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RCRA PART B PERMIT APPLICATION MARCH 1993 SECTION D: PROCESS INFORMATION

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RCRA PART B PERMIT APPLICATION

March 1993

SECTION D: PROCESS INFORMATION

Fernald Environmental Management Project

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SECTION D - PROCESS INFORMATION

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SECTION D - PROCESS INFORMATION

RCRA Part B Permit Application

Fernald Environmental Management Project

Fernald, Ohio

The information provided in this section is submitted in accordance with the requirements of the Ohio Administrative Code (OAC) 3745-55-70 through 78. This information is also in accordance with Title 40 of the Code of Federal Regulations (CFR) 270.15-21. Other federal hazardous waste regulations addressed in this section include 40 CFR 264.171-175.

D-1 CONTAINERS

This section discusses the specific process information for hazardous waste container storage at the Fernald Environmental Management Project (FEMP). The units to be permitted for container storage of hazardous waste for more than ninety (90) days are:

- CP Storage Warehouse - Building 56 (Butler Building)
- Plant 1 Pad
- Plant 8 Warehouse - Building 80
- Pilot Plant Warehouse - Building 68
- KC-2 Warehouse - Building 63
- Plant 9 Warehouse - Building 81
- Plant 6 Warehouse - Building 79

Figure D-1 shows the location of each of the above storage units at the facility. The container storage information is discussed in the following paragraphs and in Table D-1.

D-1a Containers With Free Liquids

D-1a(1) Description of Containers

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. When overpacking of 55-gallon drums is required, 85-gallon drums are typically used. Other containers used at the facility and their Department of Transportation (DOT) specification are shown in Table D-2.

Purchase of hazardous waste storage containers for use at the FEMP meet the DOT specifications (HM-181 standards). The HM-181 standards are performance-oriented standards for container usage, thus the type of container purchased will depend on the type of waste to be stored. The FEMP uses mostly mild steel drums and purchases of those containers will conform to the standards for steel drums under the HM-181 standards. Each of the other types of containers purchased for use at the facility will also meet the HM-181 standards. The FEMP has some containers that date before the DOT specification requirements. These pre-DOT containers are inspected on the same schedule as all other containers meeting the DOT requirements to ensure their integrity.

All containers storing hazardous waste are inspected for corrosion and other defects such as severe rusting, apparent structural defects, leaks, holes, dents, or bulges at the time they are first used. Dents that exceed one-inch in depth

or 6-inches in length in any two directions shall not be acceptable. Bulges that exceed outward from the original surface more than one-inch shall not be acceptable. Drum lids shall be convex in order to be acceptable. The lid is inspected for holes, dents, and bulges. If damage exceeding the specifications is found, the container is marked unacceptable and the supervisor is notified of damaged containers. All containers are inspected a minimum of once per week as required by 40 CFR 264.174 after they are filled and placed in the storage unit. The inspection schedule and procedures are described in Section F, Procedures to Prevent Hazards.

A hazardous waste label or the words "hazardous waste" is applied to the container at the accumulation start date. The hazardous waste label includes the facility name and address, the EPA Identification Number, EPA Waste Number, the accumulation start date, and/or hazardous waste determination date. The facility lot number, inventory number, drum number, and the gross, net and tare weight are attached to the drum. Also, a storage compatibility Reactivity Group Code (RGC) is marked and applied to each container.

D-1a(2) Container Management Practices

Various equipment is used to transport containers throughout the facility. The equipment consists of tuggers, trailers, forklifts, individual two-wheel drum dollies, riding hand-stackers, and fork-mounted drum grabs (vertical and horizontal). The fork-mounted drum grabs are used frequently to move individual drums for testing, sampling activities, and to repair leaking containers. The

riding hand-stacker is used for small movements within the individual unit. All larger drum movements (i.e., from one unit to another or across the site) are accomplished by forklifts (an 8,000 lb. unit) and the tuggers and trailers. Three (3) spark-proof riding hand stackers exist on-site, one each in the KC-2 Warehouse, the CP Storage Warehouse, and the Plant 6 Warehouse. All other riding hand-stackers are 4,000 lb. units with the exception of the 6,000 lb. unit located in the Plant 6 Warehouse.

The integrity of the containers is inspected for dents, leaks, holes, loose dirt, rocks or pebbles, corrosion or rust, and bulges prior to transport. Containers are inspected to ensure they are closed, non-leaking, have proper container labels and markings, and are strapped down for transport. Also, all necessary documentation indicating the contents of the container(s) and records for inventory control are attached to the lid and inspected before movement. Figure D-2 details the steps taken prior to the transport of containers. Containers moved by truck or trailer are loaded and unloaded by forklift. The containers are strapped down and transported to the storage unit, once safe conditions for movement are verified. The transportation supervisor is responsible for providing oversite and guidance and ensuring that the motor vehicle operators (MVOs) are trained to operate equipment used to transport hazardous waste. These training records are maintained in the training department. The dispatcher or transportation supervisor must be notified by the MVO before movement of any containers occurs.

Containers are placed on 6-inch high pallets during storage, to elevate the

containers in order to protect them from sitting in accumulated liquids within the container storage area. The containers are stored with markings and labels visible and legible from the aisle.

In accordance with the Revised Drum Management Plan, a minimum aisle spacing of 24 inches will be maintained at the Plant 1 Pad and a minimum of 22 inches for all other storage units. The purpose of the Revised Drum Management Plan is to implement a program to minimize the environmental impact of stored, containerized materials on-site. The Plan documents the drum management activities consistent with the commitments in the Consent Decree and its Stipulated Amendment entered December 2, 1988.

The number of containers and hazardous waste volume for each storage unit will vary depending on the size of container used and the applicable aisle spacing and stacking height necessary to meet additional fire protection standards required on-site. The number of containers in each RCRA storage unit is not to exceed the maximum storage capacity for that unit. See Table D-1 for specific information regarding stacking height and maximum capacities for each storage unit.

Containers delivered to the hazardous waste storage units are inspected according to the FEMP Hazardous Waste Container Prestorage Checklist to document that the containers are acceptable for storage. This checklist is included as Figure D-3. Once the container is acceptable, the container is logged into the FEMP Hazardous Waste Material Movement and Overpack Log and the RCRA New Drum Assignment Log.

These logs record the container number, contents, Reactivity Group Code, and date of storage. Figures D-4 and D-5 provide copies of these logs.

Hazardous waste types are grouped together and stored according to compatibility in accordance with Reactivity Group Codes and other appropriate information. Incompatible hazardous wastes are not simultaneously stored in the same area. Section F, Procedures to Prevent Hazards, provides more information on the procedures used to ensure that incompatible hazardous wastes are not stored in the same area.

Individual drums shipped from the storage unit are logged out of the Hazardous Waste Log. Containers remain closed except when a sample must be obtained, for visual inspections as a part of the waste characterization, or during addition or removal of hazardous waste. Some containers are equipped with filtered vents to prevent the build-up of pressure within the container. These filters are installed to provide ventilation to containers of wastes containing free reactive uranium metal that has the potential to generate hydrogen gas. The 3/4-inch filter vent plug is composed of a carbon-carbon composite high efficiency particulate air (HEPA) filter. The filter vent plug is inserted into the smaller bung opening of the drum lid. The plugs are installed also on all outer containers if the containers are overpacked. Approximately 3 percent of all RCRA containers in storage are currently equipped with vent plugs.

D-1a(3) Secondary Containment System Design and Operation

The following RCRA storage units are designed to store hazardous waste with free

liquids and provide a secondary containment system for the storage of liquids. Attachment D-1 provides information regarding floor coatings for the units. The secondary containment systems are operated according to 40 CFR 264.175 regulations and are designed to contain a minimum of 10 percent of the maximum storage capacity volume.

Plant 1 Pad. The Plant 1 Pad is being renovated in accordance with the Removal Action Work Plan approved by the Ohio EPA on April 3, 1991, and approved by the U.S. EPA on August 19, 1991. The existing pad and catch basins will be upgraded in the following manner:

- The existing pad will be coated with a polyethylene barrier prior to installing a new layer of concrete;
- A six inch concrete curb will be installed as shown in Figure D-6 to provide run-off control;
- New wearing surfaces will be covered with 86 mils of chemically resistant polyurethane, and;
- The trenches and sumps in the controlled areas will be coated with epoxy.

The design drawings for the Plant 1 Pad renovation are provided as Figures D-7 through D-15. A current photograph of the Plant 1 Pad is provided as Figure D-16.

A total of three (3) structures will be used to provide covered storage on the Plant 1 Pad, in addition to the waste storage areas which are not covered. Diked areas within the three (3) structures will provide secondary containment for storage of liquids. These areas will be erected with concrete curbs for

containment. The location of the three (3) structures is shown in Figure D-6. Nomenclature for the three Structures has not been established. The three structures are labeled Structure 1, Structure 2, and Structure 3 in the Figures D-7 through D-15. However, these three structures are represented in the Section D text and in the secondary containment calculations by Tension Structure 4 (TS-4) and Tension Structure 5 (TS-5), respectively. Structure 3 is not listed in Attachment D-2 since this structure has not been completed to date. An estimated containment volume is provided in Section D-1a(3)(c). The two (2) larger structures TS-4 and TS-5 have been completed and provide 70,000 square feet of storage area. Figures D-17 and D-18 provide a drum layout of the storage capacity and secondary containment dimensions of the TS-4 and TS-5. The third Structure will provide 22,500 square feet of storage. Figure D-7 shows the engineering details for the covered structures. The containment for each structure includes a centrally located trench drain which will lead to a head end sump. These drains and sumps have no connection to site drainage systems and are intended to collect accumulated liquid from a leak or spill. The trench drains and sumps are sealed with a chemically resistant epoxy coating. The new concrete bases for the first two Tension Structures, TS-4 and TS-5, have been sealed with an 86 mil chemically resistant polyurethane wear surface.

<u>KC-2 Warehouse</u>. The KC-2 Warehouse is subdivided into eight containment areas (Bays 1 through 8) by eight inch bearing walls (the east and west walls of each containment area). The Warehouse is constructed of concrete block and sheet metal and is fully enclosed. A photograph of the KC-2 Warehouse is provided as Figure D-19. The detailed design drawings for the base of the storage unit is

provided in Figures D-20 and D-21.

Bays 5, 6, and 7 have six-inch by six-inch concrete containment dikes overlain with an eight-foot wide access ramp for storage of containers with free liquids. The bays are equipped with sprinkler systems and meet the standards for storage of ignitable liquids. Construction details for the ramps are provided in Figure D-22. The concrete floor and dikes are coated with a durable epoxy to create an impermeable surface.

A project to upgrade Bays 1, 2, 3, 4, and 8 was completed in January 1993 for storage of liquid ignitable wastes. However, due to the discovery of an old groundwater monitoring well in Bay 2, the bay will not be used for storage of hazardous waste at this time. Bay 2 may be used for storage of hazardous waste without free liquids in the future. The upgrade project included installing six-inch by six-inch concrete curbing and coating the base of each bay with a chemical resistant coating. Bays 1, 2, 3, 4, and 8 are equipped with a sprinkler system.

Figures D-23 through D-36 provide the drum layouts and the secondary containment dimensions of the bays.

<u>Plant 9 Warehouse (Building 81)</u>. A photograph of the Plant 9 Warehouse is shown in Figure D-37. Detailed design parameters, dimensions and materials of construction for the Plant 9 Warehouse are provided in Figure D-38. The warehouse is a steel framed, enclosed, metal building. The base is constructed

of six-inch concrete with number 3 reinforcement rods at twelve (12) inch intervals. The interior is subdivided by dikes into three (3) containment areas (Bays A, B, and C). Each of the three bays have a secondary containment system constructed with a six-inch by six- inch concrete dike. The concrete curbs were installed in 1990. Ramps are used at the entrances allowing access to the completely enclosed perimeter. Figures D-39 and D-41 provide the drum layout for the Plant 9 Warehouse and the secondary containment dimensions.

