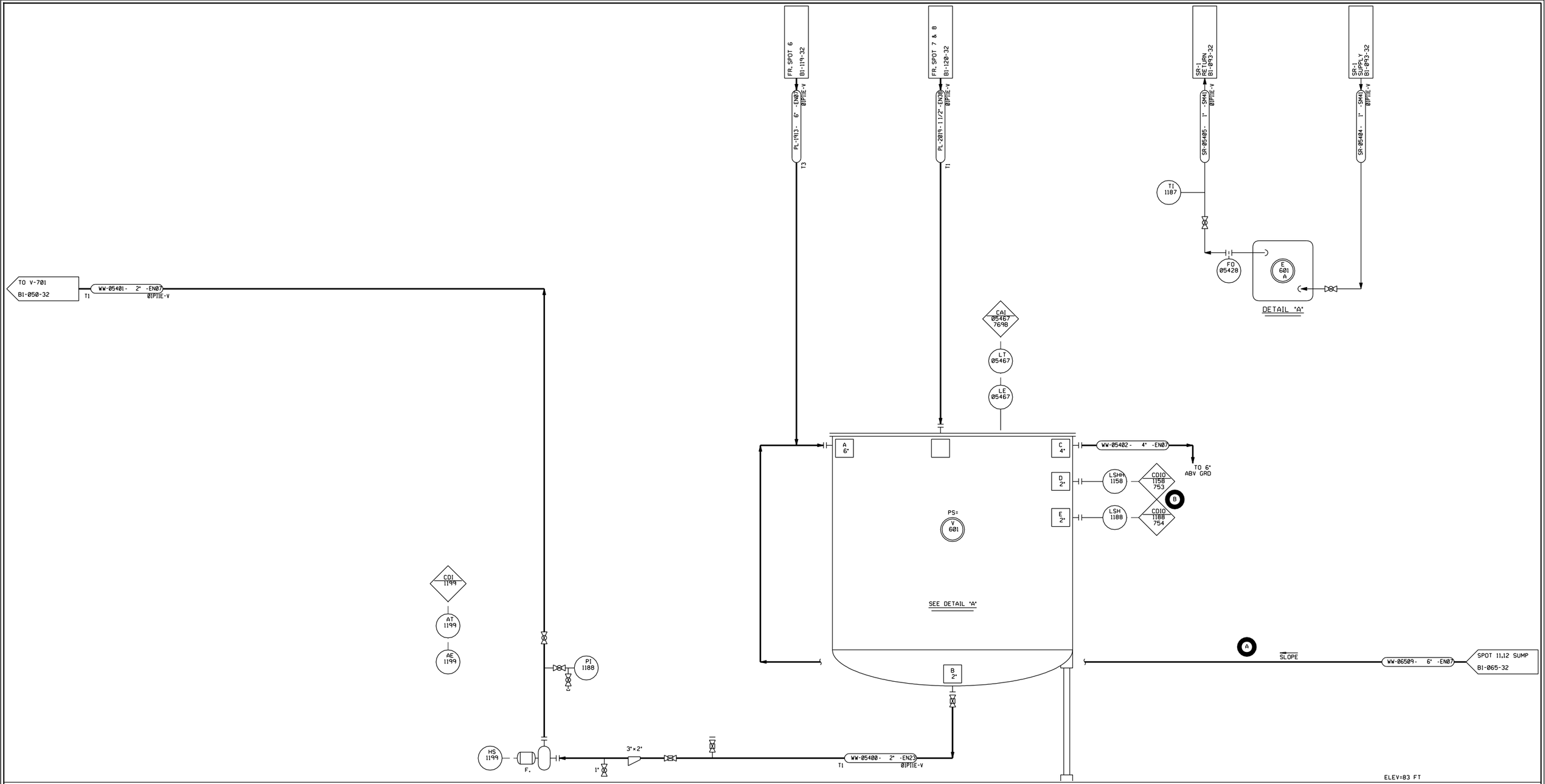
THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

32 INCINERATOR — 32 BLDG.

WATER STORAGE
V-701 & P-701
PIPING AND INSTRUMENT DIAGRAM

PROJECT NUMBER	SCALE	DRAWING NO.	REV.
32		B1-050-32	L



(A) SLOPE FOR DRAINAGE.

(B) CURRENTLY OUT OF SERVICE.

LAST LINE NO. USED: 05408

UNLESS OTHERWISE NOTED, ALL ITEMS ON THIS DRAWING ARE: EXISTING

UNLESS OTHERWISE NOTED, ALL BRANCH CONNECTIONS ON THIS DRAWING ARE: 3/4"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	GENERAL REVISIONS PER AS-BUILT.	JMD			12/93
B	GENERAL REVISIONS PER AS-BUILT.	RAM			03/96
C	GENERAL REVISIONS PER AS-BUILT.	KD			09/22/06

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED	D.STARIN	12/93
DRAWN	J.M.DUBAY	12/93
CHECKED		
APPROVED		
PROJ. ENGR.		
MFG. REP.		

STATUS | PLANT NO.

P.E. SEAL

ORIGINAL DRAWING NUMBER WAS B1-054-870005

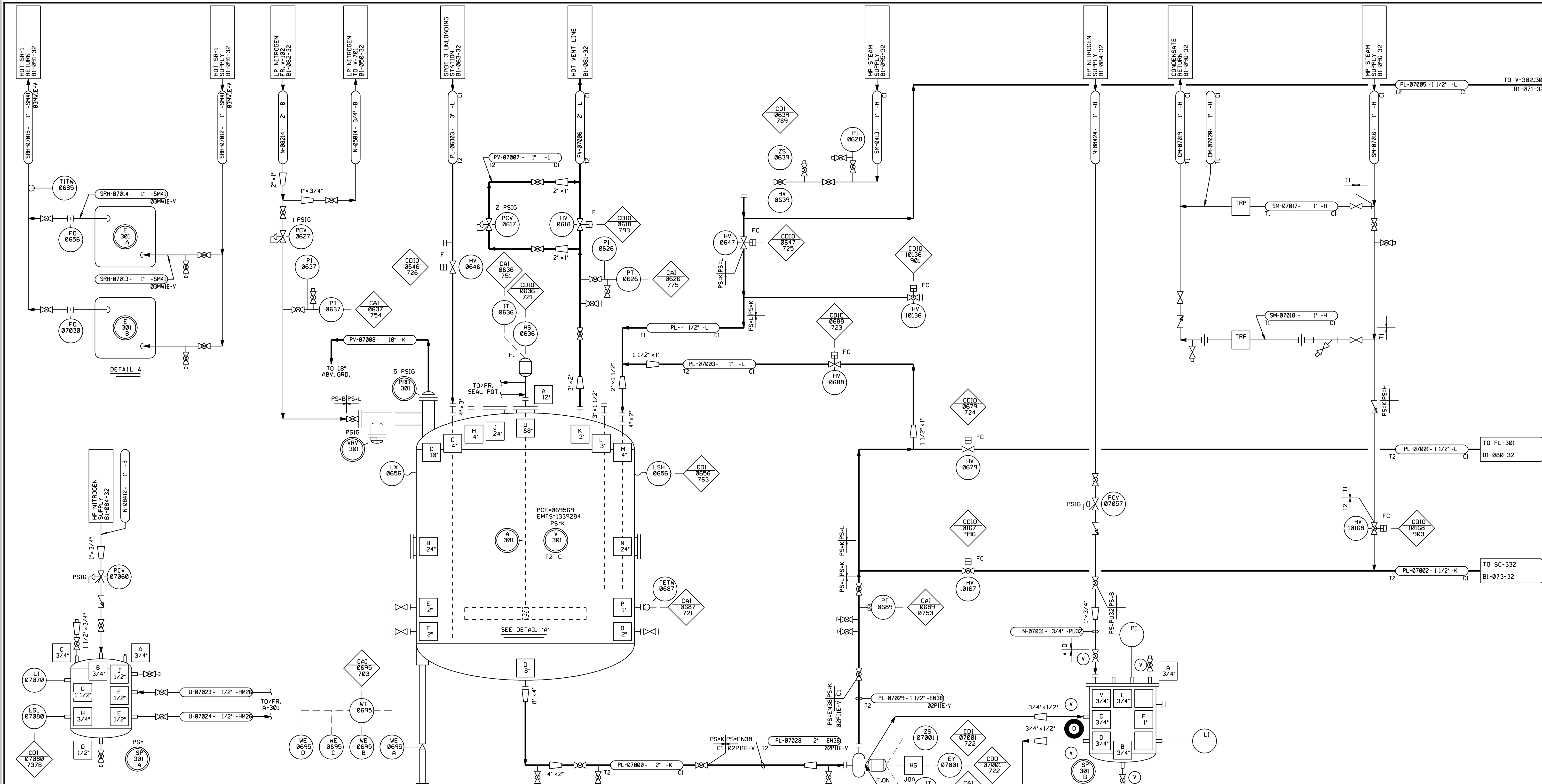
THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

32 INCINERATOR — 32 BLDG.

703 BLDG
V-601 & P-601
PIPING AND INSTRUMENT DIAGRAM

PROJECT NUMBER	SCALE		REV.
32		B1-054-32	C



TIE POINTS TO BE MADE WITHIN A FLANGED SECTION. AVOID CUTTING AND WELDING.

PUMP SUPPLIER TO PROVIDE SEAL POT AND INTERCONNECTING TUBING.

PUMP HAS 3"-300# RF INLET AND 1 1/2"-300# RF OUTLET.

UNLESS OTHERWISE NOTED ALL MOD I/O ON THIS DRAWING IS ON SYSTEM:B

LAST LINE NO. USED: 07032
LAST INST. NO. USED:

UNLESS OTHERWISE NOTED, ALL ITEMS ON THIS DRAWING ARE: EXISTING

UNLESS OTHERWISE NOTED, ALL BRANCH CONNECTIONS ON THIS DRAWING ARE: 3/4"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	4TH PASS - 2ND UPDATE	DJF			03/28/01
B	4TH PASS - 3RD UPDATE	CMC			06/14/01
C	4TH PASS - 4TH UPDATE	KP			10/08/01
D	4TH PASS - 5TH UPDATE	KP			04/22/02
E	GENERAL REVISIONS PER AS-BUILT.	LJM			04/29/04
F	GENERAL REVISIONS PER AS-BUILT.	JJC			10/12/04
G	GENERAL REVISIONS PER AS-BUILT.	SR			09/22/06
H	GENERAL REVISIONS PER AS-BUILT.	NRK			06/27/08
I	GENERAL REVISIONS PER AS-BUILT.	KSJ			01/31/11

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF

DATE ISSUED FOR

DESIGNED
DRAWN
CHECKED: TEAM CHECKED
APPROVED: D.HADLEY/S.SYLVESTER
PROJ. ENGR.: MIKE VAN HERK
MFG. REP.: ALAN POTOFF

STATUS | PLANT NO. | P.E. SEAL

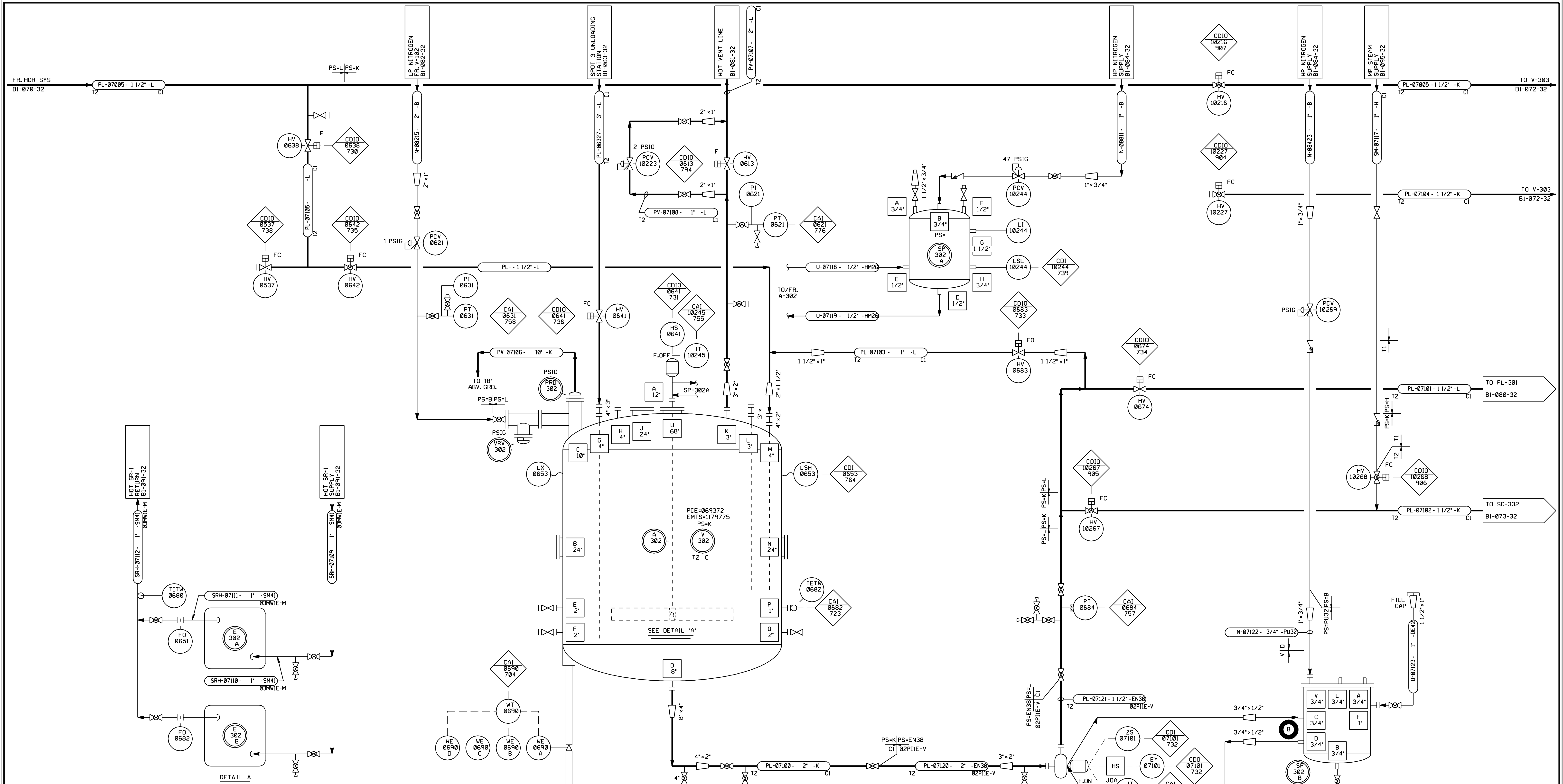
THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

32 INCINERATOR — 32 BLDG.

HOT TAR STORAGE
V-301
PIPING AND INSTRUMENT DIAGRAM

PROJECT NUMBER: 32 | SCALE | B1-070-32 | REV. I



(B) PUMP SUPPLIER TO PROVIDE SEAL POT INTERCONNECTING TUBING.

(E) PUMP HAS 3"-300# RF INLET AND 1 1/2"-300# RF OUTLET.

LAST LINE NO. USED: 07123
LAST INST. NO. USED:

UNLESS OTHERWISE NOTED, ALL ITEMS ON THIS DRAWING ARE: EXISTING

UNLESS OTHERWISE NOTED, ALL BRANCH CONNECTIONS ON THIS DRAWING ARE: 3/4"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	4TH PASS - 2ND UPDATE	DJF			03/28/01
B	4TH PASS - 3RD UPDATE	CMC			06/14/01
C	4TH PASS - 4TH UPDATE	KP			10/08/01
D	4TH PASS - 5TH UPDATE	KP			04/22/02
E	GENERAL REVISIONS PER AS-BUILT	LJM			04/29/04
F	GENERAL REVISIONS PER AS-BUILT.	JJC			10/12/04
G	GENERAL REVISIONS PER AS-BUILT.	KD			09/22/06
H	GENERAL REVISIONS PER AS-BUILT.	NRK			06/27/08
I	GENERAL REVISIONS PER AS-BUILT.	KSJ			01/31/11

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF

DATE ISSUED FOR

DESIGNED	
DRAWN	
CHECKED	TEAM CHECKED
APPROVED	D.HADLEY/S.SYLVESTER
PROJ. ENGR.	MIKE VAN HERK
MFG. REP.	ALAN POTOFF

STATUS | PLANT NO.

P.E. SEAL

ORIGINAL DRAWING NUMBER WAS B1-102-879056

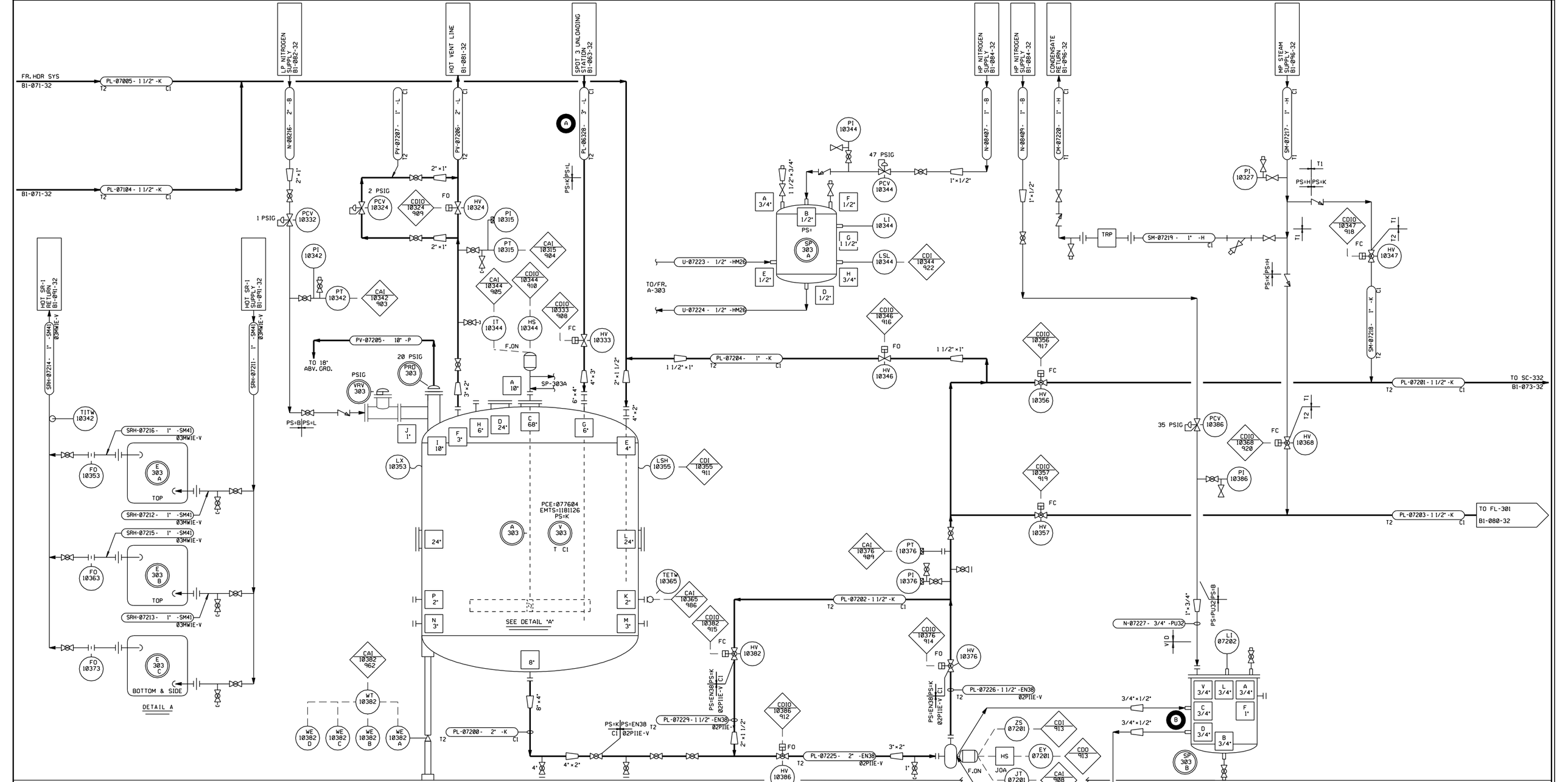
THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

32 INCINERATOR — 32 BLDG.

HOT TAR STORAGE
V-302
PIPING AND INSTRUMENT DIAGRAM

PROJECT NUMBER	SCALE		REV.
32		B1-071-32	I



A 1. DISTANCE BETWEEN FLANGED CONNECTIONS SHALL BE MAX. 20'.
2. SHALL BE NO MORE THAN ONE 90° ELBOW IN ANY LENGTH OF LINE.

B PUMP SUPPLIER TO PROVIDE SEAL POT AND INTERCONNECTING TUBING.

E PUMP HAS 3"-300# RF INLET AND 1 1/2"-300# RF OUTLET.

UNLESS OTHERWISE NOTED ALL MOD I/O ON THIS DRAWING IS ON SYSTEM:B

LAST LINE NO. USED: 07229

LAST INST. NO. USED: 07202

UNLESS OTHERWISE NOTED, ALL ITEMS ON THIS DRAWING ARE: EXISTING

UNLESS OTHERWISE NOTED, ALL BRANCH CONNECTIONS ON THIS DRAWING ARE: 3/4"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	4TH PASS - 2ND UPDATE	DJF			03/28/01
B	4TH PASS - 3RD UPDATE	CMC			06/14/01
C	4TH PASS - 4TH UPDATE	KP			10/08/01
D	4TH PASS - 5TH UPDATE	KP			04/22/02
E	GENERAL REVISIONS PER AS-BUILT	LJM			04/29/04
F	GENERAL REVISIONS PER AS-BUILT.	JJC			10/12/04
G	GENERAL REVISIONS PER AS-BUILT.	DSP			09/22/06
H	GENERAL REVISIONS PER AS-BUILT.	NRK			06/27/08

REV. MARK	REVISION	BY	CHK	APP	DATE

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED

DRAWN

CHECKED: TEAM CHECKED

APPROVED: D.HADLEY/S.SYLVESTER

PROJ. ENGR.: MIKE VAN HERK

MFG. REP.: ALAN POTOFF

STATUS

P.E. SEAL

PLANT NO.

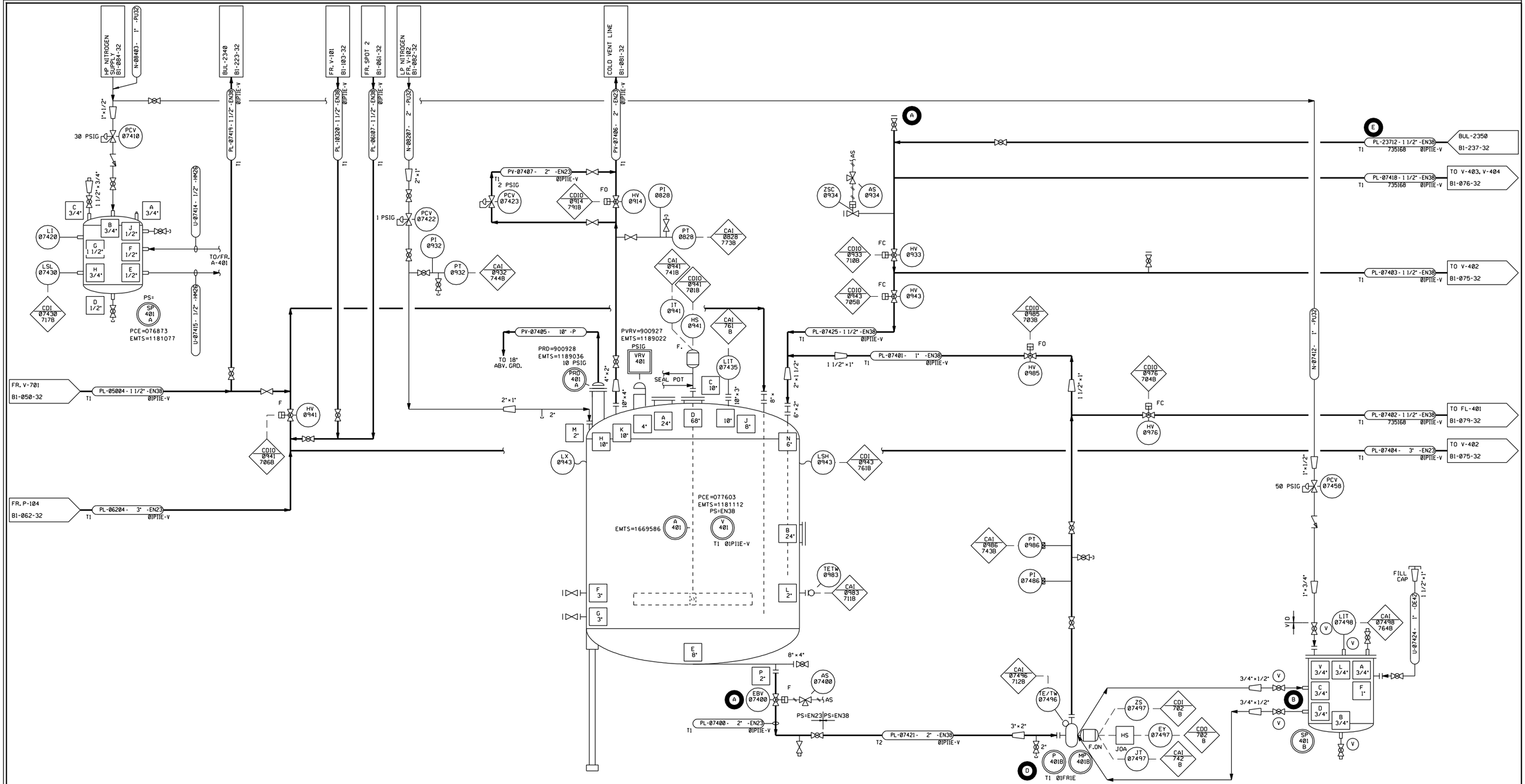
THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

32 INCINERATOR — 32 BLDG.

HOT TAR STORAGE V-303 PIPING AND INSTRUMENT DIAGRAM

PROJECT NUMBER	SCALE		REV.
32		B1-072-32	H



A — EBV OPERATED BY AIR SWITCHS LOCATED AT SE CORNER OF CONTAINMENT DIKE.

B — PUMP SUPPLIER TO PROVIDE SEAL POT AND INTERCONNECTING TUBING.

D — PUMP HAS 3"-300# RF INLET AND 1 1/2"-300# RF OUTLET.

E — ADD FLANGES EVERY 40', CLEANOUTS LOCATED BY CLIENT. PROVIDE 1" DRAIN EVERY 40'-60'. NO MORE THAN ONE 90° ELBOW BETWEEN FLANGES.

UNLESS OTHERWISE NOTED ALL MOD I/O ON THIS DRAWING IS ON SYSTEM:B

LAST LINE NO. USED: 07425

LAST INST. NO. USED: 07498

UNLESS OTHERWISE NOTED, ALL ITEMS ON THIS DRAWING ARE: EXISTING

UNLESS OTHERWISE NOTED, ALL BRANCH CONNECTIONS ON THIS DRAWING ARE: 3/4"

REV. MARK	REVISION	BY	CHK	APP	DATE
4	4TH PASS - 4TH UPDATE	KP			10/08/01
A	GENERAL REVISIONS PER AS-BUILT	KP			04/22/02
6	4TH PASS - 6TH UPDATE	LJM			04/05/04
B	GENERAL REVISIONS PER AS-BUILT.	JJC			10/12/04
C	GENERAL REVISIONS PER AS-BUILT.	DSP			09/22/06
D	GENERAL REVISIONS PER AS-BUILT.	DSP			01/19/07
E	GENERAL REVISIONS PER AS-BUILT.	SR			05/04/07
F	GENERAL REVISIONS PER AS-BUILT.	NRK			06/27/08
G	GENERAL REVISIONS PER AS-BUILT.	LJM			05/12/09
H	GENERAL REVISIONS PER AS-BUILT.	NRK			12/17/09
I	GENERAL REVISIONS PER AS-BUILT.	KSJ			01/31/11
J	GENERAL REVISIONS PER AS-BUILT.	RAM			08/22/12
K	GENERAL REVISIONS PER AS-BUILT.	RAM			10/05/12
L	GENERAL REVISIONS PER AS-BUILT.	LJM			08/23/13
M	GENERAL REVISIONS PER AS-BUILT.	NRK			09/11/13

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED

DRAWN

CHECKED: TEAM CHECKED

APPROVED: D.HADLEY/S.SYLVESTER

PROJ. ENGR.: MIKE VAN HERK

MFG. REP.: ALAN POTOFF

STATUS | PLANT NO.