Plant 6 Warehouse (Building 79). The Plant 6 Warehouse consists of a steel framed, enclosed, metal building with an 8-inch thick, reinforced concrete slab and is equipped with a secondary containment system. This containment system includes six-inch by six-inch concrete dikes around the perimeter of the three containment units (Bays A, B, and C) as shown in the Foundation Plans and Details as provided in Figure D-41. Ramps are used to allow access to the containment areas. The drum layout drawing for the Plant 6 Warehouse is included in Figure D-42. Figure D-43 includes the dimensions of the containment areas for the Plant 6 Warehouse.

CP Storage Warehouse (Building 56). The Warehouse is a pre-engineered building with ribbed metal siding and metal roofing. The upgrade project for the storage of wastes with free liquids in this storage unit was completed in January 1993. The upgrade project included the installation of six-inch by six-inch concrete dikes around the perimeter of the unit. A ramp allows access to the containment area. The secondary containment dimensions are detailed in Figure D-44. A drum layout is provided in Figure D-45. A photograph of the CP Storage Warehouse is

provided in Figure D-46.

Pilot Plant Warehouse (Building 68). The Pilot Plant Warehouse is a pre-engineered metal fabricated building which is completely enclosed and covered by metal roofing. A photograph of the Pilot Plant Warehouse is provided in Figure D-47. The base of the warehouse is constructed of eight-inch thick concrete with wire mesh fabric reinforcement as indicated in Figure D-48.

The RCRA storage area is 69 feet X 7 feet located in the center of the building. The storage area consists of a U-shaped concrete dike with the end of the U-shaped dike enclosed by a smaller U-shaped temporary Herculite containment structure to form an impermeable barrier to contain spills of hazardous waste with and without free liquids. A layout drawing of the Pilot Plant Warehouse is provided as Figure D-49. The secondary containment dimensions are included in Figure D-50.

Thorium containers designated as mixed waste under implementation plans resulting from the 1991 Proposed Amended Consent Decree are stored in the diked area of the Pilot Plant Warehouse which has been determined to be the most appropriate storage location. The FEMP RCRA Part B Permit Application has not previously identified the Pilot Plant Warehouse as storage of materials with free liquids. However, the Pilot Plant Warehouse was recommended for storage of these wastes based upon ALARA concerns. Storing the thorium mixed waste elsewhere would constitute an unacceptable radiological exposure to FEMP personnel. To address this ALARA concern, the thorium waste must be stored within a radiologically

monitored and restricted area. The Pilot Plant Warehouse is radiologically monitored and restricted, thus storage of the thorium in the Pilot Plant Warehouse is appropriate and acceptable under the Consent Decree and its Stipulated Amendment entered December 2, 1988.

D-1a(3)(a) Requirement for the Base to Contain Liquids

The concrete floors of the following storage units are inspected for cracks and gaps weekly. The inspector checks the building/pad for any structural failure of the pad surface and curbing. The surrounding area is checked for signs of a release such as pooled liquids. The condition of the secondary containment is checked to ensure that all portions of the system are sealed, and free of any cracks or gaps. All drainage features including sumps, drains, and troughs are inspected to ensure there are no standing liquids. Standing liquids must be removed within 24 hours and the area re-inspected to ensure compliance. Any cracks or gaps identified will be noted on the inspection checklist. A Maintenance Work Order is written for the repair of the crack or gap. The inspector will re-inspect the area and note the conditions until the gap or crack is repaired.

Plant 1 Pad. Under the approved Work Plan as explained in D-1a(3) above, the base, catch basins, and sumps in the covered structures of the Plant 1 Pad will be covered with a chemically resistant coating. The first two Structures (TS-4 and TS-5) have been completed. The coating applied to the base of each of the structures is a polyurethane called Auto-gard II. Attachment D-1 provides information on the coating. The coating is compatible with and impervious to the

hazardous wastes stored at the Plant 1 Pad. A twelve (12) inch concrete curb has been constructed around the perimeter of each secondary containment area for TS-4 and TS-5. TS-4 and TS-5 have two secondary containment areas designated as North and South for each structure.

KC-2 Warehouse. The floor and curbs are coated with a chemically resistant coating to create an impermeable surface. The bases of Bays 1, 2, 3, 4, and 8 of the KC-2 Warehouse were re-coated as part of a RCRA Warehouse conversion project. The re-coating started in November 1992 and was completed in January 1993. The RCRA Warehouse re-coatings were part of a project to upgrade the KC-2 Warehouse for liquid RCRA ignitable waste storage capabilities. The coating, Vulkem, was used for Bays 1, 2, 3, 4, and 8. Bays 5, 6, and 7 were re-coated during October 1989 and January 1990 with Stonhard. The vendor's specifications for both Vulkem and Stonhard are provided in Attachment D-1.

Plant 9 Warehouse (Building 81). The floor and curbs are coated with a chemically resistant coating to create an impermeable surface. The concrete surface was coated with Surtreat. Surtreat is a silicon coating and is designed to protect concrete surfaces from penetration of inorganic and organic liquids. The base of the Plant 9 Warehouse is designed to contain a minimum of 10 percent of the maximum storage capacity of free liquids in each bay of the Plant 9 Warehouse. Precipitation is not a factor of influence since the storage unit is completely enclosed. The vendor's specifications for Surtreat are provided in Attachment D-1.

Plant 6 Warehouse (Building 79). The floor and curbs are coated with a chemically resistant coating to create an impermeable surface. The base of the Plant 6 Warehouse was re-coated with Surtreat during December 1992. Attachment D-1 provides information regarding the coating system, including chemical resistance data.

CP Storage Warehouse (Building 56). The base of the unit is constructed of six inch-thick concrete with 6-6-6/6 wire fabric reinforcement as shown in Figure D-51. The base and the curbs of the CP Storage Warehouse were coated with Vulkem between October 1992 and January 1993. The vendor's specifications for Vulkem are provided in Attachment D-1.

Pilot Plant Warehouse (Building 68). The containers are stored within a U-shaped concrete containment area which is enclosed at the open end of the U-shaped concrete dike with a smaller U-shaped temporary Herculite containment structure. The temporary Herculite system consists of Herculite sheeting laid on the floor. A frame is constructed of four-inch PVC piping with slip fitted joints. The Herculite sheeting is rolled over the pipe frame to form the containment dike. The seams are heat sealed.

D-1a(3)(b) Containment System Drainage

Plant 1 Pad. Precipitation will not affect hazardous waste containers in the Structures because they are enclosed structures. The covered storage area floors are and will be sloped toward dedicated sumps which are isolated from the site stormwater and wastewater systems and are intended to collect any released hazardous waste and rinseate in the event of a leak or spill. Containers stored

at the Plant 1 Pad are elevated (placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers.

KC-2 Warehouse. Containers stored in the KC-2 Warehouse are elevated (placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers. The accumulated liquid is contained within the secondary containment system until the material is removed as described in Section D-1a(3)(e). Precipitation is not a factor of influence since the storage unit is completely enclosed.

Plant 9 Warehouse (Building 81). Containers stored in the Plant 9 Warehouse are placed on pallets during storage to eliminate the potential of spilled liquids coming into contact with the containers. The accumulated liquid is contained within the secondary containment system until the material is removed as described in Section D-1a(3)(e). Precipitation is not a factor of influence since the storage unit is completely enclosed.

Plant 6 Warehouse (Building 79). Containers stored in the Plant 6 Warehouse are elevated on pallets during storage to eliminate the potential of spilled liquids coming into contact with the containers. The accumulated liquid is contained within the secondary containment system until the material is removed as described in Section D-1(a)(3)(e). Precipitation is not a factor of influence since the storage unit is completely enclosed.

CP Storage Warehouse (Building 56). The CP Storage Warehouse is a completely

enclosed structure, thus precipitation is not a factor. Containers are elevated on pallets during storage. Any accumulated liquids would be contained in the secondary containment system until removed as described in Section D-1a(3)(e).

Pilot Plant Warehouse (Building 68). The Pilot Plant Warehouse is a pre-engineered metal fabricated building which is completely enclosed and covered by metal roofing, thus precipitation is not a factor. Any liquids would accumulate in the temporary secondary containment system until the material is removed as described in D-1a(3).

D-1a(3)(c) Containment System Capacity

Containers stored in the following warehouses are stored on pallets to elevate the containers to prevent them from sitting in accumulated liquids in the event of a leak or spill. All pallets used are at least 6 inches high and provide sufficient height to protect the container if the secondary capacity is reached.

Plant 1 Pad. The design drawings for the Plant 1 Pad renovation are provided as Figures D-7 through D-15. The location of the three covered storage areas is shown in Figure D-6. The construction drawing for the Plant 1 Pad covered structures is provided as Figure D-7. Structures 1 and 2 are divided into containment areas shown in Figures D-17 and D-18. Each containment area is 220 feet X 80 feet with a twelve (12) inch concrete dike constructed around the perimeter. The maximum storage capacity for TS-4 is 653,840 gallons (11,888 55-gallon drum equivalents) and 657,360 gallons (12,052 55-gallon drum equivalents) for TS-5. The secondary containment system is capable of holding at least 10

percent of the of the maximum hazardous waste storage volume for the area. The capacity of the secondary containment areas in TS-4 is 8,810.43 ft^3 for the North bay and 8,644.8 ft^3 for the South bay. The secondary containment capacity for the North Bay in TS-5 is 8,530.99 and 8,723.4 for the South Bay. The containment calculations are provided in Attachment D-2.

Structure 3 will be constructed similar to Structures 1 and 2, but with a single containment area. The containment area will be 22,500 square feet with a twelve (12) inch concrete dike constructed around the perimeter. Its estimated maximum storage capacity will be 330,000 gallons (6,000 55-gallon drum equivalents). The containment system capacity must be capable of holding at least 10 percent (or 4,411.0 ft^3 of liquid volume) of the maximum hazardous waste storage volume of the area. The capacity of the secondary containment area in Structure 3 will be about 11,250 ft^3.

<u>KC-2 Warehouse</u>. Hazardous waste containers stored in the KC-2 Warehouse storage bays are placed on 6-inch high pallets during storage to protect the containers from sitting in accumulated liquids. The storage and containment system capacities for Bays 1, 3, 4, 5, 6, 7, and 8 of the KC-2 Warehouse storage unit are discussed separately below. Bay 2 will only provide container storage for wastes without free liquids in the future due to the discovery of an old groundwater monitoring well in the bay. The secondary containment capacity calculations are provided in Attachment II.

- <u>Bay 1</u> - The maximum storage capacity is 32,120 gallons (584 55-gallon drum equivalents). The minimum containment capacity must equal or exceed 10

percent of the maximum storage volume or 429.49 ft^3. The secondary containment capacity is 1,877.0 ft^3.

- Bay 3 - The maximum storage capacity is 33,440 gallons (608 55-gallon drum equivalents). A minimum capacity must equal or exceed 10 percent of the maximum storage volume or 447.06 ft^3. The secondary containment capacity is 1,443.0 ft^3.
- Bay 4 - The maximum storage capacity is 25,520 gallons (464 55-gallon drum equivalents). The minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 341.18 ft^3. The secondary containment capacity is 1,287.0 ft^3.
- Bay 5 - Bay 5 contains a smaller diked area within the larger area of Bay 5. The maximum storage capacity for the larger dike is 19,800 gallons (360 55-gallon drum equivalents). The minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 264.70 ft^3. The secondary containment capacity is 887.11 ft^3. The maximum storage capacity for the smaller diked area is 3,960 gallons (72 55-gallon drum equivalents). The minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 52.8 ft^3. The secondary containment capacity is 115.16 ft^3.
- Bay 6 - The maximum storage capacity is 25,520 gallons (464 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 341.18 ft^3. The secondary containment capacity is 1,045.80 ft^3.
- Bay 7 - The maximum storage capacity is 11,440 gallons (208 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10

percent of the maximum storage volume or 152.94 ft^3. The secondary containment capacity is 647.83 ft^3.

- Bay 8.- The maximum storage capacity is 5,280 gallons (96 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 70.59 ft^3. The secondary containment capacity is 440.77 ft^3.

Plant 9 Warehouse (Building 81). Hazardous waste containers stored in the Plant 9 Warehouse storage bays are elevated on pallets during storage. The storage and containment system capacities for each bay of the Plant 9 Warehouse storage unit are discussed separately below. The secondary containment capacity calculations are provided in Attachment II.