P.E. SEAL

ORIGINAL DRAWING NUMBER WAS B1-105-879056

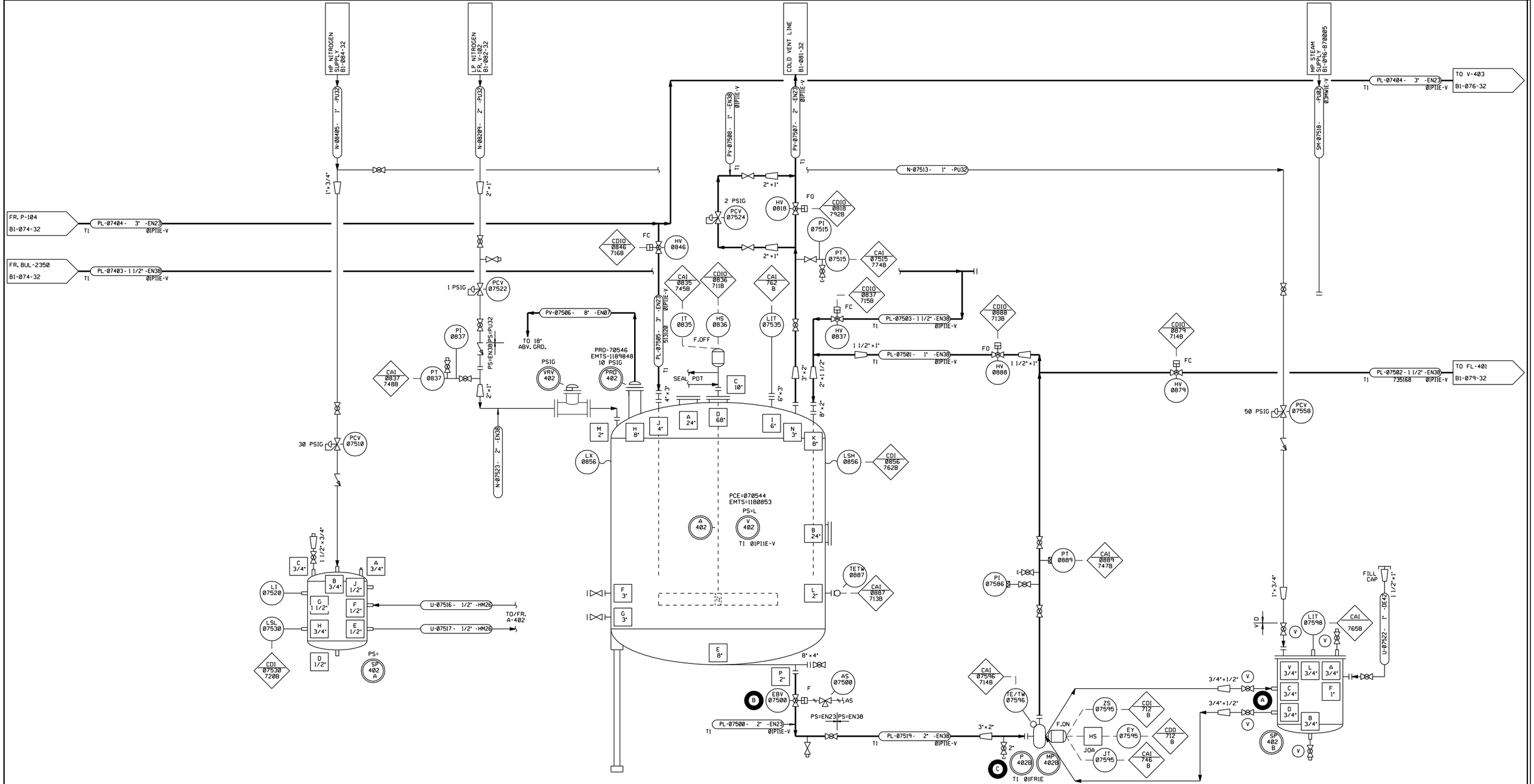
THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

32 INCINERATOR — 32 BLDG.

COLD TAR STORAGE V-401 PIPING AND INSTRUMENT DIAGRAM

PROJECT NUMBER: 32 | SCALE | B1-074-32 | REV. M



A PUMP SUPPLIER TO PROVIDE SEAL POT AND INTERCONNECTING TUBING.

B EBV OPERATED BY AIR SWITCHS LOCATED AT SE CORNER OF CONTAINMENT DIKE.

C PUMP HAS 3"-300# RF INLET AND 1 1/2"-300# RF OUTLET.

UNLESS OTHERWISE NOTED ALL MOD I/O ON THIS DRAWING IS ON SYSTEM8

LAST LINE NO. USED: 07523

LAST INST. NO. USED: 07598

UNLESS OTHERWISE NOTED, ALL ITEMS ON THIS DRAWING ARE: EXISTING

UNLESS OTHERWISE NOTED, ALL BRANCH CONNECTIONS ON THIS DRAWING ARE: 3/4"

REV. MARK	REVISION	BY	CHK	APP	DATE
5	4TH PASS - 5TH UPDATE	KP			04/22/02
A	GENERAL REVISIONS PER AS-BUILT	LJM			04/05/04
B	GENERAL REVISIONS PER AS-BUILT.	JJC			10/12/04
C	GENERAL REVISIONS PER AS-BUILT.	SR			09/22/06
D	GENERAL REVISIONS PER AS-BUILT.	DSP			01/19/07
E	GENERAL REVISIONS PER AS-BUILT.	SR			05/04/07
F	GENERAL REVISIONS PER AS-BUILT.	NRK			06/27/08
G	GENERAL REVISIONS PER AS-BUILT.	LJM			05/12/09
H	GENERAL REVISIONS PER AS-BUILT.	NRK			12/17/09
I	GENERAL REVISIONS PER AS-BUILT.	KSJ			01/31/11
J	GENERAL REVISIONS PER AS-BUILT.	RAM			08/22/12
K	GENERAL REVISIONS PER AS-BUILT.	RAM			10/05/12
L	GENERAL REVISIONS PER AS-BUILT.	KPC			10/29/12
M	GENERAL REVISIONS PER AS-BUILT.	LJM			08/23/13
N	GENERAL REVISIONS PER AS-BUILT.	NRK			09/11/13

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED

DRAWN

CHECKED TEAM CHECKED

APPROVED D.HADLEY/S.SYLVESTER

PROJ. ENGR. MIKE VAN HERK

MFG. REP. ALAN POTOFF

STATUS

PLANT NO.

P.E. SEAL

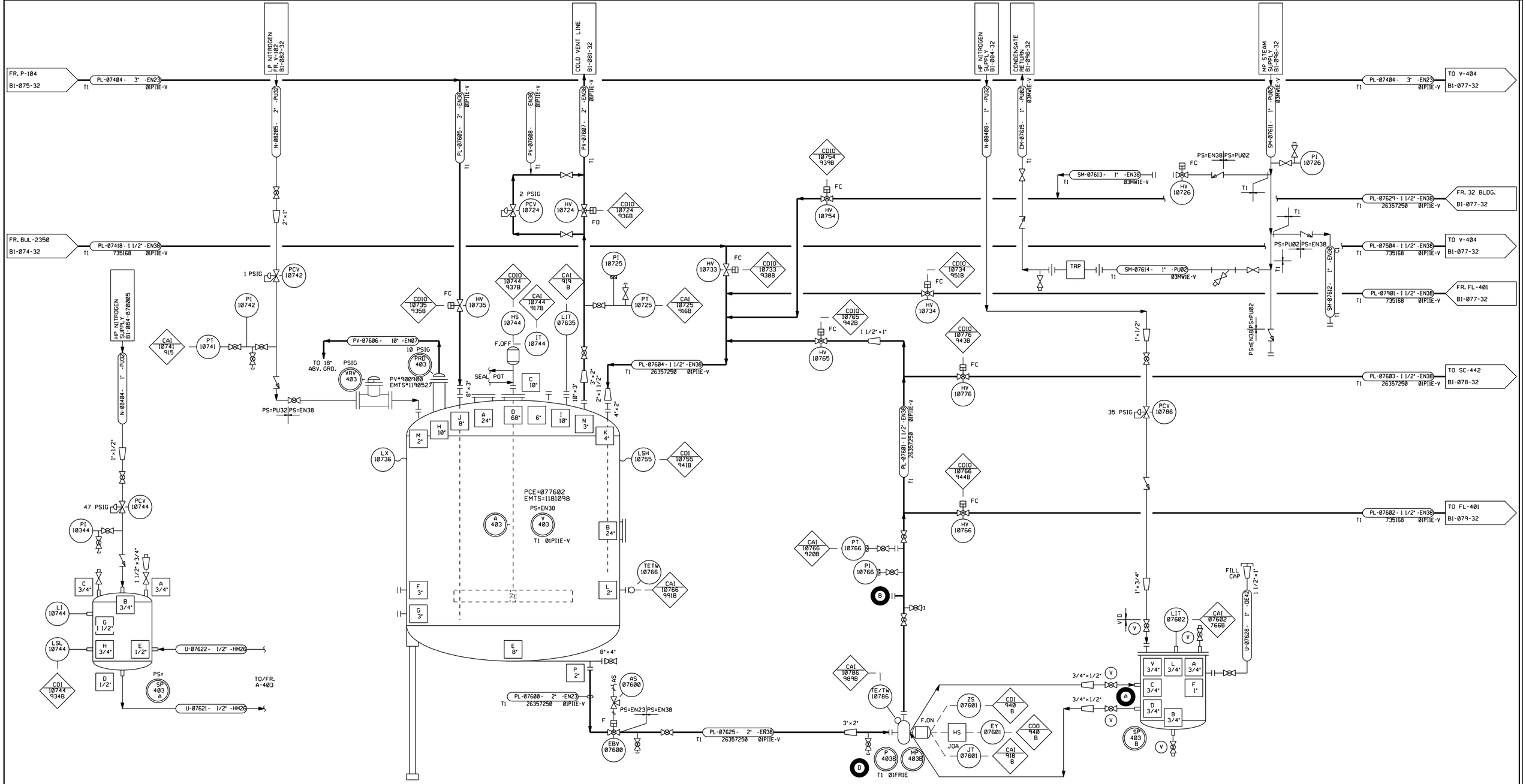
THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS MIDLAND, MICHIGAN

32 INCINERATOR 32 BLDG.

COLD TAR STORAGE V-402 PIPING AND INSTRUMENT DIAGRAM

PROJECT NUMBER	SCALE		REV.
32		B1-075-32	N



(A) PUMP SUPPLIER TO PROVIDE SEAL POT AND INTERCONNECTING TUBING.

(B) FLANGES FOR FUTURE EXPERIMENTAL AUTOMATION TO BLOW OUT TAR LINES FROM MOD.

(D) PUMP HAS 3"-300* RF INLET AND 1 1/2"-300*RF OUTLET.

UNLESS OTHERWISE NOTED ALL MOD I/O ON THIS DRAWING IS ON SYSTEM:B

LAST LINE NO. USED: 07629

LAST INST. NO. USED: 07635

UNLESS OTHERWISE NOTED, ALL ITEMS ON THIS DRAWING ARE: EXISTING

UNLESS OTHERWISE NOTED, ALL BRANCH CONNECTIONS ON THIS DRAWING ARE: 3/4"

REV. MARK	REVISION	BY	CHK	APP	DATE
3	4TH PASS - 3RD UPDATE	CMC			06/14/01
4	4TH PASS - 4TH UPDATE	KP			10/08/01
5	4TH PASS - 5TH UPDATE	KP			04/22/02
A	GENERAL REVISIONS PER AS-BUILT.	LJM			04/05/04
B	GENERAL REVISIONS PER AS-BUILT.	JJC			10/12/04
C	GENERAL REVISIONS PER AS-BUILT.	DSP			09/22/06
D	GENERAL REVISIONS PER AS-BUILT.	DSP			01/19/07
E	GENERAL REVISIONS PER AS-BUILT.	SR			05/04/07
F	GENERAL REVISIONS PER AS-BUILT.	NRK			06/27/08
G	GENERAL REVISIONS PER AS-BUILT.	LJM			05/12/09
H	GENERAL REVISIONS PER AS-BUILT.	NRK			12/17/09
I	GENERAL REVISIONS PER AS-BUILT.	KSJ			01/31/11
J	GENERAL REVISIONS PER AS-BUILT.	RAM			08/22/12
K	GENERAL REVISIONS PER AS-BUILT.	LJM			08/23/13
L	GENERAL REVISIONS PER AS-BUILT.	NRK			09/11/13

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED		STATUS
DRAWN		P.E. SEAL
CHECKED	TEAM CHECKED	
APPROVED	D.HADLEY/S.SYLVESTER	
PROJ. ENGR.	MIKE VAN HERK	
MFG. REP.	ALAN POTOFF	

PLANT NO.

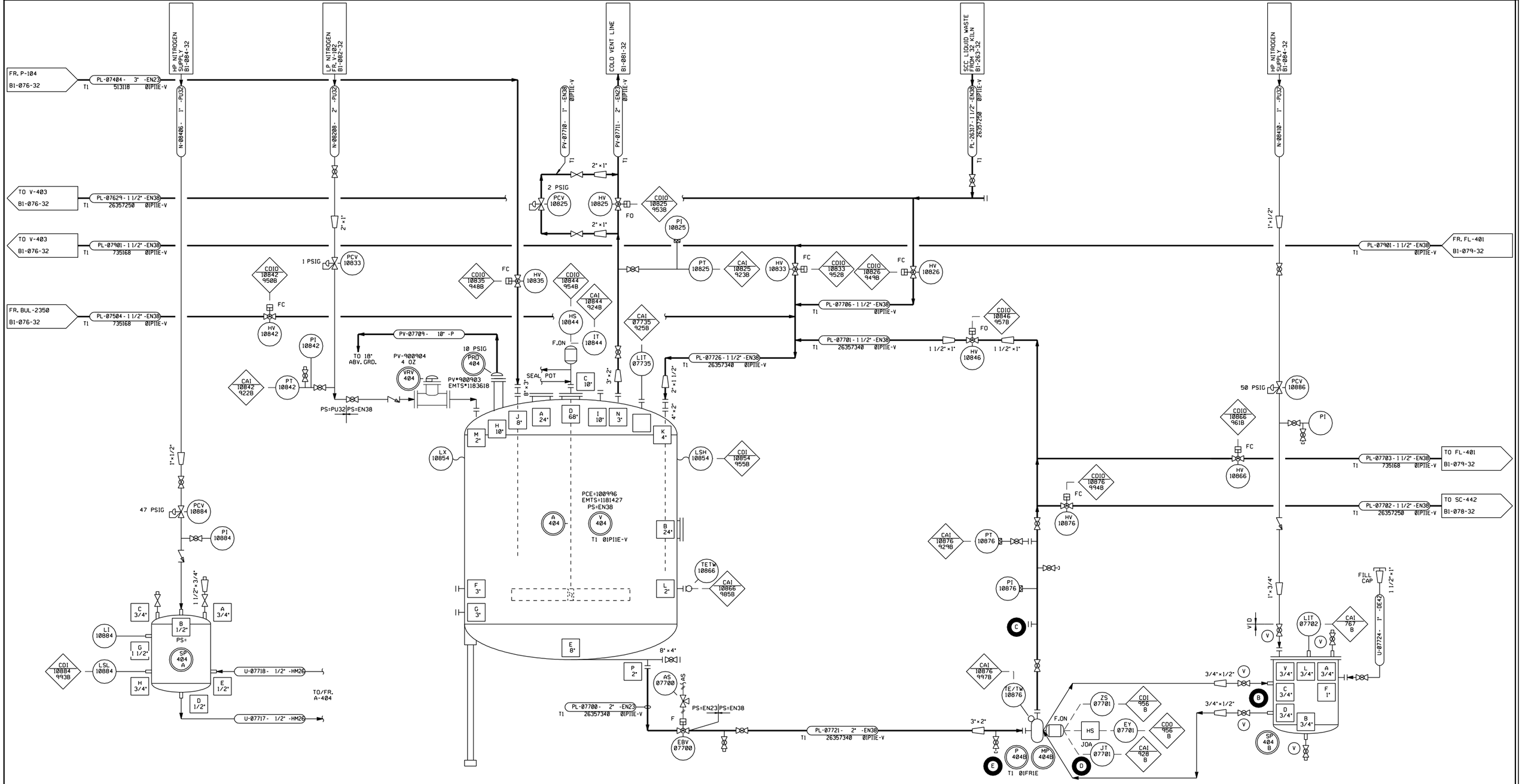
THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

32 INCINERATOR — 32 BLDG.

COLD TAR STORAGE
V-403
PIPING AND INSTRUMENT DIAGRAM

PROJECT NUMBER	SCALE		REV.
32		B1-076-32	L



B PUMP SUPPLIER TO PROVIDE SEAL POT AND INTERCONNECTING TUBING.

C FLANGES FOR FUTURE EXPERIMENTAL AUTOMATION TO BLOW OUT TAR LINES FROM THE MOD.

E PUMP HAS 3"-300# RF INLET AND 1 1/2"-300#RF OUTLET.

UNLESS OTHERWISE NOTED ALL MOD I/O ON THIS DRAWING IS ON SYSTEM:B

LAST LINE NO. USED: 07726

LAST INST. NO. USED: 07735

UNLESS OTHERWISE NOTED, ALL ITEMS ON THIS DRAWING ARE: EXISTING

UNLESS OTHERWISE NOTED, ALL BRANCH CONNECTIONS ON THIS DRAWING ARE: 3/4"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	4TH PASS - 2ND UPDATE	DJF			03/28/01
B	4TH PASS - 3RD UPDATE	KP			06/14/01
C	4TH PASS - 4TH UPDATE	CMC			10/08/01
D	4TH PASS - 5TH UPDATE	KP			04/22/02
E	GENERAL REVISIONS PER AS-BUILT.	LJM			04/21/04
F	GENERAL REVISIONS PER AS-BUILT.	JJC			10/12/04
G	GENERAL REVISIONS PER AS-BUILT.	DSP			09/22/06
H	GENERAL REVISIONS PER AS-BUILT.	DSP			01/19/07
I	GENERAL REVISIONS PER AS-BUILT.	NRK			06/27/08
J	GENERAL REVISIONS PER AS-BUILT.	LJM			05/12/09
K	GENERAL REVISIONS PER AS-BUILT.	NRK			12/17/09
L	GENERAL REVISIONS PER AS-BUILT.	KSJ			01/31/11
M	GENERAL REVISIONS PER AS-BUILT.	LJM			08/23/13
N	GENERAL REVISIONS PER AS-BUILT.	NRK			09/11/13

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	BID	FAB	CONST	REF
			DATE ISSUED FOR			

DESIGNED

DRAWN

CHECKED: TEAM CHECKED

APPROVED: D.HADLEY/S.SYLVESTER

PROJ. ENGR.: MIKE VAN HERK

MFG. REP.: ALAN POTOFF

STATUS

P.E. SEAL

PLANT NO.

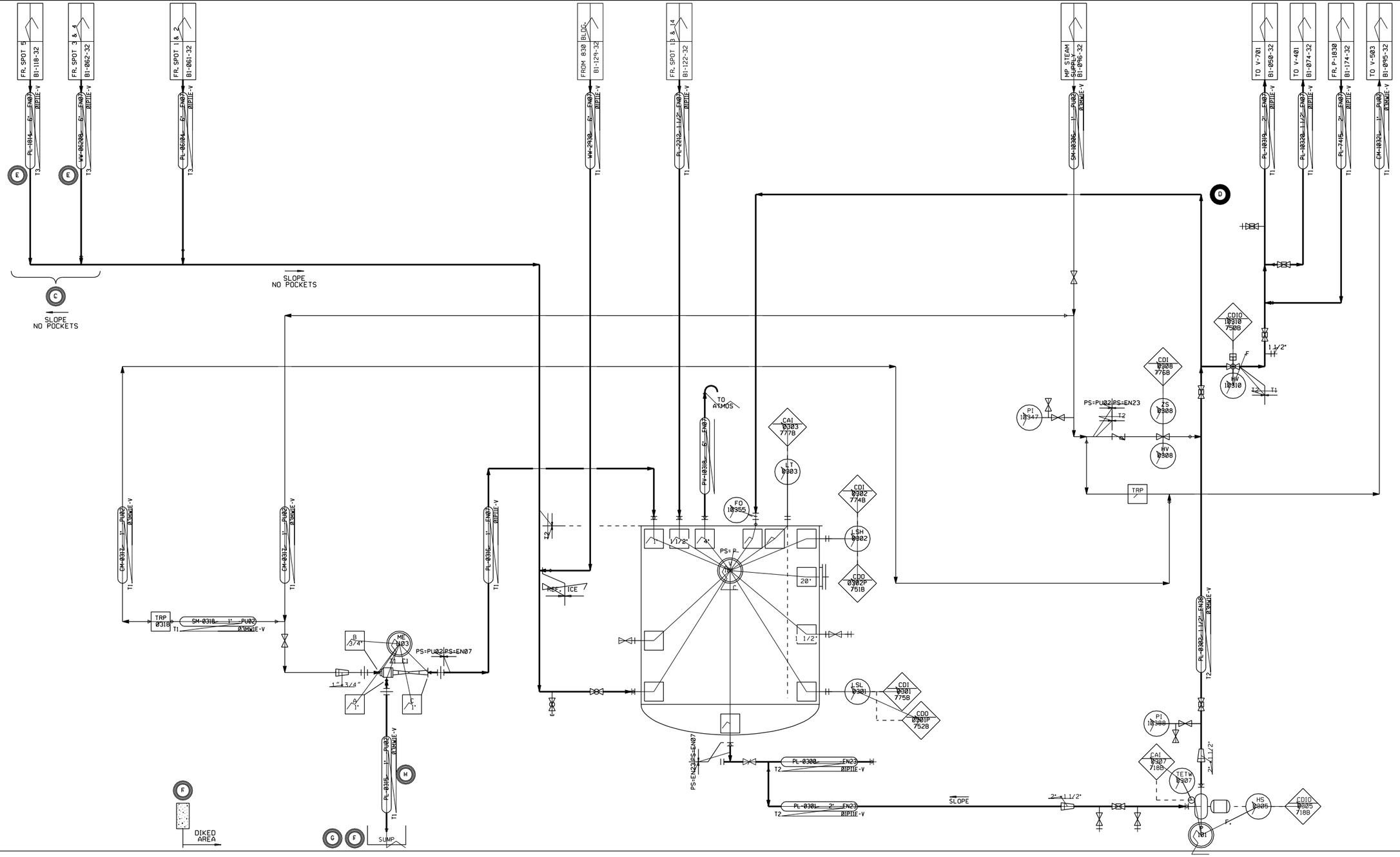
THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

32 INCINERATOR — 32 BLDG.

COLD TAR STORAGE V-404 PIPING AND INSTRUMENT DIAGRAM

PROJECT NUMBER	SCALE		REV.
32		B1-077-32	N



C INTERCONNECT SEWER LINE FROM SPOTS 3,4 & 5 TO V-601 USING 6" SCH 40 STEEL PIPE. SLOPE LINE TOWARDS V-601.

D DISCONNECT LINE TO V-701 & BLANK FLANGE.

E REMOVE EXISTING INSULATION & THEN TRACE & COVER.

F INSTALL NEW DIKE FOR V-101 BUILD-UP EXISTING DIKE FLOOR TO PROVIDE SLOPE TO EDUCTOR, DO NOT PUNCTURE EXISTING DIKE FLOOR.

G LOCATE DIP PIPE 1" FROM BOTTOM OF FLOOR AT THE LOW POINT.

H TRACE DIP PIPE PL-0315 AND EDUCTOR ME-1103 WITH 316 SS TUBING INSTEAD OF COPPER.

LAST LINE NO. USED: 10321
LAST INST. NO. USED: 10388

UNLESS OTHERWISE NOTED, ALL ITEMS ON THIS DRAWING ARE: EXISTING

UNLESS OTHERWISE NOTED, ALL BRANCH CONNECTIONS ON THIS DRAWING ARE: 3/4"

REV. MARK	REVISION	BY	CHK	APP	DATE
A	CHANGED LINE PL-0301-2"-L FROM 1 1/2"	KRK			2/89
B	ADDED IP-122, SM-0318-1"-H, WW-2930-4". TP-137 WAS TP-1, TP-136 WAS TP-2, & PL-2212-1 1/2" WAS 1".	KRK			3/89
C	ADDED TP 121, 135, 159. REV. TP. 136, 27, 122. DELETED TP 137. SM-0319 WAS SM-8505. WW-2930 WAS 4"	KRK			4/89
D	ADDED T1, TP-161, AND SPEC D.	KRK			4/89
E	GENERAL REVISIONS PER PHASE V.	RWD			8/90
F	GENERAL REVISIONS PER AS-BUILT.	JEL			02/92
G	GENERAL REVISIONS PER AS-BUILT.	RAM			04/96
H	GENERAL REVISIONS PER AS-BUILT.	DSP			09/22/06
I	GENERAL REVISIONS PER AS-BUILT.	DSP			01/19/07
J	GENERAL REVISIONS PER AS- BUILT.	SR			05/04/07
K	GENERAL REVISIONS PER AS-BUILT.	NRK			06/27/08
L	GENERAL REVISIONS PER AS-BUILT	LJM			08/23/13

DRAWING ISSUE RECORD

ISSUE NO.	REV	MATERIAL OR JOB SPEC	DATE ISSUED FOR: BID	FAB	CONST	REF

DESIGNED	C. REESE	08/87
DRAWN	M. MARHOFER	08/87
CHECKED		
APPROVED		
PROJ. ENGR.	G. FRYMAN	
MFG. REP.	D. MEDEMA	

STATUS | PLANT NO.

P.E. SEAL

ORIGINAL DRAWING NUMBER WAS B1-103-870005

THE DOW CHEMICAL COMPANY

MICHIGAN OPERATIONS — MIDLAND, MICHIGAN

32 INCINERATOR — 32 BLDG.

WASTE WATER STORAGE V-101 & P-101 PIPING AND INSTRUMENT DIAGRAM

PROJECT NUMBER	SCALE		REV.
32		B1-103-32	L

APPENDIX C2-C – NEW TANK SYSTEM INTEGRITY ASSESSMENTS

- V-303 (7 pages)
- V-401 (6 pages)
- V-403 (7 pages)
- V-404 (7 pages)
- V-701 (6 pages)
- 1163 Building (5 pages)
- 33 Building (5 pages)

ASSESSMENT OF HOT LIQUID WASTE STORAGE TANK V-303 SYSTEM INTEGRITY

In accordance with the rules promulgated under the Michigan Public Act 64, Rule 615 which incorporates U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act 40 CFR 264.192 and 264.193, the following assessment of Tank V-303 is presented attesting that the tank system has sufficient structural integrity and is acceptable for storing hazardous wastes.

GENERAL INFORMATION

Owner:	Dow Chemical U.S.A. Midland, Michigan 48667
Location:	Incineration Complex 703 Bldg. Tank Farm Dow Chemical, Michigan Division
Tank Designation:	V-303 Hot Liquid Waste Storage Tank

DESIGN STANDARDS

Tank:	ASME Section VIII, Division 1, 1986 Addenda
Secondary Containment:	ACI-318
Ancillary Equipment:	ANSI B31.3

HAZARDOUS CHARACTERISTICS OF WASTE

The tank system, including the tank, ancillary equipment and secondary containment, is compatible with its contained waste. The composition of the waste is provided in Table 1 below.

TABLE 1

CHEMICAL	VOLUME %
Phenolic Tars	42.04
Trichlorophenol	21.89
Diphenyl Oxide	9.95

Other Higher CL-OH's	7.51
Biphenyl Phenyl Ether	6.24
CHEMICAL	**VOLUME %**
Paraphenyl Phenol	4.99
Perchloroethylene (Tetrachloroethylene)	2.90
Napthalene	1.88
Dichlorophenol	1.17
Diphenyl Sulfide	0.63
FECL3	0.63
Chlorinated 2, 4-D Tars	0.11
Water	0.07

The average liquid specific gravity is 1.5.

The corrosion rate based on in service exposure of this waste to similar metallurgy and National Association of Corrosion Engineers (NACE) data would be approximately 12 mils/year. Therefore the estimated service life of this vessel is 20 years. This analysis does not take into account any additional chemicals not listed in the above table.

EXTERNAL CORROSION PROTECTION

Because all tank system metal components are above ground and therefore are not in contact with soil or with water, a corrosion potential assessment by a corrosion expert is not required to determine the corrosion potential of the soil environment surrounding the system.

DOCUMENTED AGE OF THE TANK SYSTEM

The tank was built in the Spring of 1990. The secondary containment was constructed in 1958 and was modified in 1974 and 1983. Installation of the tank system, including ancillary equipment, was completed Fall, 1990.

TANK INFORMATION

Hot Liquid Waste Storage Tank V-303 is a cylindrical steel tank supported in the vertical position by four (4) steel support legs. General information regarding the tank is as follows:

PRESSURE VESSEL DATA

Design Pressure, psig	25
Design Temperature, deg. F.	400
Hydrostatic Test Pressure, psig	38
Longitudinal Joint Efficiency, %	70
Stress Relief	No
Radiographic	None

Strength Limiting Vessel Part.	Bottom Head

General Data

Head Plate Material, ASME	SA-516-70
Shell Plate Material, ASME	SA-516-70
Reinforcing Plate Material, ASME	SA-516-70
Nozzle Neck Material, ASME	SA-105/SA-516-70
Flange Material, ASME	SA-105/SA-516-70
Manhole Cover Material, ASME	SA-105
Bolting Material, ASTM	SA-193-B7/SA-307B
Nut Material, ASTM	SA-194-2H/SA-307B
Gasket Material	JM-61
Weight Empty, Lbs.	33,500
Weight Full of Water, Lbs.	219,000
Operating Weight	221,000
Diameter, ft-in	13' - 0"
Length, ft-in	20' - 10-3/4"
Volume, Gal	22,000
Shell Nominal Thickness, in.	0.5
Heads Nominal Thickness, in.	0.547
Corrosion Allowance, in.	0.25

Operating Parameters

Pressure	2.0 psig to 6.9 in. w.c.
Temperature	100 degrees C
pH	- - -
Nitrogen Blanket	Yes
Agitated	Yes

The tank conforms to the latest ASME unfired pressure vessel codes to provide safe containment of the above described hazardous waste.

Tank venting is provided to prevent excessive pressure or vacuum buildup due to maximum emptying, filling, thermal inbreathing and outbreathing rates. The tank is equipped with a vacuum breaker with a vacuum release setting of 6.9 in. w.c. The tank has an automatic control system to maintain the pressure in the tank at 2 psig. Excess pressure is sent to either a carbon bed for adsorption or the incinerator for burning. The tank is also equipped with a dual system of emergency pressure relief. The primary relief is a rupture disk (PRD) set at 20 psig.

Tank overfill is prevented by a dual system of electronic level measurement. The volume (weight) in the tank is continuously monitored with weigh cells. Upon reaching a "high" weight, a control computer closes the fill valve and activates an alarm horn. If the level continues to rise,

a radioactive source will sense a high level which will also close the fill valve and activates an alarm horn.

The tank is carbon steel with an exterior paint coating. The carbon steel will provide an anticipated service life of 20 years.

The tank foundation will maintain the load of a full tank. The foundation is a reinforced concrete mat. The tank is anchored to the mat to prevent dislodgement.

ANCILLARY EQUIPMENT INFORMATION

The ancillary equipment generally includes a pump, pipe, fittings, and flanges that are used to contain the hazardous waste while in transit. Per Dow Chemicals directive, this certification was limited to piping and equipment within the confines of the tank secondary containment structure.

The piping outside the secondary-containment facility is exempt from the secondary-containment requirements because it is above ground and is visually inspected on a daily basis for leaks per the Act 64 Operating License.