- Bay A - The maximum storage capacity for Bay A is 37,620 gallons (684 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 502.94 ft^3. The secondary containment capacity is 1,116.0 ft^3.

  Bay B - The maximum storage capacity for Bay B is 45,320 gallons (824 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 605.8 ft^3. The secondary containment capacity is 1,563.0 ft^3.

  Bay C - The maximum storage capacity for Bay C is 3,300 gallons (60 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 44.12 ft^3. The secondary containment capacity is 140.2 ft^3.

Plant 6 Warehouse (Building 79). Hazardous waste containers stored in the Plant 6 Warehouse storage bays are placed on pallets to elevate the containers during storage. The storage and containment capacities for each bay of the Plant 6 Warehouse storage unit are discussed separately below. The secondary containment capacity calculations are provided in Attachment II.

- Bay A - The maximum storage capacity for Bay A is 82,060.0 gallons (1,492 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 1,097.06 ft^3. The secondary containment capacity is 1,928.03 ft^3.
- Bay B - The maximum storage capacity for Bay B is 79,640.0 gallons (1,448 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 1,064.7 ft^3. The secondary containment capacity is 2,061.49 ft^3.
- Bay C - The maximum storage capacity for Bay C is 69,080.0 gallons (1,256 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 923.53 ft^3. The secondary containment capacity is 1,940.16 ft^3.

CP Storage Warehouse (Building 56). Containers of hazardous waste stored in the CP Storage Warehouse are elevated (placed on pallets) during storage. The maximum storage capacity is 116,160 gallons (2,112 55-gallon drum equivalents). The minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 1,552.94 ft^3. The secondary containment capacity is 3,500 ft^3.

Pilot Plant Warehouse (Building 68). Containers of hazardous waste stored in

the Pilot Plant Warehouse are elevated during storage. The drummed containers are placed on pallets and the white metal boxes are stored on cross-sections of 4-inch by 4-inch wood beams. The maximum storage capacity of the warehouse storage area is 13,200 gallons (240 55-gallon drum equivalents). The minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 176.47 ft^3. The secondary containment capacity is 197.34 ft^3.

D-1a(3)(d) Control of Run-On

Plant 1 Pad. The covered structures will provide run-on control for the storage of containers with free liquids. The first two covered structures are constructed upon a 12 inch concrete dike to prevent run-on from entering the storage areas. The third covered structure will also be constructed upon a 12 inch concrete dike to control run-on.

KC-2 Warehouse. The KC-2 Warehouse bays are covered to prevent precipitation from entering the storage areas. The area around the warehouse is sloped away from the building to prevent run-on. Bays 1, 2, 3, 4, 5, 6, 7, and 8 are also constructed with diking to further prevent run-on.

Plant 9 Warehouse (Building 81). Precipitation is prevented from entering the Plant 9 Warehouse since this area is completely covered and enclosed on all sides. The area around the warehouse is sloped away from the building to further prevent run-on.

Plant 6 Warehouse (Building 79). Precipitation is prevented from entering the

storage unit since this area is completely covered and enclosed on all sides. To further prevent run-on, the topography around the warehouse is sloped away from the building.

CP Storage Warehouse (Building 56). The storage unit is a pre-engineered, ribbed building covered by metal roofing as shown in Figure D-46. The topography around the building is sloped away from the building to prevent run-on and a ramp is used to access the building.

Pilot Plant Warehouse (Building 68). The storage area is confined to the middle of an entirely covered and enclosed structure. The drummed containers are stored on pallets and the white metal box containers are stored on wooden beams. The topography around the building is sloped away from the building to prevent run-on.

D-1a(3)(e) Removal of Liquids from Containment System

Spills and leaks are contained within the diked containment area. Spills and leaks are remediated as follows within 24 hours from discovery of the incident.

Vermiculite, diatomaceous earth, sand, sorbent pigs, or equivalent, are used to contain and/or adsorb the spilled material within the immediate area. The characteristics of the spilled material are established from the container identification if possible. The spill may then be cleaned up by absorption. A pumping system may be used to remove larger spills. A neutralizing agent is used as necessary to reduce or eliminate the hazardous properties of the spill before

absorption. Saturated sorbent material is placed in a compatible container.

If spilled material is not identifiable, samples are analyzed for hazardous characteristics in accordance with the FEMP Waste Analysis Plan and the Waste Determination Plan. The container is properly labelled. Storage and disposal is performed in accordance with applicable regulatory requirements. Equipment and materials used is decontaminated or disposed of properly.

Liquids within the covered structures of the Plant 1 Pad will be collected by the catch basins and removed by pumps. The sumps will be inspected routinely for the presence of liquids and collected liquids will be removed from the sumps.

D-1b Containers Without Free Liquids

The Plant 1 Pad Tension Structures as included in the Work Plan are designed to store hazardous waste with or without free liquids. The other areas of the Plant 1 Pad will provide storage for waste without free liquids. Also, Bays 1, 3, 4, 5, 6, 7, and 8 of the KC-2 Warehouse, the Plant 6 Warehouse, the Plant 9 Warehouse, the CP Storage Warehouse, and the Pilot Plant Warehouse are designed for the storage of hazardous waste with and without free liquids. The Plant 8 Warehouse and Bay 2 of the KC-2 Warehouse are used only for the storage of hazardous waste without free liquids.

D-1b(1) Test for Free Liquids

The chemical and physical characteristics of the hazardous waste placed in the storage units are determined by visual inspection, specific material data,

documented criteria, and/or process knowledge. The visual inspection includes checking the container contents visually for any free standing liquids. The waste characterization process is described further in Section C, Waste Characteristics.

D-1b(2) Description of Containers

The hazardous waste container storage areas accept and store wastes in containers meeting RCRA specifications as delineated in OAC 3745-55-71 and 40 CFR 264.171 and 264.172. A thorough description of containers is presented in D-1a(1).

D-1b(3) Container Management Practices

A thorough description of container management practices on-site is presented in D-1a(2).

D-1b(4) Container Storage Area Drainage

The containers in each of the following RCRA storage units are elevated (placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers.

Plant 1 Pad. The base of the Plant 1 Pad is sloped toward catch basins to remove precipitation. The Plant 1 Pad drainage is shown in Figure D-15. The catch basins (manholes) in the uncovered areas of Plant 1 Pad are connected with the stormwater management system. The covered structures will be equipped with dedicated sumps.

CP Storage Warehouse (Building 56). The CP Storage Warehouse is a completely enclosed structure. Therefore, precipitation is not a factor. The topography around the storage unit slopes away from the building to prevent run-on. Containers stored in the CP Storage Warehouse are elevated to prevent contact with any accumulated liquids.

Plant 8 Warehouse (Building 80). A photograph of the Plant 8 Warehouse is provided as Figure D-52. Figure D-53 shows the plan view of the Plant 8 Warehouse with construction details. The base of the unit is constructed of eight inch thick concrete with number 4 reinforcement rods at twelve inch intervals as shown in Figure D-56. Since the Plant 8 Warehouse is a completely enclosed structure, run-on and precipitation is not a concern.

Pilot Plant Warehouse (Building 68). The Pilot Plant Warehouse is a pre-engineered metal fabricated building which is completely enclosed and covered by metal roofing. Thus, precipitation and run-on is not a factor.

The RCRA storage area is 69 feet X 7 feet located in the center of the building. The storage area consists of a U-shaped concrete dike with the end of the U-shaped dike enclosed by a smaller U-shaped temporary Herculite containment structure to form an impermeable barrier to contain spills of hazardous waste with and without free liquids. A layout drawing of the Pilot Plant Warehouse is provided as Figure D-49.

Thorium containers designated as mixed waste under implementation plans resulting

from the 1991 Consent Decree and its Stipulated Amendment are stored in the Pilot Plant Warehouse which has been determined to be the most appropriate storage location. The FEMP RCRA Part B Permit Application has not previously identified the Pilot Plant Warehouse as storage of materials with free liquids. However, the Pilot Plant Warehouse was recommended for storage of these wastes based upon ALARA concerns. Storing the thorium mixed waste elsewhere would constitute an unacceptable radiological exposure to FEMP personnel. To address this ALARA concern, the thorium waste must be stored within a radiologically monitored and restricted area. The Pilot Plant Warehouse is radiologically monitored and restricted, thus storage of the thorium in the Pilot Plant Warehouse is appropriate and acceptable under the Consent Decree and its Stipulated Amendment entered December 2, 1988.

KC-2 Warehouse. The KC-2 Warehouse is a completely enclosed structure, therefore, precipitation is not a factor. Containers stored in the warehouse bays are elevated (placed on pallets) during storage, to eliminate the potential of spilled liquids coming into contact with the containers.

Plant 9 Warehouse (Building 81). The Plant 9 Warehouse may be used for the storage of hazardous waste with and without free liquid. Figure D-37 provides a photograph of the Plant 9 Warehouse. The structure is an 80 foot by 100 foot single story, pre-engineered, ribbed, metal building covered with metal roofing. Concrete curbs and dikes were installed in 1990. The original stormwater drains and sumps were sealed. A detailed construction drawing of the Plant 9 Warehouse is shown in Figure D-38.

Plant 6 Warehouse (Building 79). The Plant 6 Warehouse is a pre-engineered, ribbed, unheated building covered by metal roofing. Since this unit is completely enclosed, precipitation is not a factor. A photograph of the Plant 6 Warehouse is provided as Figure D-54. The storage unit is divided into three (3) diked bays with access ramps provided for access to the enclosed areas as shown in Figure D-41. As indicated, the base is constructed of eight inch concrete with number 4 reinforcement rods at 12 inch intervals. Containers stored in the Plant 6 Warehouse are elevated (placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers.

D-2 TANKS SYSTEMS

The FEMP is not seeking a permit for tank systems, therefore, this section is not applicable.

D-3 WASTE PILES

The FEMP is not seeking a permit for waste piles, therefore, this section is not applicable.

D-4 SURFACE IMPOUNDMENTS

The FEMP is not seeking a permit for surface impoundments, therefore, this section is not applicable.

D-5 TRIAL BURN

The FEMP is not seeking a permit for trial burns, therefore, this section is not applicable.

D-6 LANDFILLS

The FEMP is not seeking a permit for landfills, therefore, this section is not applicable.

D-7 LAND TREATMENT

The FEMP is not seeking a permit for land treatment, therefore, this section is not applicable.

D-8 MISCELLANEOUS UNITS

The FEMP is not seeking a permit for miscellaneous units, therefore, this section is not applicable.

D-9 SUBPART AA

The facility has no process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction or air or steam stripping managing hazardous wastes with organic concentrations at least 10 parts per million (ppm). Therefore, the facility is not subject to this rule at this time.

D-10 SUBPART BB

The facility has no equipment that contains or contacts hazardous waste with organic concentrations of at least 10 percent by weight that are managed in:

- Units that are subject to the permitting requirements of 40 CFR Part 270,

or

- Hazardous waste recycling units that are located at hazardous waste management facilities otherwise subject to the permitting requirements of 40 CFR Part 270.

Therefore, the facility is not subject to this rule at this time.

SECTION D - PROCESS INFORMATION
RCRA STORAGE UNITS

TABLE D-1

RCRA STORAGE UNIT	MAXIMUM CAPACITY IN GALLONS (55-gallon drum equivalents)	PERCENTAGE OF TOTAL MAXIMUM CAPACITY USED (AS OF 3/15/93)	WITH FREE LIQUIDS OR WITHOUT FREE LIQUIDS	STORAGE OF IGNITABLE WASTE	STACKING HEIGHT	AISLE SPACING
1. CP STORAGE WAREHOUSE - Bldg. 56	116,160	40%	With or Without free liquids	Yes	Three High	Minimum of 22 inches
2. Plant 1 Pad	10,892,200 Total	3% Total for Plant 1 Pad	With or Without free liquids	No	Four High	Minimum of 24 inches
Structure 1	657,360		With or Without free liquids	No	Four High	Minimum 24 inches
Structure 2	653,840		With or Without free liquids	No	Four High	Minimum of 24 inches
Structure 3	Yet to be constructed. Estimated capacity of 330,000					
Area Outside of Structures	9,581,000		Without free liquids	No	Four High	Minimum of 24 inches
3. Plant 8 Warehouse - Bldg. 80	139,260	77%	Without free liquids	No	Four High	Minimum of 22 inches
4. Pilot Plant Warehouse - Bldg. 68	13,200	37%	With or Without free liquids	No	Three High	Minimum of 22 inches
5. KC-2 Warehouse - Bldg. 63	200,640 Total	27% Total for KC-2 Warehouse	With or Without free liquids	Yes	Two High	Minimum of 22 inches

SECTION D - PROCESS INFORMATION
RCRA STORAGE UNITS

TABLE D-1
(cont.)