The pipe and fittings used for the piping system are constructed of carbon steel.

The piping system is supported overhead by structural steel trestles. The trestles provide support for the piping system and provide protection against physical damage and excessive stress due to settlement, vibration, expansion, and contraction.

The ancillary equipment conforms to the latest ANSI B31.3 codes to provide safe containment of the above described hazardous wastes.

The service life for the piping system is 12 years.

TANK SECONDARY CONTAINMENT INFORMATION

The secondary containment system, which is constructed to prevent any migration of wastes or accumulated liquid out of the system, to the soil or groundwater, consists of a reinforced, on-grade concrete slab with containment walls (diking). The containment system surrounds the tank completely and covers all surrounding earth likely to come into contact with the waste if released from the tank. All concrete surfaces are coated with approximately 10 to 20 mils of Sherwin Williams Industrial Floor Enamel. All construction joints are either caulked or are provided with PVC waterstop. Caulked joints were found to be in good condition at the time of inspection and are inspected at regular intervals in accordance with the Act 64 operating license.

The secondary containment system is constructed of materials that are compatible with the above-described waste for a contact period as listed below and have sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste to which it is exposed, climatic conditions, and the stress of daily operation. The foundation is capable of

providing support to the secondary containment system, resistance to pressure gradients above and below the system and capable of preventing failure due to settlement, compression or uplift. Any spillage of waste will be removed from the containment system in accordance with Special Condition F of Part IV of the Michigan Act 64 operating license.
The Sherwin Williams floor coating only, has the following resistance properties based on the type of materials managed in the waste storage tanks.

Chemical Contact Type	Resistance Time
Spill and Splash Contact	24 hours
Intermittent Contact	12 hours
Continuous Contact	6 hours

The total containment provided is approximately 166,000 gallons which is 750% of the largest storage tank volume. The containment system also has sufficient volume to contain precipitation from a 25-year, 24-hour rainfall event.

The containment slab is sloped to a cast-in-place concrete trench which collect liquids resulting from leaks, spills or precipitation. The trench drains to a concrete collection sump. Precipitation collected in the sump is tested for TOD (Total Oxygen Demand). Per the Act 64 Incinerator Operating License, if the TOD of the precipitation is greater than 1600 ppm, it is removed from the sump and incinerated within 48 hours, if the TOD is less than 1600 ppm, it is removed from the sump within 96 hours and directed to the licensed wastewater treatment facility.

ANCILLARY EQUIPMENT SECONDARY CONTAINMENT INFORMATION

Per Dow Chemical's directive, this certification was limited to piping and equipment within the confines of the tank secondary containment structure. The piping outside the secondary-containment facility is exempt from the secondary-containment requirements because it is above ground and is visually inspected on a daily basis for leaks per the Act 64 Operating License.

INSTALLATION OF TANK SYSTEM

Installation of the tank system by Dow Chemical followed written procedures as outlined in the project specifications and in accordance with manufacturers' instructions. These procedures include inspection of the system for the presence of weld breaks, punctures, scrapes of protection coatings, cracks, corrosion, misalignment, incorrect elevations, improper alignment or any other structural damage or inadequate construction or installation.

TIGHTNESS TEST

The tank vessel was tested by the Manufacturer for tightness in accordance with written procedures and code requirements. The ancillary equipment was hydrotested by a mechanical contractor retained by Dow Chemical under the supervision of Dow Chemical personnel. The

hydrotest consisted of pressurizing the piping to 150% of the pipe design pressure. The piping had to hold this pressure for one-half of an hour.

...END OF ASSESSMENT...

HAZARDOUS WASTE STORAGE TANK DESIGN AND INSTALLATION

AMENDED CERTIFICATION STATEMENT

V-303 HOT LIQUID WASTE STORAGE TANK

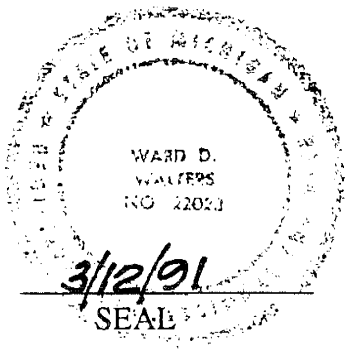
I, Ward D. Walters, P.E., have reviewed a portion of the design and installation of a tank system located at Incineration Complex, 703 Building Tank Farm, Dow Chemical, Michigan Division, Midland, Michigan. My duties were to review and certify the written assessment for the V-303 Hot Liquid Waste Storage Tank, as required by the Resource Conservation and Recovery Act (RCRA) regulation(s), namely 40 CFR 264.192, paragraphs (a)(1), (a)(2), (a)(5), (b-partial), (d), and (e); and 264.193 paragraphs (b-partial), (c), (d), and (e).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

WW ENGINEERING & SCIENCE
Facilities Engineering and
Construction Management Division

By: Ward D. Walters
Ward D. Walters, P.E.

Design Certification Leader
Title



22023
Registration Number

5555 Glenwood Hills Parkway, SE
Grand Rapids, MI 49512
Address

ASSESSMENT OF COLD LIQUID STORAGE TANK V-401 SYSTEM INTEGRITY

In accordance with the rules promulgated under the Resource Conservation and Recovery Act (40 CFR 264.192), the following assessment of Tank V-401 is presented attesting that the tank system has sufficient structural integrity and is acceptable for storing hazardous wastes.

GENERAL INFORMATION

Owner:	Dow Chemical U.S.A. Midland, Michigan 48667
Location:	Incineration Complex 703 Bldg. Tank Farm Dow Chemical, Michigan Division
Tank Designation:	V-401 Cold Liquid Storage Tank

DESIGN STANDARDS

Tank:	ASME Section VIII, Division 1
Secondary Containment:	ACI-318

HAZARDOUS CHARACTERISTICS OF WASTE

The tank system, including the tank and secondary containment, is compatible with its contained waste. The composition of the waste is provided in Table 1 below.

TABLE 1

CHEMICAL	VOLUME %
Water	58.10
Dowanol EPH, PPH	6.07
Ethanol	5.60
Dowanol TMH	5.05
Etox Reactor Tar (Heavy Tar)	4.00
Mineral Oil	3.95
Alkanol Amines	2.86

CHEMICAL	VOLUME %
Polyglycol AE501	2.82
Dowanol TEH	2.62
Butylene Glycol	2.19
Methylene Chloride	1.75
Carbon Tetrachloride	1.71
C1 Butylene Oxide	0.69
Polyglycol P6-26-2	0.62
Mobiltherm 603 (Lube Oil)	0.57
Diisopropanol Amine	0.54
Phenol	0.23
Brake Fluid (Lube Oil)	0.18
Chlorothene (111 Trichloroethane)	0.11
Ferric Sulfate	0.10
Propylene Glycol	0.08
Diethylene Glycol	0.08
Diethanol Amine	0.03
NACL	0.02
Na2S03	0.02

The average liquid density is 1.1.

The corrosion rate based on in service exposure of this waste to similar metallurgy and National Association of Corrosion Engineers (NACE) data would be less than 2 mils/year. Therefore, the estimated service life of this vessel is 20 years. This analysis does not take into account any additional chemicals not listed in the above table.

EXTERNAL CORROSION PROTECTION

Because all tank system metal components are above ground and therefore are not in contact with soil or with water, a corrosion potential assessment by a corrosion expert is not required to determine the corrosion potential of the soil environment surrounding the system.

DOCUMENTED AGE OF THE TANK SYSTEM

The tank was built in the Winter of 1989. The secondary containment was constructed in 1958 and was modified in 1974 and 1983. Installation of the tank was completed February 22, 1990.

TANK INFORMATION

Cold Liquid Storage Tank V-401 is a cylindrical steel tank supported in the vertical position by four (4) steel support legs. General information regarding the tank is as follows:

PRESSURE VESSEL DATA

Design Pressure, psig	25
Design Temperature, deg. F.	100
Hydrostatic Test Pressure, psig	38
Longitudinal Joint Efficiency, %	70
Stress Relief	No
Radiographic	Part-Head to Shell
Strength Limiting Vessel Part.	Shell

GENERAL DATA

Head Plate Material, ASME	SA-240-316L
Shell Plate Material, ASME	SA-240-316L
Reinforcing Plate Material, ASME	SA-240-316L
Nozzle Neck Material, ASME	SA-312-316L
Flange Material, ASME	SA-105/SA-516-70
Manhole Cover Material, ASME	SA-105/SA-516-70 (Clad with 316L Stainless Steel)
Bolting Material, ASTM	SA-193-B7/SA-307B
Nut Material, ASTM	SA-194-2H/SA-307B
Gasket Material	Teflon envelope supplied by manufacturer. Some Teflon gaskets replaced with Asbestos where revisions were made.
Weight Empty, Lbs.	19,000
Weight Full of Water, Lbs.	176,000
Diameter, ft-in	13' - 0"
Length, ft-in	20' - 9-1/2"
Volume, Gal	18,000
Shell Nominal Thickness, in.	0.25
Heads Nominal Thickness, in.	0.375

OPERATING PARAMETERS

Pressure	2.0 psig to 6.5 in. w.c.
Temperature	40 degrees C
pH	Near 7
Nitrogen Blanket	Yes
Agitated	Yes

The tank conforms to the latest ASME unfired pressure vessel codes to provide safe containment of the above described hazardous waste.

Tank venting is provided to prevent excessive pressure or vacuum buildup due to maximum emptying, filling, thermal inbreathing and outbreating rates. The tank is equipped with a

vacuum breaker with a vacuum release setting of 6.5 in. w.c. The tank has automatic control system to maintain the pressure in the tank at 2 psig. Excess pressure is sent to either a carbon bed for adsorption or the incinerator for burning. The tank is also equipped with a dual system of emergency pressure relief. The primary relief is a pressure relief valve (PRV) set at 5 psig. The secondary relief is a rupture disk set at 10 psig.

Tank overfill is prevented by a dual system of electronic level measurement. The volume (weight) in the tank is continuously monitored with weigh cells. Upon reaching a "high" weight, a control computer closes the fill valve and activates an alarm horn. If the level continues to rise, a radioactive source will sense a high level which will also close the fill valve and activates an alarm horn.

The tank is 316L stainless steel which does not require exterior coating or painting. The 316L stainless is compatible with the containment waste and will provide an anticipated service life of twenty (20) years.

The tank foundation will maintain the load of a full tank. The foundation is a reinforced concrete mat. The tank is anchored to the mat to prevent dislodgement.

ANCILLARY EQUIPMENT INFORMATION

Ancillary equipment is not included in this certification.

TANK SECONDARY CONTAINMENT INFORMATION

The secondary containment system, which is constructed to prevent any migration of wastes or accumulated liquid out of the system, to the soil or groundwater, consists of a reinforced, on-grade concrete slab with containment walls (diking). The containment system surrounds the tank completely and covers all surrounding earth likely to come into contact with the waste if released from the tank. All construction joints are either caulked or are provided with PVC waterstop. Caulked joints were found to be in good condition at the time of inspection, but should be reinspected at regular intervals.

The total containment provided is approximately 166,000 gallons which is 950% of the largest storage tank volume. The containment system also has sufficient volume to contain precipitation from a 25-year, 24-hour rainfall event.

The containment slab is sloped to a cast-in-place concrete trench which collect liquids resulting from leaks, spills or precipitation. The trench drains to a concrete collection sump. Spilled or leaked waste is removed from the concrete sump within 24 hours. Precipitation collected in the sump is tested for TOD (Total Oxygen Demand). Per the 703 Incinerator Operating Permit, if the TOD of the precipitation is greater than 1600 ppm, it is removed from the sump and incinerated within 48 hours, if the TOD is less than 1600 ppm, it is removed from the sump within 96 hours.

The secondary containment system is constructed of materials that are compatible with the above described waste for a contact period of 24 hours and have sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste to which it is exposed, climatic conditions and the stress of daily operation. The foundation is capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system and capable of preventing failure due to settlement, compression or uplift.

INSTALLATION OF TANK SYSTEM

Installation of the tank system by Dow Chemical followed written procedures as outlined in the project specifications and in accordance with manufacturers' instructions. These procedures include inspection of the system for the presence of weld breaks, punctures, scrapes of protection coatings, cracks, corrosion, misalignment, incorrect elevations, improper alignment or any other structural damage or inadequate construction or installation.

TIGHTNESS TEST

The tank system was tested by the Manufacturer for tightness. The items tested include only the vessel. Testing was performed in accordance with written procedures and code requirements.

...END OF ASSESSMENT...

HAZARDOUS WASTE STORAGE TANK DESIGN AND INSTALLATION

CERTIFICATION STATEMENT

V-401 COLD LIQUID STORAGE TANK

I, Ward D. Walters, P.E., have reviewed a portion of the design and installation of a tank system located at Incineration Complex, 703 Building Tank Farm, Dow Chemical, Michigan Division, Midland, Michigan. My duties were to review and certify the written assessment for the V-401 Cold Liquid Storage Tank, as required by the Resource Conservation and Recovery Act (RCRA) regulation(s), namely 40 CFR 264.192, paragraphs (a)(1), (a)(2), (a)(5), (b), (d), and 264.193 paragraphs (c), and (e).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

WW ENGINEERING & SCIENCE
Facilities Engineering and
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By: _____
Ward D. Walters, P.E.

Design Certification Leader
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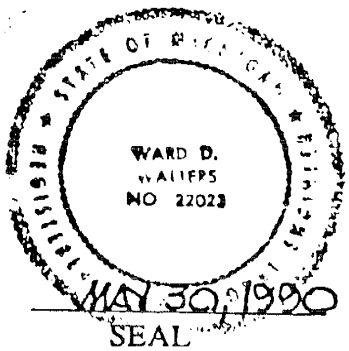


SEAL

ASSESSMENT OF COLD LIQUID WASTE STORAGE TANK V-403 SYSTEM INTEGRITY

In accordance with the rules promulgated under the Michigan Public Act 64, Rule 615 which incorporates U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act 40 CFR 264.192 and 264.193, the following assessment of Tank V-403 is presented attesting that the tank system has sufficient structural integrity and is acceptable for storing hazardous wastes.

GENERAL INFORMATION

Owner:	Dow Chemical U.S.A. Midland, Michigan 48667
Location:	Incineration Complex 703 Bldg. Tank Farm Dow Chemical, Michigan Division
Tank Designation:	V-403 Cold Liquid Waste Storage Tank

DESIGN STANDARDS

Tank:	ASME Section VIII, Division 1, 1986 Addenda
Secondary Containment:	ACI-318
Ancillary Equipment:	ANSI B31.3

HAZARDOUS CHARACTERISTICS OF WASTE

The tank system, including the tank, ancillary equipment and secondary containment, is compatible with its contained waste. The composition of the waste is provided in Table 1 below.

TABLE 1

CHEMICAL	VOLUME %
Water	58.10
Dowanol DPH, PPH	6.07
Ethanol	5.60

Dowanol TMH	5.05
Etox Reactor Tar (Heavy Tar)	4.00

CHEMICAL	VOLUME %
Mineral Oil	3.95
Alkanol Amines	2.86
Polyglycol AE501	2.82
Dowanol TEH	2.62
Butylene Glycol	2.19
Methylene Chloride	1.75
Carbon Tetrachloride	1.71
C1 Butylene Oxide	0.69
Polyglycol P6-26-2	0.62
Mobiltherm 603 (Lube Oil)	0.57
Diisopropanol Amine	0.54
Phenol	0.23
Brake Fluid (Lube Oil)	0.18
Chlorothene (111 Trichloroethane)	0.11
Ferric Sulfate	0.10
Propylene Glycol	0.08
Diethylene Glycol	0.08
Diethanol Amine	0.03
NACL	0.02
Na2S03	0.02

The average liquid specific gravity is 1.1.

The corrosion rate based on in service exposure of this waste to similar metallurgy and National Association of Corrosion Engineers (NACE) data would be approximately 2 mils/year. Therefore, the estimated service life of this vessel is 20 years. This analysis does not take into account any additional chemicals not listed in the above table.

EXTERNAL CORROSION PROTECTION

Because all tank system metal components are above ground and therefore are not in contact with soil or with water, a corrosion potential assessment by a corrosion expert is not required to determine the corrosion potential of the soil environment surrounding the system.

DOCUMENTED AGE OF THE TANK SYSTEM

The tank was built in the Spring of 1990. The secondary containment was constructed in 1958 and was modified in 1974 and 1983. Installation of the tank system, including ancillary equipment, was completed Fall, 1990.

TANK INFORMATION

Cold Liquid Waste Storage Tank V-403 is a cylindrical steel tank supported in the vertical position by four (4) steel support legs. General information regarding the tank is as follows:

PRESSURE VESSEL DATA

Design Pressure, psig	25
Design Temperature, deg. F.	100
Hydrostatic Test Pressure, psig	38
Longitudinal Joint Efficiency, %	70
Stress Relief	No
Radiographic	Spot-Head to Shell
Strength Limiting Vessel Part.	Shell

GENERAL DATA

Head Plate Material, ASME	SA-240-316L
Shell Plate Material, ASME	SA-240-316L
Reinforcing Plate Material, ASME	SA-240-316L
Nozzle Neck Material, ASME	SA-312-316L
Flange Material, ASME	SA-105/SA-516-70
Manhole Cover Material, ASME	SA-105/SA-516-70 (Clad with 316L Stainless Steel)
Bolting Material, ASTM	SA-193-B7/SA-307B
Nut Material, ASTM	SA-194-2H/SA-307B
Gasket Material	Teflon envelope supplied by manufacturer Some Teflon gaskets replaced with Asbestos gaskets where revisions were mad
Weight Empty, Lbs.	19,000
Weight Full of Water, Lbs.	176,000
Diameter, ft-in	13' - 0"
Length, ft-in	20' - 9-1/2"
Volume, Gal	18,000
Shell Nominal Thickness, in.	0.25
Heads Nominal Thickness, in.	0.312
Corrosion Allowance, in.	0.0

OPERATING PARAMETERS

Pressure	2.0 psig to 6.9 in. w.c.
Temperature	40 degrees C
pH	Near 7
Nitrogen Blanket	Yes
Agitated	Yes

The tank conforms to the latest ASME unfired pressure vessel codes to provide safe containment of the above described hazardous waste.

Tank venting is provided to prevent excessive pressure or vacuum buildup due to maximum emptying, filling, thermal inbreathing and outbreathing rates. The tank is equipped with a vacuum breaker with a vacuum release setting of 6.9 in. w.c. The tank has an automatic control system to maintain the pressure in the tank at 2 psig. Excess pressure is sent to either a carbon bed for adsorption or the incinerator for burning. The tank is also equipped with a dual system of emergency pressure relief. The primary relief is a pressure relief valve (PRV) set at 5 psig. The secondary relief is a rupture disk (PRD) set at 10 psig.

Tank overfill is prevented by a dual system of electronic level measurement. The volume (weight) in the tank is continuously monitored with weigh cells. Upon reaching a "high" weight, a control computer closes the fill valve and activates an alarm horn. If the level continues to rise, a radioactive source will sense a high level which will also close the fill valve and activates an alarm horn.

The tank is 316L stainless steel which does not require exterior coating or painting. The 316L stainless is compatible with the containment waste and will provide an anticipated service life of twenty (20) years.

The tank foundation will maintain the load of a full tank. The foundation is a reinforced concrete mat. The tank is anchored to the mat to prevent dislodgement.

ANCILLARY EQUIPMENT INFORMATION

The ancillary equipment generally includes a pump, pipe, fittings, and flanges that are used to contain the hazardous waste while in transit. Per Dow Chemicals directive, this certification was limited to piping and equipment within the confines of the tank secondary containment structure.

The piping outside the secondary-containment facility is exempt from the secondary-containment requirements because it is above ground and is visually inspected on a daily basis for leaks per the Act 64 Operating License.

The pipe and fittings used for the piping system are constructed of 316L stainless steel.

The piping system is supported overhead by structural steel trestles. The trestles provide support for the piping system and provide protection against physical damage and excessive stress due to settlement, vibration, expansion, and contraction.

The ancillary equipment conforms to the latest ANSI B31.3 codes to provide safe containment of the above described hazardous wastes.

The service life for the piping system is 20 years.

TANK SECONDARY CONTAINMENT INFORMATION

The secondary containment system, which is constructed to prevent any migration of wastes or accumulated liquid out of the system, to the soil or groundwater, consists of a reinforced, on-grade concrete slab with containment walls (diking). The containment system surrounds the tank completely and covers all surrounding earth likely to come into contact with the waste if released from the tank. All concrete surfaces are coated with approximately 10 to 20 mils of Sherwin Williams Industrial Floor Enamel. All construction joints are either caulked or are provided with PVC waterstop. Caulked joints were found to be in good condition at the time of inspection and are inspected at regular intervals in accordance with the Act 64 operating license.

The secondary containment system is constructed of materials that are compatible with the above-described waste for a contact period as listed below and have sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste to which it is exposed, climatic conditions, and the stress of daily operation. The foundation is capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system and capable of preventing failure due to settlement, compression or uplift. Any spillage of waste will be removed from the containment system in accordance with Special Condition F of Part IV of the Michigan Act 64 operating license.

The Sherwin Williams floor coating only, has the following resistance properties based on the type of materials managed in the waste storage tanks.

Chemical Contact Type	Resistance Time
Spill and Splash Contact	24 hours
Intermittent Contact	12 hours
Continuous Contact	6 hours

The total containment provided is approximately 166,000 gallons which is 750% of the largest storage tank volume. The containment system also has sufficient volume to contain precipitation from a 25-year, 24-hour rainfall event.

The containment slab is sloped to a cast-in-place concrete trench which collect liquids resulting from leaks, spills or precipitation. The trench drains to a concrete collection sump. Precipitation collected in the sump is tested for TOD (Total Oxygen Demand). Per the Act 64 Incinerator Operating License, if the TOD of the precipitation is greater than 1600 ppm, it is removed from the sump and incinerated within 48 hours, if the TOD is less than 1600 ppm, it is removed from the sump within 96 hours and directed to the licensed wastewater treatment facility.

ANCILLARY EQUIPMENT SECONDARY CONTAINMENT INFORMATION

Per Dow Chemical's directive, this certification was limited to piping and equipment within the confines of the tank secondary containment structure. The piping outside the secondary-

containment facility is exempt from the secondary-containment requirements because it is above ground and is visually inspected on a daily basis for leaks per the Act 64 Operating License.

INSTALLATION OF TANK SYSTEM

Installation of the tank system by Dow Chemical followed written procedures as outlined in the project specifications and in accordance with manufacturers' instructions. These procedures include inspection of the system for the presence of weld breaks, punctures, scrapes of protection coatings, cracks, corrosion, misalignment, incorrect elevations, improper alignment or any other structural damage or inadequate construction or installation.

TIGHTNESS TEST

The tank vessel was tested by the Manufacturer for tightness in accordance with written procedures and code requirements. The ancillary equipment was hydrotested by a mechanical contractor retained by Dow Chemical under the supervision of Dow Chemical personnel. The hydrotest consisted of pressurizing the piping to 150% of the pipe design pressure. The piping had to hold this pressure for one-half of an hour.

...END OF ASSESSMENT...

HAZARDOUS WASTE STORAGE TANK DESIGN AND INSTALLATION

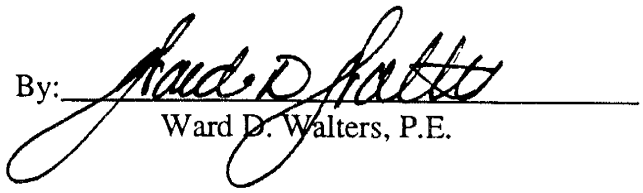
AMENDED CERTIFICATION STATEMENT

V-403 COLD LIQUID WASTE STORAGE TANK

I, Ward D. Walters, P.E., have reviewed a portion of the design and installation of a tank system located at Incineration Complex, 703 Building Tank Farm, Dow Chemical, Michigan Division, Midland, Michigan. My duties were to review and certify the written assessment for the V-403 Cold Liquid Waste Storage Tank, as required by the Resource Conservation and Recovery Act (RCRA) regulation(s), namely 40 CFR 264.192, paragraphs (a)(1), (a)(2), (a)(5), (b-partial), (d), and (e); and 264.193 paragraphs (b-partial), (c), (d), and (e).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

WW ENGINEERING & SCIENCE
Facilities Engineering and
Construction Management Division

By: 
Ward D. Walters, P.E.

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ASSESSMENT OF COLD LIQUID WASTE STORAGE TANK V-404 SYSTEM INTEGRITY

In accordance with the rules promulgated under the Michigan Public Act 64, Rule 615 which incorporates U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act 40 CFR 264.192 and 264.193, the following assessment of Tank V-404 is presented attesting that the tank system has sufficient structural integrity and is acceptable for storing hazardous wastes.

GENERAL INFORMATION

Owner:	Dow Chemical U.S.A. Midland, Michigan 48667
Location:	Incineration Complex 703 Bldg. Tank Farm Dow Chemical, Michigan Division
Tank Designation:	V-404 Cold Liquid Waste Storage Tank

DESIGN STANDARDS

Tank:	ASME Section VIII, Division 1, 1986 Addenda
Secondary Containment:	ACI-318
Ancillary Equipment:	ANSI B 31.3

HAZARDOUS CHARACTERISTICS OF WASTE

The tank system, including the tank, ancillary equipment and secondary containment, is compatible with its contained waste. The composition of the waste is provided in Table 1 below.

TABLE 1

CHEMICAL	VOLUME %
Water	58.10
Dowanol DPH, PPH	6.07
Ethanol	5.60

CHEMICAL	VOLUME %
Dowanol TMH	5.05
Etox Reactor Tar (Heavy Tar)	4.00
Mineral Oil	3.95
Alkanol Amines	2.86
Polyglycol AE501	2.82
Dowanol TEH	2.62
Butylene Glycol	2.19
Methylene Chloride	1.75
Carbon Tetrachloride	1.71
C1 Butylene Oxide	0.69
Polyglycol P6-26-2	0.62
Mobiltherm 603 (Lube Oil)	0.57
Diisopropanol Amine	0.54
Phenol	0.23
Brake Fluid (Lube Oil)	0.18
Chlorothene (111 Trichloroethane)	0.11
Ferric Sulfate	0.10
Propylene Glycol	0.08
Diethylene Glycol	0.08
Diethanol Amine	0.03
NACL	0.02
Na2S03	0.02

The average liquid specific gravity is 1.1.

The corrosion rate based on in service exposure of this waste to similar metallurgy and National Association of Corrosion Engineers (NACE) data would be approximately 2 mils/year. Therefore, the estimated service life of this vessel is 20 years. This analysis does not take into account any additional chemicals not listed in the above table.

EXTERNAL CORROSION PROTECTION

Because all tank system metal components are above ground and therefore are not in contact with soil or with water, a corrosion potential assessment by a corrosion expert is not required to determine the corrosion potential of the soil environment surrounding the system.

DOCUMENTED AGE OF THE TANK SYSTEM

The tank was built in the Spring of 1990. The secondary containment was constructed in 1958 and was modified in 1974 and 1983. Installation of the tank system, including ancillary equipment, was completed Fall, 1990.

TANK INFORMATION

Cold Liquid Waste Storage Tank V-404 is a cylindrical steel tank supported in the vertical position by four (4) steel support legs. General information regarding the tank is as follows:

PRESSURE VESSEL DATA

Design Pressure, psig	25
Design Temperature, deg. F.	100
Hydrostatic Test Pressure, psig	55
Longitudinal Joint Efficiency, %	70
Stress Relief	No
Radiographic	Spot-Head to Shell
Strength Limiting Vessel Part.	Shell

GENERAL DATA

Head Plate Material, ASME	SA-240-316L
Shell Plate Material, ASME	SA-240-316L
Reinforcing Plate Material, ASME	SA-240-316L
Nozzle Neck Material, ASME	SA-312-316L
Flange Material, ASME	SA-105/SA-516-70
Manhole Cover Material, ASME	SA-105/SA-516-70 (Clad with 316L Stainless Steel)
Bolting Material, ASTM	SA-193-B7/SA-307B
Nut Material, ASTM	SA-194-2H/SA-307B
Gasket Material	Teflon envelope supplied by manufacturer Some Teflon gaskets replaced with Asbestos gaskets where revisions were mad
Weight Empty, Lbs.	19,500
Weight Full of Water, Lbs.	210,000
Diameter, ft-in	13' - 0"
Length, ft-in	21' - 0-1/2"
Volume, Gal	22,000
Shell Nominal Thickness, in.	0.25
Heads Nominal Thickness, in.	0.312
Corrosion Allowance, in.	0.0

OPERATING PARAMETERS

Pressure	2.0 psig to 6.9 in. w.c.
Temperature	40 degrees C
pH	Near 7
Nitrogen Blanket	Yes
Agitated	Yes

The tank conforms to the latest ASME unfired pressure vessel codes to provide safe containment of the above described hazardous waste.

Tank venting is provided to prevent excessive pressure or vacuum buildup due to maximum emptying, filling, thermal inbreathing and outbreathing rates. The tank is equipped with a vacuum breaker with a vacuum release setting of 6.9 in. w.c. The tank has an automatic control system to maintain the pressure in the tank at 2 psig. Excess pressure is sent to either a carbon bed for adsorption or the incinerator for burning. The tank is also equipped with a dual system of emergency pressure relief. The primary relief is a pressure relief valve (PRV) set at 5 psig. The secondary relief is a rupture disk (PRD) set at 10 psig.

Tank overfill is prevented by a dual system of electronic level measurement. The volume (weight) in the tank is continuously monitored with weigh cells. Upon reaching a "high" weight, a control computer closes the fill valve and activates an alarm horn. If the level continues to rise, a radioactive source will sense a high level which will also close the fill valve and activates an alarm horn.

The tank is 316L stainless steel which does not require exterior coating or painting. The 316L stainless is compatible with the containment waste and will provide an anticipated service life of twenty (20) years.

The tank foundation will maintain the load of a full tank. The foundation is a reinforced concrete mat. The tank is anchored to the mat to prevent dislodgement.

ANCILLARY EQUIPMENT INFORMATION

The ancillary equipment generally includes a pump, pipe, fittings, and flanges that are used to contain the hazardous waste while in transit. Per Dow Chemicals directive, this certification was limited to piping and equipment within the confines of the tank secondary containment structure.