RCRA STORAGE UNIT	MAXIMUM CAPACITY IN GALLONS (55-gallon drum equivalents)	PERCENTAGE OF TOTAL MAXIMUM CAPACITY USED (AS OF 3/15/93)	WITH FREE LIQUIDS OR WITHOUT FREE LIQUIDS	STORAGE OF IGNITABLE WASTE	STACKING HEIGHT	AISLE SPACING
Bay 1	32,120		With or Without free liquids	Yes	Two High	Minimum of 22 inches
Bay 2	43,560		Without free liquids	No	Two High	Minimum of 22 inches
Bay 3	33,440		With or Without free liquids	Yes	Two High	Minimum of 22 inches
Bay 4	25,520		With or Without free liquids	Yes	Two High	Minimum of 22 inches
Bay 5-Large Diked Area	19,800		With or Without free liquids	Yes	Two High	Minimum of 22 inches
Small Diked Area	3,960		With or Without free liquids	Yes	Two High	Minimum of 22 inches
Bay 6	25,520		With or Without free liquids	Yes	Two High	Minimum of 22 inches
Bay 7	11,440		With or Without free liquids	Yes	Two High	Minimum of 22 inches
Bay 8	5,280		With or Without free liquids	Yes	Two High	Minimum of 22 inches
6. Plant 9 Warehouse - Bldg. 81	86,240	56% Total for All Bays in Plant 9 Warehouse	With or Without free liquids	No	Four High	Minimum of 22 inches

SECTION D - PROCESS INFORMATION
RCRA STORAGE UNITS

TABLE D-1
(cont.)

RCRA STORAGE UNIT	MAXIMUM CAPACITY IN GALLONS (55-gallon drum equivalents)	PERCENTAGE OF TOTAL MAXIMUM CAPACITY USED (AS OF 3/15/93)	WITH FREE LIQUIDS OR WITHOUT FREE LIQUIDS	STORAGE OF IGNITABLE WASTE	STACKING HEIGHT	AISLE SPACING
Bay A	37,620		With or Without free liquids	No	Four High	Minimum of 22 inches
Bay B	45,320		With or Without free liquids	No	Four High	Minimum of 22 inches
Bay C	3300		With or Without free liquids	No	Four High	Minimum of 22 inches
7. Plant 6 Warehouse - Bldg. 79	230,780	41% Total for All Bays in Plant 6 Warehouse	With or Without free liquids	No	Four High	Minimum of 22 inches
Bay A	82,060		With or Without free liquids	No	Four High	Minimum 22 inches
Bay B	79,640		With or Without free liquids	No	Four High	Minimum of 22 inches
Bay C	69,080		With or Without free liquids	No	Four High	Minimum of 22 inches

SECTION D - PROCESS INFORMATION
CONTAINER SPECIFICATIONS

TABLE D-2

CONTAINER TYPE	DOT SPECIFICATIONS	VOLUME	WASTE TYPE
Single Trip, Bung Type	17E	55-gallon	liquids
Single Trip, Open Head	17H	55-gallon	liquids and solids
Sealed Head	5	5-gallon	liquids
Metal Drum	17C	10-gallon	liquids
Metal Drum	17C	30-gallon	liquids and solids
Metal Drum	16 gauge	85-gallon	liquids
Metal Drum	16 gauge	110-gallon	liquids
Steel	Type 7-A	330-gallon	solids
Steel (Sea/Land)	Strong Tight Packaging	40 cu. yd.	solids

FLOOR COATINGS

EPOXY	EPOXY\ PHENOLC	EPOXY/ AMINE	ACRYLIC	FLUOROPOLYMER	POLYURETHANE	SILICON	VINYL	FURAN	PHENOLIC
EPO Coat VA by Commercial Co.	7122 by Plasite	UltraPlex ESD by FlorLine Corp.	Degadur (Methyl-acrylate) by Degussa Corp.	Fluorolast by Lauren	Chemi-Cote UR-1000 (Aliphatic) UR-2000 (Aromatic) UR-4000 (Aliphatic Polyester) by Garland	Penncoat 401 by Pennwalt	4000 SERIES (Vinyl Ester) by Plasite	Furan Mortar by Pennwalt	Mod. Phenolic Mortar by Pennwalt
Chemi-Top Resurfacer by Garland		Series 66 by Tnemec	R71, R61sl, R7, & R8 (Acrylic) by Silikal		Chemglaze A-Line (Aliphatic) Z-Line (Aromatic) by Lord Co.	Silica\Silicate Mortar by Pennwalt	Mortar CE-239 (Vinyl Ester) by Pennwalt		Phenolic Mortar by Pennwalt
Penntrowel by Pennwalt		Series 104 by Tnemec	Spray-Cure & Seal by Murphy-Phoenix Company		Pennguard by Pennwalt	Surtreat (water soluble Alkaline Silicates) by	Series 35 (Vinyl-Copolymer) by Tnemec		
C-725 by Plasite					Auto-Gard II by Neogard, Division of Jones-Blair		Series 120 (Vinyl Ester) by Tnemec		
7133 by Plasite									
7156 by Plasite									
9060 by Plasite									
9080 by Plasite									
Stonkote GS4 & HT4 by Stonhard Inc.									
Series 61 by Tnemec Co.									
ICO-Super Guard by International Coatings Inc.									

VULKEM application instructions

Vulkem Traffic Deck Coating System

Vulkem 350 / 345 / 346

1. PURPOSE

1.1 The purpose of this document is to establish uniform procedures for applying the VULKEM TRAFFIC DECK COATING SYSTEM.

1.2 The techniques involved may require modification to adjust to job site conditions. Consult your Vulkem representative for specific design requirements.

2. SCOPE

2.1 This document will provide the necessary instructions for the application of the VULKEM TRAFFIC DECK COATING SYSTEM to qualify for the manufacturer's warranty.

3. CONDITIONS

3.1 Surfaces to receive coating, sealant or liquid applied flashing material shall be sound, dry, clean and free of all dirt, dust, oil, grease, wax, tar, asphalt, mildew, mold, paint, sealer, coatings, curing agents, loose particles, laitance and other contamination or foreign matter which may interfere with the adhesion of the coating, sealant or liquid applied flashing materials.

Sandblast

3.2 The condition of "dry" shall be determined by fastening a rubber mat to the concrete deck for a minimum of six hours. Said mat shall be located in an area exposed to the sun. After six hours (minimum), the surface beneath the rubber mat shall show minimal evidence of moisture or dampness.

3.3 Shrinkage cracks in the concrete surface which are 1/8 inch wide or greater shall be ground out to a minimum 1/4 inch wide by 1/2 inch deep and treated following section 5. Detail Work. Structural cracks resulting from building movement regardless of width shall be ground out to a minimum 1/4 inch wide by 1/2 inch deep and treated following section 5. Detail Work.

3.4 Spalled areas shall be cleaned and filled with a non shrink grout and made level with the existing surface.

3.5 In the event of exposed reinforcing steel, the exposed portions of steel shall be ground to expose clean, bright metal and coated with Vulkem Primer #181.

3.6 Surfaces shall be made free of defects which may telegraph and show through the finished coating. Surfaces which are rough (fins, ridges, exposed aggregate, honeycombs, deep broom finish, etc.) shall be leveled and made smooth by applying a coat of sand filled epoxy or equivalent filler material. If filler material is porous, it should be sealed with Vulkem Primer #171 at the rate of 125 square feet per gallon.

3.7 All drains shall be clean and operative. Drains shall be recessed lower than the deck surface. Surfaces shall be sloped to the drain to provide positive drainage.

3.8 Cut a 1/4 inch wide by 1/4 inch deep keyway into the concrete surface at any point where the coating will have an exposed terminating edge. That is; any point where the coating will end in an open area subject to traffic. (i.e., at the end of a ramp, etc.)

3.9 If the project is restorative in nature, old sealant and backing material shall be removed. The joint interface may require a thorough wire brushing, grinding sandblasting, solvent washing and/or a primer.

4. MATERIALS

4.1 Recommended materials and their use is as follows:

VULKEM 227 SEALANT. A two-part polyurethane sealant for use in sealing cracks, expansion joints, control joints and for use in forming cants.

MAMECO INTERNATIONAL, INC.

4475 East 175th Street • Cleveland, Ohio 44128-3599

Telephone: (216) 752-4400 • (800) 321-6412 • FAX (216) 752-5005

VULKEM 350 COATING. A one-part, self-leveling polyurethane coating used as the elastomeric waterproof membrane of the system.

VULKEM 450 COATING. A one-part, slightly thixotropic polyurethane coating used for liquid applied flashing. Also used in lieu of Vulkem 350 in sloped areas.

VULKEM 345 COATING. A two-part, sand-filled, polyurethane coating to provide optimum wearing characteristics.

VULKEM 346 COATING. A one-part, aliphatic modified coating to provide additional chemical and UV resistance to the coating system.

BACKER ROD. A closed cell polyethylene back up material used in expansion joints and at the base of cants to prevent three sided adhesion, and to control the depth of the sealant.

VULKEM PRIMER #171. A one-part, film forming primer to be used on porous surfaces to improve adhesion and to reduce pinholes in the membrane. Also used in expansion joints subject to continuous immersion or subject to water intrusion from hydrostatic conditions.

VULKEM PRIMER #181. A one-part primer for use on any metal surface to which any VULKEM product may be applied.

VULKEM PRIMER #191. A one-part interlaminar primer for use when applying a fresh coat of Vulkem urethane after preceeding coat has been exposed for long periods and/or has lost its surface tack.

AGGREGATE. 20-30 mesh silica sand or alumina oxide, which imparts the non slip texture and contributes to wear resistance.

5. DETAIL WORK

NOTE: ***Do not apply sealant or coatings to a frosty, damp or wet surface or when the air temperature is below 40°F. or the surface temperature is above 110°F. Cure times as stated below are based upon standard ambient conditions of 75°F., 50% Relative Humidity. A decrease in ambient temperature will significantly lengthen the cure time.***

5.1 Mix Vulkem 227 Sealant using a suitable size mixing blade in a slow speed electric or air powered drill motor. Avoid trapping air into the mixture. Move the mixing blade around the inside of the container to assure complete disbursement of the catalyst.

5.2 Lay a 1/4 inch diameter Backer Rod into the corner at the juncture of all horizontal and vertical surfaces (such as: curbs, wall sections, columns or penetrating through the deck). Apply a bead of VULKEM 227 Sealant one inch diameter over the Backer rod. Tool the sealant bead to form a 45° cant. Use sufficient pressure to force out any entrapped air and to assure complete wetting of the surface. Remove excess sealant from the deck or wall surface.

5.3 Install a Backer Rod, 1/8 inch to 1/4 inch diameter larger than the joint width to all prepared expansion joints. Set depth of Backer Rod to control the depth of the sealant. (Depth of sealant is measured from the top of the Backer Rod to the top of the concrete surface). Proper depth of sealant is as follows:

Joints 3/8 inch or less—Sealant depth shall be equal to the joint width (1/4 inch minimum).

Joints 1/2 inch to 3/4 inch—Sealant depth shall equal one half of joint width.

Joints over 3/4 inch—Sealant depth shall be 3/8 inch.

5.4 Completely fill joint with VULKEM 227 Sealant. For cracks treated as expansion joints, tool sealant flush with the surface. For expansion joints, tool sealant slightly concave so as the surface of the sealant is below the surface of the deck.