The piping outside the secondary-containment facility is exempt from the secondary-containment requirements because it is above ground and is visually inspected on a daily basis for leaks per the Act 64 Operating License.

The pipe and fittings used for the piping system are constructed of 316L stainless steel.

The piping system is supported overhead by structural steel trestles. The trestles provide support for the piping system and provide protection against physical damage and excessive stress due to settlement, vibration, expansion, and contraction.

The ancillary equipment conforms to the latest ANSI B31.3 codes to provide safe containment of the above described hazardous wastes.

The service life for the piping system is 20 years.

TANK SECONDARY CONTAINMENT INFORMATION

The secondary containment system, which is constructed to prevent any migration of wastes or accumulated liquid out of the system, to the soil or groundwater, consists of a reinforced, on-grade concrete slab with containment walls (diking). The containment system surrounds the tank completely and covers all surrounding earth likely to come into contact with the waste if released from the tank. All concrete surfaces are coated with approximately 10 to 20 mils of Sherwin Williams Industrial Floor Enamel. All construction joints are either caulked or are provided with PVC waterstop. Caulked joints were found to be in good condition at the time of inspection and are inspected at regular intervals in accordance with the Act 64 operating license.

The secondary containment system is constructed of materials that are compatible with the above-described waste for a contact period as listed below and have sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste to which it is exposed, climatic conditions, and the stress of daily operation. The foundation is capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system and capable of preventing failure due to settlement, compression or uplift. Any spillage of waste will be removed from the containment system in accordance with Special Condition F of Part IV of the Michigan Act 64 operating license.

The Sherwin Williams floor coating only, has the following resistance properties based on the type of materials managed in the waste storage tanks.

Chemical Contact Type	Resistance Time
Spill and Splash Contact	24 hours
Intermittent Contact	12 hours
Continuous Contact	6 hours

The total containment provided is approximately 166,000 gallons which is 750% of the largest storage tank volume. The containment system also has sufficient volume to contain precipitation from a 25-year, 24-hour rainfall event.

The containment slab is sloped to a cast-in-place concrete trench which collect liquids resulting from leaks, spills or precipitation. The trench drains to a concrete collection sump. Precipitation collected in the sump is tested for TOD (Total Oxygen Demand). Per the Act 64 Incinerator Operating License, if the TOD of the precipitation is greater than 1600 ppm, it is removed from the sump and incinerated within 48 hours, if the TOD is less than 1600 ppm, it is removed from the sump within 96 hours and directed to the licensed wastewater treatment facility.

ANCILLARY EQUIPMENT SECONDARY CONTAINMENT INFORMATION

Per Dow Chemical's directive, this certification was limited to piping and equipment within the confines of the tank secondary containment structure. The piping outside the secondary-

containment facility is exempt from the secondary-containment requirements because it is above ground and is visually inspected on a daily basis for leaks per the Act 64 Operating License.

INSTALLATION OF TANK SYSTEM

Installation of the tank system by Dow Chemical followed written procedures as outlined in the project specifications and in accordance with manufacturers' instructions. These procedures include inspection of the system for the presence of weld breaks, punctures, scrapes of protection coatings, cracks, corrosion, misalignment, incorrect elevations, improper alignment or any other structural damage or inadequate construction or installation.

TIGHTNESS TEST

The tank vessel was tested by the Manufacturer for tightness in accordance with written procedures and code requirements. The ancillary equipment was hydrotested by a mechanical contractor retained by Dow Chemical under the supervision of Dow Chemical personnel. The hydrotest consisted of pressurizing the piping to 150% of the pipe design pressure. The piping had to hold this pressure for one-half of an hour.

...END OF ASSESSMENT...

HAZARDOUS WASTE STORAGE TANK DESIGN AND INSTALLATION

AMENDED CERTIFICATION STATEMENT

V-404 COLD LIQUID WASTE STORAGE TANK

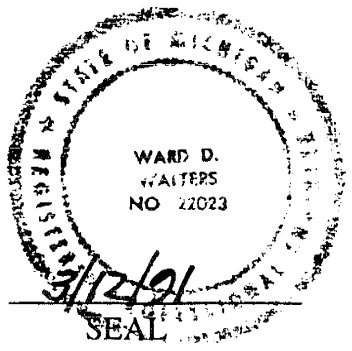
I, Ward D. Walters, P.E., have reviewed a portion of the design and installation of a tank system located at Incineration Complex, 703 Building Tank Farm, Dow Chemical, Michigan Division, Midland, Michigan. My duties were to review and certify the written assessment for the V-404 Cold Liquid Waste Storage Tank, as required by the Resource Conservation and Recovery Act (RCRA) regulation(s), namely 40 CFR 264.192, paragraphs (a)(1), (a)(2), (a)(5), (b-partial), (d), and (e); and 264.193 paragraphs (b-partial), (c), (d), and (e).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

WW ENGINEERING & SCIENCE
Facilities Engineering and
Construction Management Division

By: _____
Ward D. Walters, P.E.

Design Certification Leader
Title



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ASSESSMENT OF HAZARDOUS WASTE SYSTEM TANK V-701

In accordance with the rules promulgated under the Michigan Publics Act 64, Rule 615 which incorporates U.S Environmental Protection Agency (EPA) resource Conservation and Recovery Act 40 CFR 265.192 and 256.193, the following assessment of Tank System V-701 is presented attesting that the tank system has sufficient structural integrity and is acceptable for storing of hazardous wastes.

GENERAL INFORMATION

Owner:	Dow Chemical Environmental Operations Midland, Michigan 48667
Location:	703 Building Dow Chemical, Michigan Division
Tank Designation:	V-701 (PV 34885)
National Board No.:	842

DESIGN STANDARDS

Tank:	ASME Code Section VIII, Division I, 1962 (Tank), 1995 – A96 (Modifications)
Secondary Containment:	ACI-318
Ancillary Equipment:	ANSI B73.1M for Pumps and ASME B31.3 for Process Piping

HAZARDOUS CHARACTERISTICS OF THE WASTE

Tank V-701 serves as a storage vessel for hazardous waste that is sent to an onsite incinerator. The hazardous waste is received from one of the following systems through overhead stainless steel piping: (1) transfer from Tanks V101 or V601; (2) waste from the railcar sump; (3) Tank V-701 secondary containment dike sump; (4) or wastewater from the carbon bed accumulator. Hazardous waste may also be transferred to V-701 from an adjacent tank truck unloading station. From V-701, the hazardous waste is transferred via overhead stainless steel piping to the incineration facility. The holding period for the hazardous waste is less than one (1) year.

The composition of the hazardous waste is provided in Table 1 below:

TABLE 1

CHEMICAL	WEIGHT %
Water	99%
Misc. Organic/Inorganic Compounds	1%

The average liquid specific gravity is 1.0.

The average pH is 7.

The tank system, including the tank, ancillary equipment and secondary containment, is compatible with the contained hazardous waste. To insure system integrity, Dow Chemical has an external non-destructive testing program that monitors the corrosion rate of the tank to estimate remaining service life.

EXTERNAL CORROSION PROTECTION

Because all tank system metal components are above ground and therefore are not in contact with solid or with water, a corrosion potential assessment by a corrosion expert is not required to determine the corrosion potential of the soil environment surrounding the system.

DOCUMENTED AGE OF THE TANK SYTEM

The tank was constructed in 1965. Modifications to the tank were done in 1998. Installation of the ancillary piping and equipment was completed in 1998. The secondary containment system was constructed in 1958 and modified in 1974 and 1983.

TANK INFORMATION

Tank V-701 is a cylindrical carbon steel tank supported in the vertical position by six (6) steel support legs. General information regarding the tank is as follows:

PRESSURE VESSEL DATA	
Design Pressure/Vacuum	30 psi/10 psi
Design Temperature	200 F
Hydrotest Test Pressure	45 psi
Longitudinal Joint Efficiency	85%
Stress Relief	No
Radiographic	Spot x-ray

Strength Limiting Vessel Part	Bottom Head

GENERAL DATA

Head Plate Material, ASME	SA-285-C
Shell Plate Material, ASME	SA-285-C
Nozzle Neck Material, ASME	SA-53 E/A OR SA258C
Flange Material, ASME	SA-285-C
Bolting Material, ASME	SA-193 B7 Studs
Nut Material, ASME	SA-194 2H
Gasket Material	1/16" Styrene – Butadiene Rubber
Weight Empty	11,000 lbs
Weight Full of Water	73,970 lbs
Diameter	10'-0" OD
Length	11' - 4" TL to TL
Operating Volume	7,000 gal
Shell Nominal thickness	1/2"
Heads Nominal Thickness	1/2"
Corrosion Allowance	1/16"
Exterior Insulation	1 ½" Polyisocyanurate w/Aluminum Covering

OPERATING PARAMETERS

Pressure	0-2 psig
Temperature	30-45 °C
Nitrogen Blanket	Yes
Recirculated	Yes

The tank conforms to ASME Code for Pressure Vessels, Section VIII, Division 1, 1962 (Tank), 1995 Edition, A96 Addenda to provide safe containment of the above described hazardous waste.

The tank pressure is controlled at 0-2 psig with a nitrogen purge and vented to the incineration facility to prevent excessive pressure or vacuum buildup due to maximum emptying, filling, thermal inbreathing and outbreathing rates. The tank is equipped with a 3" PVRV that is set to relieve at 4 psig.

Tank V-701 level system is redundant, with the volume monitored by a nitrogen bubbler level sensor with a capacitance high level sensor (LSH) as backup instrumentation. The alarm setpoint ranges from 75-90%. The high level alarm has the capability to shut off the flow into the tank.

The tank is carbon steel with 1 ½" exterior polyisocyanurate insulation and aluminum covering.

ANCILLARY EQUIPMENT INFORMATION

The ancillary equipment generally includes a pump, pipe, fittings and flanges that are used to contain the hazardous waster while in transit.

The pipe and fittings used for the piping system are constructed of stainless steel Schedule 40 for pipe sizes 2" and smaller, and schedule 10 is use for pipe sizes 3" and larger.

The ancillary equipment conforms to the latest ANSI B73.1M codes for pumps and ASME B31.3 codes for process piping to provide safe containment of the above described hazardous waste.

TANK SECONDARY CONTAINMENT INFORMAITON

The secondary containment system, which is constructed to prevent any migration of waster of accumulated liquid out of the system, to the soil or groundwater, consists of a reinforced, on grade concrete slab with containment walls (diking). The containment system surrounds the tank completely and covers all surrounding earth likely to come into contact with the waste if released from the tank. All construction joints are either caulked or are provided with PVC water stops. Caulked joints should be inspected at regular intervals. The interior walls and floor do not have a lining or coating.

The secondary containment slab is sloped to a sump which collect liquids resulting from leaks, spills or precipitation. Spilled or leaked waste and accumulated precipitation is removed from the concrete sump within twenty-four (24) hours.

The total containment provided is approximately 166,000 gallons which is more than 100% of the storage tank volume plus sufficient volume to contain precipitation from a 25 year, 24 hour rainfall event.

The walls and floors also have sufficient strength and thickness to prevent failure due to pressure gradients, physical contact with the waste, climatic conditions and the stress of daily operation. The foundation is capable of providing support to the secondary containment system, resistance to pressure gradients above the system and capable of preventing failure due to settlement, compression or uplift.

ANCILLARY EQUIPMENT SECONDARY CONTAINMENT INFORMATION

Secondary containment is provided for some of the ancillary equipment distributing the flow of hazardous waster from its point of generation to the storage tank. This piping is above ground piping which is visually inspected on a daily basis in accordance with 40 CFR 265.193 (f).

INSTALLATION OF TANK SYSTEM

Installation of the tank system by Dow Chemical followed written procedure as outlined in the project specifications and in accordance with manufacturer's instructions. These procedures include inspection of the system for the presence of weld breaks, punctures, scrapes of protection coatings, cracks, corrosion, misalignment, incorrect elevations, improper alignment or any other structural damage or inadequate construction or installation.

TIGHTNESS TEST

The tank system was tested for tightness prior to introduction of chemicals on June 8, 1998. Testing was performed in accordance with written procedures. Checks were made prior to the initiation of testing and during the actual test.

*****END OF ASSESSMENT*****

HAZARDOUS WASTE STORAGE TANK DESIGN AND INSTALLATION

CERTIFICATION STATEMENT

V-701 TANK SYSTEM

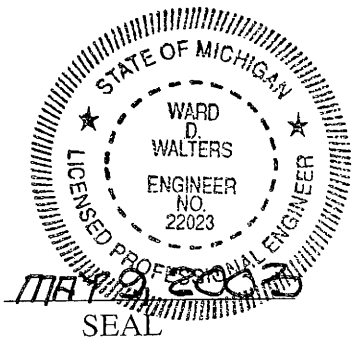
I, Ward D. Walters, P.E., have reviewed a portion of the design and installation of a tank system located at Dow Chemical, Michigan Division, 703 Building, Midland, Michigan. My duties were to review and certify the written assessment for the Tank System V-701, as required by the Resource Conservation and Recovery Act (RCRA) regulation(s), namely 40 CFR 265.192, paragraphs (a)(1), (a)(2), (a)(5), (b), (d), and (e); and 265.193 paragraphs (b), (c), (d), (e)(2) and (f).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

EARTH TECH

By: _____
Ward D. Walters, P.E.

Tank System Certification Leader
Title



SEAL

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ASSESSMENT OF
BUILDING 1163 - SOLID WASTE MARSHALLING STRUCTURE

In accordance with the rules promulgated under the Resource Conservation and Recovery Act (40 CFR 265.192 and 265.193), the following assessment of the Building 1163-Solid Waste Marshalling Structure is presented attesting that the containment system has sufficient structural integrity and is acceptable for storing solid hazardous waste.

GENERAL INFORMATION

Owner:	Dow Chemical U.S.A. Midland, Michigan 48667
Location:	Building 1163
Tank Designation:	Solid Waste Marshalling Structure

DESIGN STANDARDS

Tank:	AISC Manual of Steel Construction, 8th Edition
Ancillary Equipment:	ANSI B31.3
Secondary Containment	ACI-318-77 National Design Specification for Wood Construction, 1977

HAZARDOUS CHARACTERISTICS OF WASTE

The tank system, including the piping, fittings, flanges, and secondary containment, is compatible with its contained waste. The composition of the waste is provided below.

Waste Description	*Components*	*Average Weight %*
Primary WWTP Solids	Sand (SiO_2)	25
	$Ca(OH)_2$	20
	Water	55
	Other Constituents	<1
	pH	12.0
Secondary WWTP Solids	Sand (SiO_2)	10
	$Ca(OH)_2$	20
	Water	55
	Organics (Bio Mass)	15
	Other Constituents	<1
	pH	12.0

Waste Description	*Components*	*Average Weight %*
Incinerator Ash	Sand (SiO_2)	55
	Fe_2O_3	15
	Al_2O_3	10
	CaO	15
	Na_2O	5
	Other Constituents	<1
	pH	9.5

CORROSION INFORMATION

Each material contains 20% - 25% alkaline materials. When combined with free water, the resulting aqueous solution will corrode mild steel at 2-10 mils per year (MPY) according to National Association of Corrosion Engineers data. However, free water will generally not be present and these materials will not corrode the steel. Allowing for the occasional presence of water on the floor and a rare presence on the walls, the estimated average corrosion rate over a 20 year service life would be 5 MPY and 1 MPY for the floor and walls, respectively. These average corrosion rates would result in a total metal loss of 100 mils and 40 mils which is an acceptable corrosion rate for this structure. This analysis allows only occasional wetting of the solids/tank and does not take into account any additional chemicals not listed in the above table.