5.5 Allow VULKEM 227 Sealant to cure overnight.

5.6 Apply a coat of wax (or bondbreaker tape) over the cured VULKEM 227 Sealant cant. Apply a strip of tape (masking tape or duct tape) to the vertical sections, two or three inches above the VULKEM 227 Sealant cant to provide a neat termination of the vertical detail coat. Apply a 25 mil thick detail coat of VULKEM 450 over the treated cant and extend the VULKEM 450 to the tape on the vertical surface and 4 inches onto the horizontal surface. Featheredge the ter-

minating edge of the VULKEM 450 detail coat on the horizontal surface so it will not show through the finished coating.

5.7 Apply a 30 mil thick detail coat of VULKEM 450, 6 inches wide centered over all untreated cracks, all routed and sealed cracks and over all cold joints. Feather edge terminating edge of detail coat to avoid these edges from showing through the finished coating.

5.8 Allow all detail coats to cure for 24 hours.

NOTE: Expansion joints should not be coated over. If a uniform color is required (including joints) apply VULKEM 346 over the joints.

6. COATING APPLICATION

6.1 Apply VULKEM 350, 25 mils thick to the entire area to be coated, including over all detail coats, but excluding expansion joints. The most popular method of application is with a notched squeegee or notched trowel. VULKEM 350 can be applied with a roller (solvent resistant roller sleeve) or by airless spray equipment. Airless spray should be at least a 30:1 ratio pump. Operate at 50 psi, use a .029 to .037 reversible tip. ***(Note: In sloped areas, use VULKEM 450 in lieu of VULKEM 350).*** (1)

6.2 Allow VULKEM 350 (VULKEM 450) to cure for 24 hours. (see Note Section 5).

6.3 VULKEM 345 MIXING. VULKEM 345 is a two-part material and requires mixing immediately prior to application. The two components (Part A and Part B) must be mixed thoroughly until there are no streaks or striations in the mixture.

NOTE: The VULKEM 350 (or VULKEM 450) should have a slight surface tack to aid in the adhesion of the VULKEM 345. If the membrane coat has cured so as to not have a surface tack, the surface must be cleaned with a cloth which has been wet with Xylol (Xylene). DO NOT SATURATE THE SURFACE WITH SOLVENT. If the membrane coat has been allowed to be exposed for a prolonged period, it should be cleaned, then prime coated with VULKEM PRIMER #191.

6.4 The first coat of VULKEM 345 is applied to driving lanes, ramps, and turn areas. Apply the VULKEM 345 with a heavy duty roller (3/4 to 1 inch nap) at a thickness of 15 mils. Apply in sections which can be easily reached for backrolling. Immediately following the application of the VULKEM 345, broadcast a 20 to 30 mesh silica sand (or other suitable aggregate) into the wet VULKEM 345. Broadcast the sand at a rate of 12.5 pounds per gallon of VULKEM 345. This is an equal volume of sand and liquid. Regardless of how the sand is broadcast (i.e. by hand, seed spreader, sandblast, etc.), backrolling is necessary to assure all the aggregate is evenly distributed. (2)

6.5 Allow the first coat of VULKEM 345 to cure overnight.

6.6 Repeat steps above (paragraph 6.3 thru 6.5). The second coat of VULKEM 345 shall be applied over the entire surface of the deck. (3)

6.7 Allow the second coat of VULKEM 345 to cure overnight.

6.8 Apply VULKEM 346 with a brush, roller or airless spray at a rate of 200 square feet per gallon. Apply this final coat to the entire coated area. (4)

7. CLEAN UP

7.1 Clean all adjacent areas to remove any stains or spills with MEK, Toluene or Xylene.

7.2 Clean tools or equipment with MEK, Toluene, or Xylene before materials cure.

7.3 Clean hands by soaking in hot, soapy water then brush with a stiff bristle brush.

8. USAGE

The following is a guide to figuring material usage:

VULKEM 227 SEALANT. For a 1 inch cant bead over a 1/4 inch backer rod, 1 gallon of sealant for every 20 linear feet is required.

VULKEM 450 DETAIL COAT (25 MILS). A detail coat which extends 4 inches on the vertical wall and 4 inches on the horizontal deck requires 1 gallon of coating for every 90 linear feet. A detail coating (6

inch x 25 inch mils) over a crack requires 1 gallon of coating for every 120 linear feet.

VULKEM 350 COATING. Apply at 55 square feet per gallon for a mil thickness of 30 mils.

VULKEM 345 COATING. Apply at 100 square feet per gallon for a mil thickness of 15 wet mils (per coat). Broadcast an equal quantity of sand, yielding a 30 mil thick coating.

VULKEM 346 TOPCOAT. Apply at 200 square feet per gallon for a mil thickness of 8 mils.

APPROVED ☑
APPROVED AS CORRECTED ☐
REVISE AND RESUBMIT ☐
NOT APPROVED ☐

Checking is only for conformance with the designed concept of the project and compliance with the information given in the contract documents. Supplier is responsible for dimensions to be confirmed correlated at the job site; for information that pertains solely to the fabrication processes or to techniques of construction; and for co-ordination of the work of all trades.

R. E. SCHWEITZER CONSTRUCTION CO.
2563 NORTHBEND ROAD
CINCINNATI, OHIO 45239

Date: 10/6/92 By: Raymond V. Roll

-4457-

SPEC-DATA®

This Spec-Data sheet conforms to editorial style prescribed by The Construction Specifications Institute. The manufacturer is responsible for technical accuracy.

1. PRODUCT NAME

AUTO-GARD II Concrete wear surface coatings

2. MANUFACTURER

Neogard Div. of Jones-Blair
P.O. Box 35288
6900 Maple Avenue
Dallas, Texas 75235
Phone: (214) 353-1689

3. PRODUCT DESCRIPTION

AUTO-GARD II is a fluid surface applied elastomeric wearing surface waterproofing system which is applied in homogenous layers positively bonded to the substrate. The system's elastic qualities allow it to bridge shrinkage cracks in concrete.

Basic Use: Surface applied, skid resistant wearing surface waterproofing coating system for parking garages and ramps to protect occupied areas underneath against water damage and to keep concrete slabs from spalling and deteriorating due to deicing salts, chemicals and freeze-thaw damage.

Limitations: The substrate must be concrete, structurally sound with a minimum of 4000 psi compressive strength, clean and dry. AUTO-GARD II cannot be bonded to wax, oils, grease or tar. It cannot be applied to concrete cured with compounds of wax, chlorinated rubber or resin base. Minimum temperature for application is 40°F (4.4°C). Steel decking over which concrete is poured should be perforated to permit escape of trapped moisture on exterior exposed applications.

Composition and Materials: The AUTO-GARD II system is composed of polyurethane coating, quartz aggregate, and epoxy primer.

Sizes: The basic ingredients in AUTO-GARD II are shipped in liquid form, in metal containers, varying in size from 5 to 55 gallon capacity. All containers bear Underwriters' Laboratory, Inc. labels.

Colors: Gray and tan are the standard colors. Other top coat colors are available on special order. Price subject to inquiry.

4. TECHNICAL DATA

Physical properties of the liquid polyurethane coating are included in Table 1. Test results of the cured coating film are listed in Tables 2 and 3.

5. INSTALLATION

Licensed Applicator: AUTO-GARD II coating materials are installed by licensed applicators of Neogard. These licensed applicators are trained for the application of Neogard coatings in complete accordance with application instructions provided by Neogard. Applicators are licensed on a non-exclusive basis.

Preparatory Work: Proper surface preparation is of the utmost importance. All surfaces to which AUTO-GARD II is to be applied must be uniform, clean, dry, free of ridges, sharp projections, or other defects.

Concrete decks shall be cured for a minimum of 28 days. Water cured treatment of concrete is preferred. The use of concrete curing agents, if any, shall be of the sodium silicate base only. Others require prior written approval by Neogard. Prior to application of materials, deck must be acid etched with a 14% or 15% solution of muriatic acid.

It is recommended to finish the concrete with power or hand steel trowel followed by a soft hair broom to obtain light texture or "sidewalk" finish.

Methods: The AUTO-GARD II system is applied by squeegee, power roller, hand roller, airless spray, or combination of all four.

Primer: Apply Neogard II Primer at the nominal rate of ⅓–½ gallon per 100 square feet over entire surface. When primer is tack-free apply base coat same day or re-prime.

Detail Work: Cracks less than 1/16" should be primed and coated with two or three coats of AUTO-GARD II coating material. Cracks in excess of 1/16" should be routed out, blown clean, and filled flush with urethane

TABLE 1. PHYSICAL PROPERTIES OF LIQUID POLYURETHANE COATING

PHYSICAL PROPERTY	RESULTS	ASTM TEST METHOD IF APPLICABLE
Flashpoint of Solvent	80-100°F	D1310
Solvent Odor	Ester	D1296
Specific Gravity	1.18	D1475
Viscosity	80-100 KU	D562
Volume Solids	75% ±2%	Calculated
Weight Per Gallon	9.65±2 lbs.	D1475
Weight Solids	80% ±2%	D1353

TABLE 2. PERFORMANCE REQUIREMENTS OF CURED FILM

PHYSICAL PROPERTY	RESULTS	ASTM TEST METHOD IF APPLICABLE
Fire Resistance of System	U.L. 790 Class "A" over non-combustible deck	E108
Tensile Strength Min. at Break	2500 psi	D412
Elongation at Break at 75°F (23.8°C), % Min.	450%	D412
Permanent Set at Break % Min.	10%	D412
Hardness	78 to 87 Shore A	D2240
Tear Resistance	250 lbs. per linear inch	D1004
Abrasion	15 mg. loss	C501 Taber Abrasion 1000 Rev. with 1000 gm/wheel psig CS-17 Wheels
Adhesion to Substrate lbs/in. Min.	30 lbs/in.	D903
Weather Stability	Maintains Flexibility −40°F to +180°F	Heat/Cold
Thermal Shock	No loss of Adhesion	Alternate Heat/Cold cycle
Weathering Resistance	Slight Chalking Weatherometer 350 hours	D822
Moisture Vapor Transmission at 36 mil	1.08 Perms	E96 Procedure B

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Neogard Div. of Jones-Blair
November 1988
(Supersedes November 1984)
7
TRAFFIC TOPPING
Vehicular System

TABLE 3. CHEMICAL RESISTANCE OF CURED COATING FILM

16 Hour Spot Test ASTM D1308*

CHEMICAL	RESULT
Automobile Brake Fluid	N
Animal Urine	N
Battery Acid	N
Bleach	S
Blood	N
Bunker Fuel #2	N
Carbon Tetrachloride	N
*Chloroform	N
Deicing Chemical	N
Ethylene Glycol (Anti-Freeze)	N
Gasoline	N
Hydrochloric Acid 20%	N
Hydrochloric Acid 35%	S
Isopropyl Alcohol	N
Lipstick	N
Methyl Alcohol	N
Methylethyl Keytone	O
Mineral Oil	N
Motor Oil	N
Naphtha	N
Nitric Acid 10%	S
Skydrol (Fire retardant, Aircraft Hydraulic Fluid)	B
Sodium Chloride 5%	N
Sodium Hydroxide 40%	N
Sulfuric Acid 25%	N
Treated Sewage	N
Xylene	O

*Contact Neogard for test results of film under constant immersion.

Key: N –No Effect
S –Staining of Film
O –Slight Swell
B –Blistered

sealant. Apply detail coats to sealed cracks as detailed above. Extend coating a minimum distance of 2" on either side of all cracks, cold joints or control joints. Sheet flashings should be provided at locations of high movement.

Base Coat: Apply 1⅓ gallons per 100 square feet of AUTO-GARD II polyurethane coating material to all surfaces in two coats to yield an average 20 dry mils. Extend base coat over all cracks, and control joints which have received treatment. Install integral flashings after base coat has cured. Apply base coat same day as prime coat.

Wearing Surface Coat: Apply in one coat, ⅔ gallons per 100 square feet of AUTO-GARD II coating material to yield an average of 8 dry mils and immediately broadcast properly-graded, evenly distributed, hard (6.5+ Moh's Scale) #7992 aggregate at the rate of 15 lbs. per 100 square feet. When dry, sweep off excess aggregate and recoat surface with 1 gallon per 100 square feet of AUTO-GARD II material to yield an average of 12 dry mils. Total system coating thickness averages 40 dry mils exclusive of aggregate.

Note: For heavy traffic areas such as ticket booths, spiraled ramps, turn areas, or in other areas subjected to extreme high traffic abrasion: after aggregate coat and before finish coat—apply 1 gallon to yield an average of 12 dry mils per 100 square feet of AUTO-GARD II coating and immediately broadcast an additional 10 pounds per 100 square feet of aggregate. When dry, sweep off excess aggregate and coat surface with 1 gallon (12 mils) per 100 square feet of AUTO-GARD II coating material. This will yield an average 52 dry mil system, exclusive of aggregate.

Precautions: Although AUTO-GARD II is rated fire resistant in its cured state, it is a "red label" liquid and highly flammable during application. Extreme caution must be used when applying AUTO-GARD II in an interior situation where the solvents can contaminate the air conditioning or ventilation of occupied spaces. In confined areas, the best form of protection against organic solvents or other potentially sensitizing vapors is a fresh air supply. For maximum protection, it is recommended to use NIOSH/MESA approved self-contained breathing apparatus with a full face piece operated in a positive pressure mode. In unrestricted (open outdoor) areas, it is recommended to wear a suitable mask or respirator of a type approved by NIOSH/MESA. To prevent excessive skin contact with the material, it is recommended to use fabric coveralls and neoprene or other resistant gloves. To prevent eye contact, wear a full face mask or OSHA-approved protective goggles. Keep away from heat, sparks and open flames.

6. AVAILABILITY AND COST

Availability: AUTO-GARD II systems are available through licensed applicators nationally and internationally.

Cost: Costs vary due to variations in labor rates, job size and conditions. Budget quotations available upon request.

7. WARRANTY

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AUTO-GARD II materials and workmanship are jointly and severally guaranteed, on a single document, by Neogard and the licensed applicator. The guarantee insures the waterproofing performance of the system, at no cost to the owner, for a period of three years. Provisions also guarantee the integrity of the system against cracking of the substrate up to 1/16" in width; otherwise, no liability is to be assumed for defects in the substrate. Liability for damage, in any respect to the building or contents thereof is specifically excluded from this guarantee.

8. MAINTENANCE

Good housekeeping procedures as generally practiced by the industry will assure years of satisfactory performance. However, should damage occur, repairs are simple, and the procedure for them can be followed by maintenance men. Areas to be repaired should be cleaned, all damaged materials removed, the area primed and the full mil thickness replaced. Where a regular maintenance and cleaning program is required, surfaces may be washed with commercial detergents or steam cleaned. All blades on snow removal equipment must be guarded with a ski device at each end of blade to protect surface from contact damage.

9. TECHNICAL SERVICES

Factory trained representatives are established in principal cities and markets throughout the continental United States and factory personnel are available for assistance at any time. Call area code (214) 353-1689 and ask for "Technical Service."

10. FILING SYSTEMS

SPEC-DATA® II
Sweet's Architectural File

NEOGARD
Div. of Jones-Blair
6900 Maple Avenue—P.O. Box 35288—Dallax, Texas 75235—Phone (214) 353-1689
Telex No: 73-2665 Cable: Neogard Dal

SURTREAT

Tony

Headquarters
Allegheny Building • Suite 1111
429 Forbes Avenue • Pittsburgh, PA 15219
(412) 281-1202 FAX 281-1282

Research & Development
University of Pittsburgh • Applied Research Center
805 William Pitt Way • Pittsburgh, PA 15238
Writer's Phone Number:
(412) 826-3444

Surtreat Concrete Surface Protection Properties

SURTREAT protects concrete surfaces from penetration and attack by inorganic and organic liquid via two mechanisms: surface penetration/chemical reaction and surface coating/sealing.

The primary **SURTREAT** concrete protection mode results from the liquid **SURTREAT** formulation penetrating the concrete and reacting with the portland cement to form an inorganic polymer which is chemically bonded to the cement. This seals the concrete pores and makes it resistant to attack by even strong mineral acids. The reduced porosity inhibits penetration of organic and inorganic liquids, but does not completely resist surface wetting of the concrete.

Further application of **SURTREAT** is made to build up a surface film which is resistant to penetration by and solubility in organic liquids. This surface film, though, is not totally resistant to reaction with strong mineral acids. The surface coating is not removed, but changes appearance from a clear to white film when contacted by strong acids.

When **SURTREAT** is applied to protect a RCRA warehouse concrete floor several applications are made to both seal the pores and protect the concrete, and to form a solvent resistant surface film. A floor so treated will resist reaction with and penetration by inorganic acids such as:

Hydorchloric	- 32%
Sulfuric	- 98%
Sulfuric	- 50%
Nitric	- Concentrated

and organic acids such as:

Acetic	- Glacial
Acetic	- 50%
Citric	- Aqueous Solution

and inorganic bases such as:

Sodium hydroxide	- 50% solution
Potassium hydroxide	- 50% solution

The **SURTREAT** sealed concrete surface with a top coat will resist solubility in and penetration by the most aggressive organic liquids such as:

Acetone
Chloroform
Trichloroethylene
Xylene
Benzene
Methanol
Acetic Acid
Dimethylsulfoxide
Tetrahydrofurane
Dimethyl Acetamide

SURTREAT coated concrete surfaces have not been exposed to every organic solvent or inorganic chemical. The exposure tests run (as summarized here) have demonstrated a high degree of resistance to chemical attack and penetration.

A condition under surface penetration which might occur could be a combined spill of strong mineral acids and aggressive organic solvents such as hydrochloric acid plus trichloroethylene, where the acid would attack the top coat and open the surface to wetting by the organic solvent. This combination was tested in the laboratory as a mixed spill and the concrete surface resisted both reaction and penetration by both chemicals.

All resistance tests were run on **SURTREAT** coated surfaces by applying a few drops of each chemical and observing its effect up to one hour versus a similar application to an uncoated surface.

Specific resistance tests can be run on any combination of chemicals which may be of concern.

If a spill does occur on a **SURTREAT** coated floor, it should be inspected for surface damage and if necessary **SURTREAT** will repair the surface coating.

For further information on **SURTREAT** chemical resistance please contact:

Robert A. Walde
Surtreat Corp.
805 William Pitt Way
Pittsburgh, PA 15238
(412) 826-3240

Besides applying **SURTREAT** to a concrete floor, **SURTREAT** also seals all cracks and joints with a urethane elastomer which is then coated with **SURTREAT** to protect it from solvents. This insures a total resistance to migration of a chemical spill from the containment area.

Degadur

CHEMICAL RESISTANCE CHART

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Test Media	DEGADUR® 330, 410, 412, 510	DEGADUR® 520
Acids		
Acetic Acid, 10%	•	•
Acetic Acid, 30%	O	•
Chromic Acid, 20%	•	•
Chromic Acid, 40%	–	•
Citric Acid, 30%	•	•
Formic Acid, 10%	O	•
Hydrochloric Acid, conc.	•	•
Lactic Acid, 30%	+	•
Nitric Acid, 10%	•	•
Nitric Acid, 30%	O	O
Phosphoric Acid, 40%	•	•
Sulphuric Acid, 30%	+	•
Sulphuric Acid, 50%	O	•
Alkalies		
Ammonia, 10%	+	•
Caustic Soda, 50%	+	+
Potassium Hydroxide, 50%	•	•
Sodium Hypochlorite	+	•
Miscellaneous		
Acetone	–	–
Ammonium Chloride	+	+
Animal Fats	+	+
Antifreeze	+	+
Benzene	–	O
Butyl Acetate	–	–
Calcium Chloride	+	+
Carbon Tetrachloride	–	O
Castor Oil	+	+

	DEGADUR® 330, 410, 412, 510	DEGADUR® 520
Miscellaneous (cont.)		
Crude Oil	+	+
Diesel Fuel	•	•
Ethanol, 30%	•	•
Ethyl Acetate	–	–
Fruit Juices	•	•
Gasoline	O	•
Hydrogen Peroxide, 10%	•	•
Hydrogen Peroxide, 35%	•	•
Isopropyl Alcohol	–	O
Kerosene	+	•
Linseed Oil	•	•
Methyl Ethyl Ketone	–	–
Mineral Oil	•	•
Olive Oil	•	•
Paraffin Oil	+	•
Petroleum	+	+
Potassium Chloride	•	+
n-Propyl Alcohol	–	O
Salt Water	+	•
Sodium Carbonate	+	+
Sodium Sulphate	+	+
Styrene	O	+
Turpentine	+	+
Toluene	–	O
Trichloroethylene	–	–
Vegetable Juice	•	•
White Spirits	•	•
Wine	O	•
Xylene	–	O

• Adequate Resistance O Resistant – Non-Resistant

For resistance to other chemicals, please contact Degussa.

PHYSICAL TESTS—SYSTEMS

TYPICAL PROPERTIES OF DEGADUR®-BASED RESURFACING SYSTEMS

U.S.

Property	Test Method	Units	330SL	412RO	412SL	412TO	510PC
USDA Approval	—	—	Yes	Yes	Yes	Yes	No
Compressive Strength	ASTM D695	psi	2500-3000	900-1400	5000-5500	4400-5200	2800-3500
Tensile Strength	ASTM D638	psi	500-700	1400-1600	1500-2000	400-600	600-1000
Flexural Strength	ASTM C580 mod	psi	1300-1500	—	2700-2800	2500-3000	1500-2200
Freeze/Thaw Resistance	ASTM C666	Pass/Fail	Pass	—	—	—	—
Bond Strength	ACI 503R	psi	Substrate Failure (250 psi minimum)				
Coeff. of Thermal Exp.	VDE 0304/1	10E-5/F	4.4	—	3.5	2.8	2.7
Vicat Temperature	DIN 53460	F	122	140	140	140	140

METRIC

Property	Test Method	Units	330SL	412RO	412SL	412TO	510PC
USDA Approval	—	—	Yes	Yes	Yes	Yes	No
Compressive Strength	ASTM D695	N/mm²	17-21	6-10	34-38	30-35	19-24
Tensile Strength	ASTM D638	N/mm²	3-5	9-11	10-14	2-5	4-7
Flexural Strength	ASTM C580 mod	N/mm²	9-10	—	18-19	17-21	10-15
Freeze/Thaw Resistance	ASTM C666	Pass/Fail	Pass	—	—	—	—
Bond Strength	ACI 503R	N/mm²	Substrate Failure (1.5 N/mm² minimum)				
Coeff. of Thermal Exp.	VDE 0304/1	10E-5/K	7.9	—	6.3	5.0	4.0
Vicat Temperature	DIN 53460	C	50	60	60	60	60

Coating properties are dependent upon quality and size of fillers, as well as adherence to our recommended formulations. Measurements conducted at 68°F (20°C) and 24-hour cure where applicable.

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PRODUCT SELECTOR GUIDE

General Application by Area	330SL	412RO	412SL	412TO	510PC	520PD
Bridge Decks	●					
Chemical Storage		●	●			
Concrete Rehabilitation					●	
Coolers	●					
Dustproofing						●
Freezers	●					
Joint Repair	●				●	
Kitchens			●	●		
Laboratories		●	●	●		
Loading Docks	●					
Machine Shops	●		●			
Parking Garages	●				●	●
Ramps	●				●	
Restrooms			●	●		
Ship Decks	●					
Staircases					●	●
Walls		●				
Warehouses						
Light Traffic			●			
Heavy Traffic	●				●	
Wet Areas		●	●	●		●

General Application by Industry						
Automotive	●		●	●		
Bakeries	●	●	●	●		
Bottling	●		●	●		
Breweries	●		●	●		
Cheese Factories	●	●	●	●		
Chemical Process	●	●	●			
Civil Engineering	●				●	●
Dairies	●		●	●		
Electroplating	●		●	●		
Food Processing		●	●	●		
Fruit & Produce			●	●		
Hospitals		●	●	●		
Marine	●	●				
Meat Packing		●	●	●		
Photographic			●	●		
Poultry		●	●	●		
Printing			●	●		
Pulp & Paper	●		●	●		
Schools		●	●	●		
Supermarkets			●	●		
Textile	●		●	●		
Wineries			●	●		

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chemical resistance

FlorLine's UltraPlex

The purpose of this Table is to present a general outline for determining the suitability of using UltraPlex floor topping in specific applications. Recommendations are based on both laboratory and actual field use.