EXTERNAL CORROSION PROTECTION

Because all tank system metal components are above ground and therefore are not in contact with soil or with water, a corrosion potential assessment by a corrosion expert is not required to determine the corrosion potential of the soil environment surrounding the system.

DOCUMENTED AGE OF THE TANK SYSTEM

Building 1163 was built in Fall of 1982. The structure was modified to include a secondary containment system in August and September of 1988. Ancillary equipment installed during September, 1988 includes a dual wall building sewer and a leak detection system for the secondary containment.

TANK INFORMATION

The solid waste marshalling structure is a three sided tank constructed of steel plate. The overall dimensions of the tank are 68 feet x 56 feet x 14.5 feet high. The maximum fill height has been calculated to be 12 feet. The floor plate is constructed of continuously welded 3/4 inch, ASTM A-36 checker plate which slopes to the primary trench drain. The tank sides are constructed of continuously welded 1/2 inch and 1/4 inch ASTM - A36 plate.

Because the tank is of open type construction, operating temperature and pressure are equal to ambient.

The tank interior has no corrosion coating, but the tank floor plate and side plate thickness include a corrosion allowance of 0.1 inches and 0.04 inches respectively, which will provide an anticipated service life of twenty (20) years.

The tank floor is supported by a compacted granular fill which was placed on top of a concrete foundation slab. The tank sides are supported by structural steel members which bear on walls constructed of reinforced concrete and timber posts. The tank and tank support structure will maintain the full load of a full tank as well as operating vehicles.

ANCILLARY EQUIPMENT INFORMATION

The solid waste enters the marshalling structure via overhead conveyor or trucked-in dumpster box. The solid waste leaves the building via 15 yard dump trucks which are loaded by front end loaders. The above mentioned equipment does not have secondary containment but will be visually inspected in accordance with 40 CFR 265.193 (f). Any waste on exterior truck surfaces will be removed before the trucks are allowed to leave the tank.

Any residual liquid waste will collect in the primary trench drain and will flow by gravity to an adjacent sewer via below ground dual wall, 6 inch diameter, Schedule 40 HDPE pipe.

TANK SECONDARY CONTAINMENT INFORMATION

The secondary containment system, which is constructed to prevent any migration of wastes or an accumulated liquid out of the system to the soil or groundwater, consists of a reinforced, ongrade concrete foundation slab, a lower containment wall of reinforced concrete and an upper containment wall of 1/4 inch and 14 gauge ASTM A-36 plate. The containment system surrounds the three sides of the tank as well as the tank floor. If liquid waste enters the secondary containment, it will drain through granular material to a leak detection trench via the sloped concrete foundation slab.

The concrete portion of the secondary containment was designed to ACI-318 specifications. All concrete surfaces are coated with coal tar epoxy.

The steel portion of the secondary containment was designed to AISC specifications and has no corrosion coating.

ANCILLARY EQUIPMENT SECONDARY CONTAINMENT INFORMATION

The leak detection trench contains a 6 inch diameter Schedule 40 HDPE collection pipe within the interior of the building. It is incased in a 12 inch diameter Schedule 40 HDPE pipe at the two points where the 6 inch diameter pipe exits the building. This dual walled pipe terminates at vertical inspection ports directly outside the building wall.

The secondary containment for the 6 inch diameter building sewer is a 12 inch diameter Schedule 40 HDPE pipe.

INSTALLATION OF TANK SYSTEM

Installation of the tank system by Dow Chemical followed written procedures as outlined in the project specifications. These procedures include inspection of the system for the presence of weld breaks, punctures, scrapes of protection coatings, cracks, corrosion, misalignment, incorrect elevations, improper alignment or any other structural damage of inadequate construction or installation.

TIGHTNESS TEST

Since the tank is of open construction, tightness testing is not applicable.

The dual walled 6 inch diameter building sewer was tightness tested with compressed air. The pipe held 5.25 psi for a one hour period.

....END OF ASSESSMENT....

HAZARDOUS WASTE STORAGE TANK DESIGN AND INSTALLATION

CERTIFICATION STATEMENT

I, Ward D. Walters, P.E., hereby certify that the design and installation of Building 1163 - Solid Waste Marshalling Structure located at Dow Chemical, Michigan Division, Midland, Michigan, satisfies the applicable requirements of 40 CFR 265.192 and 265.193. My duties were to prepare and certify the written assessment for the Dow Chemical, Michigan Division, Midland, Michigan as required by the Resource Conservation and Recovery Act (RCRA) regulation(s), namely 40 CFR 265.192, paragraphs (a)(1), (a)(2), (a)(5), (d), (e), (g) and 265.193 paragraphs (b), (c), (d), (e), and (f).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

WW FACILITIES GROUP

By: Ward D. Walters

Ward D. Walters

Design Certification Leader

Title

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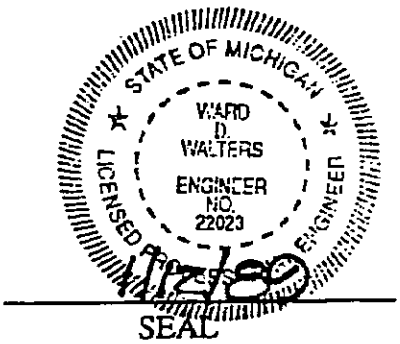


SEAL

ASSESSMENT OF
BUILDING 33 – KILN ASH STORAGE STRUCTURE

In accordance with the rules promulgated under the Michigan Public Act 64, Rule 615 which incorporates US Environmental Protection Agency (EPA) Resources Conservation and Recovery Act 40 CFR 265.192 and 265.193, the following assessment of Building 33 is presented attesting that Building 33 and ancillary equipment have sufficient structural integrity and are acceptable for storing and transporting of hazardous wastes.

GENERAL INFORMATION

OWNER:	Dow Chemical U.S.A. Environmental Operations Midland, Michigan 48667
LOCATION:	Building 33
TANK DESIGNATION:	Solid Waste Marshalling Structure

DESIGN STANDARDS

TANK:	AISC Manual of Steel Construction, 9th Edition American Concrete Institute (ACI) 318-99
ANCILLARY EQUIPMENT:	ANSI B31.3

HAZARDOUS CHARACTERISTICS OF WASTE

The tank system, including the piping, fittings, flanges, and secondary containment, is compatible with its contained waste.

Building 33 will store ash from the Dow Environmental Operations Kiln. Ash is transported from the incinerator process by conveyor to Building 33. As the ash accumulates, it is hauled to an approved land fill. If the need arises Building 33 may also store pressed waste from the wastewater treatment plant. The hazardous characteristics of the waste are:

Waste	Components	Average Weight %
Kiln Ash	SiO_2	47.6
	H_2O	25.0
	C_aO	8.1
	Fe_2O_3	6.2
	P_2O_5	3.8
	Al_2O_3	3.7

	SO_3	2.5
	MgO	1.3
	Na_2O	0.8
	K_2O	0.5
	TiO_2	Trace
	Cl	Trace
	CO_2	Trace
Primary WWTP Solids	H_2O	60
	$CaCO_3$	20
	Dirt/Salts	10
	Organics	5
	Misc. Solids (i.e. polymers)	5
Secondary WWTP Solids	H2O	70-80
	BIOMASS	10-15
	Inert Solids	6-8
	Ash	2-3
	Polymers	2
	Organics	<1

The pH is typically around 7, but may vary from 5 to 9.

CORROSION INFORMATION

The floor and walls of Building 33 are constructed of reinforced concrete and clad with ¾" steel plate and fully welded seams. There exists only a minor corrosion potential of the steel floor and walls with the ash.

The ancillary equipment is constructed of polyethylene (HDPE) pipe and 316SS Pipe. The corrosion rate according to the National Association of Corrosion Engineers (NACE) is nearly zero at the operating conditions and should last indefinitely.

EXTERNAL CORROSION PROTECTION

Because all tank system components are above ground and are not in contact with soil or with water, a corrosion potential assessment by a corrosion expert is not required to determine the corrosion potential of the soil environment surrounding the system.

DOCUMENTED AGE OF THE TANK SYSTEM

Building 33 was built the Spring of 2003.

TANK INFORMATION

The Ash Storage Building is a reinforced concrete and structural steel structure. The floor of the structure is constructed of reinforced concrete topped with a 60 mil HDPE liner, 4-inch sand lift, a fully welded ¾" steel plate floor surface and sloped to a floor trench approximately 65 feet long. Three (3) of the sides are constructed of reinforced concrete walls to a height of 12 feet. Anchored to the interior face of the walls is ½" steel plate and it is seal welded to the floor plate. Above the three (3) walls is a structural steel frame and metal siding system up to a height of 29 feet above grade. The fourth side is constructed of a structural steel framing and metal siding system to a height of 27 feet above grade. The structure is enclosed with structural steel framing and a metal roof deck. The structure is 61 feet by 66 feet in plan dimension.

Any residual liquid waste or wash water from the cleaning of vehicles will collect in the trench drain and will flow by gravity to the onsite wastewater treatment plant. The trench is 1' x 1' x 65' with a 10" HDPE pipe outlet and is incased in the reinforced concrete floor.

The solid waste enters the Ash Storage Building via an overhead conveyor from an adjacent incinerator complex. The solid waste will leave the building via dump trucks or other appropriate transportation which are loaded by heavy equipment. Any waste on exterior surfaces will be removed in a manner to prevent "track-out" onto paved roadways.

Because the tank is of the open type construction, operating temperature and pressure are equal to ambient.

ANCILLARY EQUIPMENT INFORMATION

The current ancillary equipment includes two conveyors which transport ash to the storage structure, a front end loader and dump trucks (or other appropriate heavy equipment) which transport the waste ash to an appropriate disposal site. Other ancillary equipment consists of the trench drain and 10" sewer line, and the 4" leak detection pipe below the trench.

The conveyor is permanently installed and inspected daily for proper operation. The dump trucks or similar vehicles enter the marshalling structure where they are loaded by the front end loader or other heavy equipment. Before the dump trucks exit the marshalling structure the vehicles are checked for residual ash. Any residual ash contained on the vehicle is removed in a manner to prevent "track-out" onto paved roadways.

TANK SECONDARY CONTAINMENT INFORMATION

The secondary containment system, which is constructed to prevent any migration of wastes or an accumulated liquid out of the system to the soil or groundwater, consists of a 60 mil HDPE liner system installed on top of the reinforced concrete slab. On all sides the liner is returned to the vertical edge of the concrete wall or curb for 4-inches, and is fusion welded to a HDPE insert strip in the wall or curb.

In the floor trench, below the steel plate floor, and above the liner and concrete slab is a 4" stainless steel perforated pipe. This pipe collects any liquid contained in the secondary containment system. An inspection port is provided for determination of any evidence of contained hazardous waste and for sampling as required. If contained hazardous waste is detected it will be removed by pumping.

ANCILLARY EQUIPMENT SECONDARY CONTAINMENT INFORMATION

There is not secondary containment for all the ancillary equipment, but it is all visually inspected in accordance with 40 CFR 265.193 (f).

INSTALLATION OF TANK SYSTEM

Installation of the tank system by Dow Chemical followed written procedures as outlined in the project specifications. These procedures include inspection of the system for the presence of weld breaks, punctures, scrapes of protection coatings, cracks, corrosion, misalignment, incorrect elevations, improper alignment or any other structural damage of inadequate construction or installation.

TIGHTNESS TEST

Since the tank is of open construction, tightness testing is not applicable.

...END OF ASSESSMENT...

HAZARDOUS WASTE STORAGE TANK DEIGN AND INSTALLATION

CERTIFICATION STATEMENT

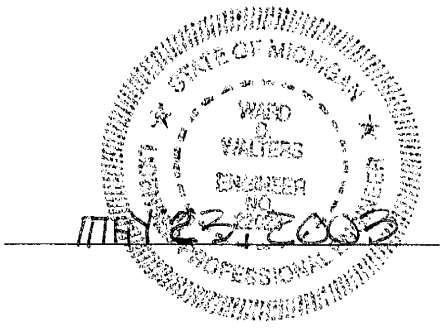
I, Ward D. Walters, P.E., hereby certify that the design and installation of Building 33 – Kiln Ash Storage Building located at Dow Chemical, Michigan Division, Midland, Michigan, satisfies the applicable requirements of 40 CFR 265.192 and 265.193. My duties were to prepare and certify the written assessment for the Dow Chemical, Michigan Division, Midland, Michigan as required by the Resource Conservation and Recovery Act (RCRA) regulations(s), namely 40 CFR 265.192, paragraphs (a)(1), (a)(2), (a)(5), (e), (g) and 265.193 paragraphs (b), (c), (d), (e), and (f).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Earth Tech, Inc.

By: _____
Ward D. Walters, P.E.

Tank System Certification Leader
Title



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APPENDIX C2-D – 1163 AND 33 BUILDING TREATMENT

ATTACHMENT XIV.C2

APPENDIX C2-D

1163 AND 33 BUILDING TREATMENT

Treatment

Treatment in the 1163 and 33 Buildings primarily consists of dewatering via gravity of bulk solids and sludges (e.g., incinerator ash and wastewater treatment plant solids), but also includes liquid generated from washing the vehicles leaving the units. Liquids are primarily aqueous in nature and are collected in a trench drain. Liquids collected by the trench drain by gravity to the sewer system. The sewer transfers the liquids to the Michigan Operations, Midland Plant site Wastewater Treatment Plant.

Waste is moved into these units by using front-end loaders, dump trucks, or other portable containers (e.g., roll-off boxes, dewatering boxes, etc.). Wastewater treatment plant solids that contain free liquids are generally transported by vacuum trucks or other portable containers and can be dumped into large drainage boxes for dewatering.

Materials stored/treated within the 1163 and 33 Buildings are separated by moveable concrete barrier walls to ensure that material that is destined for landfill is not commingled with material destined for incineration.

Material may be removed from the 1163 and 33 Buildings using dump trucks or other containers for transportation to the appropriate treatment or disposal unit. Generally, when removing large volumes of material, a front end loader will scoop up the solids from the floor of the unit and place the load into dump trucks for transport. Dump trucks are tarped after filling to prevent exposure to wind or precipitation during transport.

1163 Building has a treatment capacity of 1,950 cubic yards per day or 400,000 gallons per day. 33 Building also has a treatment capacity of 1,950 cubic yards per day or 400,000 gallons per day. Operators use visual observation to determine when the bulk solids and sludges have dewatered to such an extent that they can be incinerated. On occasion, a sorbent may be added to a bulk solid or sludge to aid in the processing of the material in the 32 incinerator bulk solids feed unit. Any bulk solids or sludges must pass the paint filter liquids test (i.e., no free liquids) before being landfilled. Any free liquids remaining in a bulk solid or sludge destined for landfill will be treated by adding a nonbiodegradable sorbent (e.g., clays, vermiculites, sand, etc.).