Laboratory method was to immerse a 1/4" x 4" x 4" specimen for 28 days. The sample was removed from the reagent at 7 day intervals, washed, weighed, and examined. This method has proven to be more severe than continuous immersion for longer periods. Values were assigned at the end of the test.

Value assignments are keyed as follows:

R-1 ..... Continuous use.
R-2 ..... Intermittant use.
R-3 ..... Occasional spillage.
NR ..... Not Recommended.
* ..... Surface may discolor.

Acetic Acid, 25%	R-3*
Acetic Acid, Glacial	NR
Acetone	NR
Alum (saturated)	R-1*
Aluminum chloride, 50%	R-1
Ammonium hydroxide, 50%	R-1
Ammonium nitrate, 50%	R-1
Ammonium sulfate (saturated)	R-1
Aniline	R-2
Barium hydroxide (saturated)	R-1
Beer	R-1
Benzene	R-1
Benzoic Acid, 3%, (saturated)	R-2
Benzoyl chloride	R-1*
Boric Acid, (saturated), 30%	R-1
Butyric Acid	R-1
Butyl acetate	R-1
Butyl lactate	R-2
Bromine	NR
Carbon disulfide	NR
Calcium Chloride, 50%	R-1
Calcium hydroxide (saturated)	R-1
Calcium nitrate, 50%	R-1
Calcium sulfate (saturated)	R-1*
Carbon tetrachloride, 75°F	R-1
Chlorobenzene	R-1
Chloroform	NR
Chromic acid, 15%	R-3*
Citric Acid, 50%	R-1*
Cola Syrup, 75°F	R-1
Copper sulfate, 50%	R-1*
Cresylic Acid	R-2
Cutting Oils	R-1
Diacetone alcohol	R-1
Dichloroethylene	NR
Diethyl phthalate	R-1
Dimethyl phthalate	R-1
Ethyl Acetate	R-3
Ethyl Alcohol, 75°F	R-1
Ethylene chloride	NR
Ethylene glycol	R-1*
Fatty Acids	R-2
Ferric chloride	R-2
Formaldehyde, 40%	R-1
Formic Acid	NR
Fruit Juices	R-1
Glycolic Acid, 75°F	R-1*
Glyoxal	R-1
Hydrobromic Acid, 47%, 75°F	R-2*
Hydrochloric Acid, 15%	R-1
Hydrochloric Acid, 37%	R-1
Hydrogen Peroxide, 10%, 120°F	R-1
Hydrogen Peroxide, 30%, 75°F	R-2
Isopropyl alcohol, 75°F	R-1
Jet Fuel	R-1
Kerosene	R-2
Lactic Acid, 20%	R-1*
Lactic Acid, 85%	R-2*
Lanolin	R-1
Lard	R-2
Lead chloride (saturated)	R-1*
Linseed Oil	R-1
Magnesium chloride	R-1
Mayonnaise	R-2
Methylene chloride	NR
Methyl ethyl ketone	NR
Methyl isobutyl ketone, 75°F	R-1
Milk, 85°F	R-1
Mineral Oil	R-1
Nickel Nitrate, 50%	R-1*
Nickel Sulfate, 50%	R-1*
Nitric Acid, 30%, 75°F	R-2*
Nitric Acid, 10%	R-1
Nitric Acid, 20%	R-3*
Nitric Acid, 40%	NR
Oleic Acid	R-1
Peanut Butter	R-1
Perchloroethylene	R-2
Phenol, 5%, 75°F	R-3
Potassium Hydroxide, 50%	R-1
Potassium Nitrate, 50%	R-1
Pyridine	NR
Salicylic Acid, 3%, 75°F	R-2
Skydrol	R-1
Sodium Bicarbonate, 3%	R-1
Sodium Bichromate, 50%	R-1*
Sodium Bisulfate, 30%	R-1
Sodium Carbonate, 30%	R-1
Sodium Chloride, 40%	R-1
Sodium Chromate, 50%	R-1
Sodium Hydroxide, 50%	R-1
Sodium Nitrate, 50%	R-1*
Sodium Sulfate, 50%	R-1*
Sodium Thiosulfate, 50%	R-1
Stearic Acid (saturated)	R-1*
Succinic Acid (saturated)	R-1
Sugar Solution	R-1
Sulfuric Acid, 25%	R-2*
Sulfuric Acid, 50%	R-2*
Sulfuric Acid, 98%	R-3*
Tannic Acid, 50%	R-1
Tartaric Acid (saturated)	R-1
Tetrachloroethane	R-1
Toluene, 75°F	R-1
Trichloroethylene, 75°F	R-3*
Trisodium Phosphate (saturated)	R-1
Urea, 50%	R-1
Vegetable Juices	R-1
Vegetable Oil	R-2
Vinegar, household	R-1
Water	R-1
Wine	R-1
Xylene, 75°F	R-1
Zinc Chloride (saturated)	R-1*

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fluid resistance of VITON fluoroelastomer

LAUREN "FLUOROLAST" COATINGS FORMULATED FROM VITON® FLUOROPOLYMERS PERFORM SIMILARLY TO VITON® IN FLUID ENVIRONMENTS. DATA HERE IS REPRINTED BY PERMISSION OF THE DUPONT CO.

Products made from VITON* fluoroelastomer are successfully used in contact with a great variety of fluids, in many instances at temperatures far higher than are practical with other elastomers. The choice of premium-priced VITON is justified by its trouble-free service which saves far more expensive maintenance and downtime costs.

To assist design engineers concerned with specifying rubber components exposed to severe chemical environments, the accompanying tabulation has been prepared. It includes evaluations of the fluid resistance of VITON versus a selection of materials whose influences, at various temperatures and for certain exposure times, range from virtually no effect on, to complete solution of, products made from properly compounded VITON.

We emphasize that it should be used *as a guide only*. The tabulation is based on laboratory tests and records of actual service performance. But an elastomer's degree of compatibility with a particular fluid also depends on such variables as temperature, time, velocity of flow, aeration, stability of the fluid, degree of contact, nature of suspended solids, etc.

It is always advisable to test the product under actual service conditions before specification. If this is impractical, then tests should be devised which simulate actual service conditions as closely as possible. Obviously, your rubber supplier should be provided with complete details on the conditions involved, since correct compounding and processing are important to the success of any resilient part where chemical resistance is one of the service requirements.

Rating Key
- A—Little or no effect
- B—Minor to moderate effect
- C—Severe effect, ranging to complete destruction
- T—No data—likely to be compatible
- X—No data—not likely to be compatible

Chemical	
Acetaldehyde	
Acetic acid, 20%	
Acetic acid, 30%	
Acetic acid, glacial	
Acetic anhydride	
Acetone	
Acetylene	
Aluminum chloride solutions	
Aluminum sulfate solutions	
Ammonia, anhydrous	
Ammonium chloride solutions	
Ammonium hydroxide solutions	
Ammonium sulfate solutions	
Amyl acetate	
Amyl alcohol	A
Aniline	
Aniline	B
Aniline	C
ASTM oil #1	A
ASTM oil #3	A
ASTM reference fuel A	
ASTM reference fuel B	
ASTM reference fuel C	
Asphalt	A
Barium hydroxide solutions	
Beer	
Benzaldehyde	
Benzene	B
Benzoyl chloride	
Borax solutions	
Boric acid solutions	
Bromine, anhydrous liquid	A
Butane	
Butyl acetate	
Butyraldehyde	
Butyric acid	
Calcium bisulfite solutions	
Calcium chloride solutions	
Calcium hydroxide solutions	
Calcium hypochlorite, 5%	
Calcium hypochlorite, 20%	B
Carbon bisulfide	
Carbon dioxide	
Carbon monoxide	
Carbon tetrachloride	A
Castor oil	
Chlorine gas, dry	A
Chlorine gas, wet	
Chloroacetic acid	
Chlorobenzene	
Chloroform	
Chlorosulfonic acid	
Chromic acid, 10-50%	
Citric acid solutions	
Copper chloride solutions	

*Reg. U.S. Pat. & Tm. Off.

Chemical	Rating
Copper sulfate solutions	A
Cottonseed oil	A(300°F.)
Creosote oil	A(212°F.)
Cyclohexane	A
Dibutyl phthalate	B
Diethyl sebacate	B
Dioctyl phthalate	B
DOWTHERM A	A(212°F.)
DOWTHERM A	B(400°F.)
Epichlorohydrin	C(122°F.)
Ethyl acetate	C
Ethyl alcohol	A
Ethyl chloride	A
Ethyl ether	B
Ethylene dichloride	A-B(120°F.)
Ethylene glycol	A(250°F.)
Ethylene oxide	C(158°F.)
Exxon 2380 turbo oil (lubricant)	A(392°F.)
Ferric chloride solutions	A
Fluosilicic acid	T
Formaldehyde, 40%	A
Formic acid	C(158°F.)
FREON-11	B
FREON-11	T(130°F.)
FREON-12	A-B
FREON-12	B(130°F.)
FREON-22	C
FREON-22	X(130°F.)
FREON-113	A
FREON-113	T(130°F.)
FREON-114	A
FREON-114	T(130°F.)
Furfural	C(158°F.)
Fyrquel 220 (hydraulic fluid)	A(212°F.)
Gasoline	A
Glue	A
Glycerin	A(250°F.)
n-Hexane	A
Hydrazine	C
Hydrochloric acid, 20%	A
Hydrochloric acid, 20%	A(230°F.)
Hydrochloric acid, 37%	A(158°F.)
Hydrochloric acid, 37%	B(230°F.)
Hydrocyanic acid	A
Hydrofluoric acid, 48%	A(212°F.)
Hydrofluoric acid, 75%	B(158°F.)
Hydrofluoric acid, anhydrous	A
Hydrogen	A
Hydrogen peroxide, 90%	A
Hydrogen peroxide, 90%	C(270°F.)
Hydrogen sulfide	B(270°F.)
Isooctane	A
Isopropyl alcohol	A
Isopropyl ether	C
JP-4	A(400°F.)

Chemical	Rating
JP-5	A(400°F.)
JP-6	A(100°F.)
JP-6	B(550°F.)
Kerosene	A(158°F.)
Kerosene	B(400°F.)
Lacquer solvents	C
Lactic acid	A
Linseed oil	A
Lubricating oils	A(158°F.)
Magnesium chloride solutions	A
Magnesium hydroxide solutions	A
Mercuric chloride solutions	A
Mercury	A
Methyl alcohol	A-B
Methyl ethyl ketone	C
Methylene chloride	B(100°F.)
Mineral oil	A
Mobil XRM 206A (aircraft eng. lube)	A(350°F.)
Naphtha	A(158°F.)
Naphthalene	A(176°F.)
Nitric acid, 10%	A
Nitric acid, 30%	A
Nitric acid, 60%	A
Nitric acid, 70%	A
Nitric acid, 70%	B(100°F.)
Nitric acid, red fuming	B
Nitric acid, red fuming	C(158°F.)
Nitrobenzene	B
Oleic acid	B
Oleum, 20-25%	A
Palmitic acid	A
Perchloroethylene	A(212°F.)
Phenol	A(212°F.)
Phenol	B(300°F.)
Phosphoric acid, 20%	A
Phosphoric acid, 60%	A(212°F.)
Phosphoric acid, 70%	A
Phosphoric acid, 85%	A
Pickling solution (20% nitric acid, 4% HF)	A
Pickling solution (17% nitric acid, 4% HF)	A
Pickling solution (17% nitric acid, 4% HF)	C(225°F.)
Picric acid	A
Potassium dichromate solutions	A
Potassium hydroxide solutions	A
Pydraul 312C	A
Pyridine	C
QFI-2023 (silicone brake fluid)	A(392°F.)
SAE #10 oil	A
Sea water	A
Shell turbine oil 307	B(392°F.)

Chemical	Rating
Silicone grease	A
SKYDROL 500	C
SKYLUBE 450	C(392°F.)
Soap solutions	A
Sodium chloride solutions	A
Sodium dichromate, 20%	A
Sodium hydroxide, 20%	A
Sodium hydroxide, 46½%	A
Sodium hydroxide, 46½%	C(100°F.)
Sodium hydroxide, 50%	C
Sodium hydroxide, 73%	C
Sodium hypochlorite, 5%	A
Sodium hypochlorite, 20%	B(158°F.)
Sodium peroxide solutions	A
Soybean oil	A(250°F.)
Stannic chloride	A
Stannous chloride, 15%	A
Steam (see water)	B(300°F.)
Stearic acid	T
Styrene	A
Sulfur, molten	A(250°F.)
Sulfur dioxide, liquid	A
Sulfur dioxide, gas	A
Sulfur trioxide	A
Sulfuric acid, up to 5%	A
Sulfuric acid, 5-10%	A
Sulfuric acid, 10-50%	A
Sulfuric acid, 50-80%	A
Sulfuric acid, 60%	A(250°F.)
Sulfuric acid, 90%	A(158°F.)
Sulfuric acid, 95%	A
Sulfuric acid, 95%	A(158°F.)
Sulfuric acid, fuming (20% oleum)	A
Sulfurous acid	A
Sunoco XS-820 (EP lubricant)	A(300°F.)
Tannic acid, 10%	A
Tartaric acid	A
Tetrahydrofuran	C
Toluene	B(100°F.)
Tributyl phosphate	C(212°F.)
Trichlorethylene	A
Trichloroethylene	B(158°F.)
Tricresyl phosphate	A(300°F.)
Triethanolamine	C
Trisodium phosphate solutions	A
Tung oil	A
Turpentine	A(158°F.)
Water	A(158°F.)
Water	A(212°F.)
Xylene	A
Xylene	B(158°F.)
Zinc chloride solutions	A

(Freon is a registered trademark of E. I. du Pont de Nemours & Co. (Inc.)

CONVERSIONS FOR EXPOSURE TEMPERATURES INDICATED IN TABLE

°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.
100	38	158	70	230	110	350	176
120	49	176	80	250	121	392	200
122	50	212	100	270	132	400	204
130	54	225	107	300	149	550	288

Ford Co.

Table II
Impact Resistance

Z-line coatings are designed to have outstanding impact resistance and flexibility. As these properties are inherent in the basic urethane polymers, the films are not subject to embrittlement with age.

Impact tests are run by striking the direct (coated) side and reverse (uncoated) side of the metal panel and observing the blister formed for cracking or crazing.

The test panels were coated with Chemglaze Wash Primer and one coat of Chemglaze Z451 Gray Coating.

Test	Substrate	Coating Thickness	Results
Gardner Labs Impact (Direct) Range 0-160 in. lbs.	Steel	1.5 mils	Pass 160 in. lbs.
General Electric Elongation Range 0.5 - 60 per cent	Aluminum	1.5 mils	Pass 60% elongation

Table III
Chemical and Solvent Resistance

Chemglaze Z-Line coatings show excellent chemical and solvent resistance when used with the correct primer. (Formar [illegible])

These coatings have excellent salt spray resistance when the metal is primed with Chemglaze Epoxy Metal Primer 9965, Wash Primer 9924, or Urethane Primer 9420.

Chemicals which attack urethane coatings are strong oxidizing acids like nitric and chromic as well as some organic acids such as acetic at concentrations of 10 per cent or higher. Also, acids will attack certain pigments in the green, yellow, orange and brown coatings.

Chemglaze coatings are softened on immersion in certain oxygenated solvents but recover when the solvent evaporates, making them suitable for intermittent exposure to these materials. Test panels were 1/4" thick sandblasted cold rolled steel. Panels were primed and spray coated with multiple coats of Chemglaze Z252 White to a total film thickness of 6 ± 1/2 mil.

The tests were run by partially immersing coated steel panels in the various test fluids for a period of 30 days. Resistance for 24 hours was considered adequate for splash or spillage exposure. Fume or vapor resistance was measured by observing the panel above the test fluid during the 30 days immersion.

All data are at room temperature 77°F (25°C) unless otherwise indicated.

Code: x — suggested o — not suggested

Reagent		Immersion	Splash or Spillage	Fumes or Vapors
Acids, Inorganic — with Wash or Epoxy Primer[2]				
Hydrochloric	10%	x	x	x
	35%	o	o	x
Sulfuric	10%	x	x	x
	35%	x	x	x
Phosphoric	10%	x	x	x
	50%	x	x	x
Chromic	2%	x	x	x
	10%	o	o	x
Nitric	2%	x	x	x
	10%	o	o	x

Continued on next page

Table III (Continued)

Reagent		Immersion	Splash or Spillage	Fumes or Vapors
Acids, Organic — with Wash or Epoxy Primer				
Lactic	10%	x	x	x
Acetic	5%	o	x	x
	10%	o	x	x
	Glacial	o	o	x
Citric	10%	x	x	x
Oleic		x	x	x
Maleic		x	x	x
Alkalies — with Wash or Epoxy Primer				
Ammonium Hydroxide	10%	o	x	x
	50%	o	x	x
Ammonia		o	x	x
Sodium Hydroxide	10%	x	x	x
	50%	x	x	x
Salts — with Wash or Epoxy Primer				
Sodium Chloride	20%	x	x	x
Calcium Chloride	20%	x	x	x
Ferric Chloride	20%	x	x	x
Trisodium Phosphate	10%	x	x	x
Miscellaneous Chemicals — with Wash Primer				
Tide Solution (160°F)	1%	o	x	x
Sodium Hypochlorite	1%	x	x	x
Sea Water (synthetic)		x	x	x
Sugar Solution	10%	x	x	x
Water (160°F)		o	x	x
Miscellaneous Chemicals — with Epoxy Primer				
Freon®[3]	100%	x	x	x
Sour Crude Oil		x	x	x
Chlorine Gas (Wet or Dry)		o	x	x
Solvents — with Epoxy Primer				
Aliphatic Hydrocarbons				
Gasoline		x	x	x
Hexane		x	x	x
JP-4		x	x	x
Brake Fluid		x	x	x
Aromatic				
Xylol		x	x	x
Toluol		x	x	x
Chlorinated				
Trichloroethylene		o	x	x
Carbon Tetrachloride		x	x	x
Alcohols				
Methyl Alcohol		o	x	x
Ethyl Alcohol		o	x	x
Ethylene Glycol		x	x	x
Glycerol		x	x	x
Ketones and Esters				
Acetone		o	x	x
Methyl Ethyl Ketone		o	x	x
Ethyl Acetate		o	x	x
Miscellaneous				
Nitropropane		o	x	x
Turpentine		x	x	x

[2]Request Bulletin No. DS10-7043 for additional information on primers.

[3]Freon® is a registered trademark of E.I. duPont de Nemours & Co. Inc.

Table II
Chemglaze® A-Line Coatings over 9922 Epoxy Primer Exposed 3 Years at 45°'s in South Florida

Chemglaze II	Initial	60° GLOSS Uncleaned	Cleaned
A276 White	93	18	82
A382 Black	93	53	87
A471 Light Gray	92	8	76
A571 Aviation Red	92	10	86
A672 Dark Green	93	22	88
A771 Blue	94	42	87
A872 Omaha Orange	94	74	89
A971 Yellow	94	72	90

Flatting

A-Line coatings may be reduced in gloss by adding A170 flatting agent. For example, a 1:1 blend of A170 with an A-Line product will result in a very low gloss coating. Additional 9986 catalyst must be added when A170 is used (approx. 1-3% of weight of A170). Refer to Bulletin No. DS10-7066, "Flatting Agents for Gloss Control."

Baking Conditions

The cure time in certain applications may be accelerated by baking. Some typical conditions are shown below.

150°F (65°C) - 30 min.
200°F (93°C) - 20 min.

Clean Up and Stripping

Chemglaze Thinners, 9951 and 9954, xylene and ketones, may be used for clean up. Paint strippers which will facilitate removal of cured urethanes are available from the following vendors.

Shelly Andrews Co.
3540 North Southport Ave.
Chicago, IL 60657
(312) 871-5100
"Krano 95"

Penetone Corp.
Subsidiary of
West Chemical Products, Inc.
74 Hudson Ave.
Tenafly, NJ 07670
"Pen-Strip" 5061 or NPX

Chemical & Solvent Resistance of Chemglaze® Coatings

The following data shown in Table III illustrate the excellent chemical and solvent resistance of Chemglaze A-Line coatings when used with the appropriate primer. Steel panels, sandblasted, primed and spray coated with A276 White to a total film thickness of 5 ± 1/2 mils were immersed for 30 days in the test fluids. Tests were run at 77°F (25°C).

Chemicals which will attack urethane coatings are strong oxidizing acids like nitric and chromic as well as some organic acids such as acetic at concentrations of 5% or higher. Also, some acids will cause color changes in certain green, yellow, orange, brown, red and tan coatings.

Table III
Chemical & Solvent Resistance of Chemglaze® A-Line Coatings

Reagent	Solution (Percent)	Immersion	Splash or Spillage
Acids, Inorganic			
Hydrochloric	10	Pass	Pass
Sulfuric & Phosphoric			
Acids, Organic			
Acetic	5 & 10	Not Rec.	Pass
Citric/Lactic	10	Pass	Pass
Alkalies			
Sodium Hydroxide	10, 50	Pass	Pass
Ammonium Hydroxide	10, 50	Not Rec.	Pass
Salts			
Sodium & Calcium Chloride	20	Pass	Pass
Solvents			
Aliphatic[1]	—	Pass	Pass
Aromatic[2]	—	Pass	Pass
Alcohols[3]	—	Pass	Pass
Ketones & Esters[4]	—	Pass	Pass
Miscellaneous			
Sea Water (Synthetic)	—	Pass	Pass
Water at 160°F	—	Pass	Pass

1 - Aliphatic Solvents - Gasoline, hexane, JP-4, brake fluid
2 - Aromatic Solvents - Xylene, toluene
3 - Alcohols - Ethyl, ethylene glycol, glycerol
NOTE: fail in methyl alcohol immersion
4 - Ketones & esters - Acetone, methyl ethyl ketone, ethyl acetate

Commercial Chemical Company

1. PRODUCT NAME

HI-SOLIDS EPOXY COATING

EPO COAT VA

Multi-purpose epoxy coating.

2. MANUFACTURER

Commercial Chemical Company
1021 Summer St.
Cincinnati, Ohio 45204
Phone: 513-921-8600

3. PRODUCT DESCRIPTION

BASIC USES: EPO Coat VA is an extremely versatile epoxy coating that exhibits outstanding durability, adhesion, chemical resistance, wear resistance and weatherability. This coating performs excellently on concrete, wood, metal, masonry surfaces and as a seal coat for troweled-on epoxy toppings.

EPO Coat VA is used as the base color coat in our Uni-Floor line of seamless epoxy floor systems, as it provides excellent adhesion to concrete. It also provides tough, long wearing non-skid coatings when aggregates such as silica sand are broadcast into the surface.

EPO Coat VA is used to coat floors, walls, machinery and equipment in meat packing and beverage plants, paper processing facilities, hospitals, food processing facilities, loading docks, swimming pools and to provide extremely long wear factory safety lines. EPO Coat cures overnight in most conditions. Treated floors may be opened for light foot traffic in approximately 24 hours, and two to three days should be allowed for heavy duty traffic. Seven days should be allowed for maximum chemical resistance.

LIMITATIONS: Surfaces which are to be coated must a) be at least 50°F, b) be clean and dry, c) be structurally sound and d) adequate ventilation must be provided.

COLOR: White, tile red, brown, light and dark grey, light and dark blue, tan, safety yellow and clear, are standard, many other colors are available upon request.

GLOSS: High gloss unless otherwise specified.

APPLICABLE STANDARDS: Accepted for the coating and sealing of floors and other structural surfaces in establishments operating under the Federal Meat and Poultry Products Inspection Program.

COVERAGE:

Steel (4 mils)	350 - 450 sq. ft. per gallon.
Concrete (2 coats)	one thin, penetrating coat, one heavy build coat, 100 - 150 sq. ft. per gallon total for both coats.
Concrete block (Sealed or previously painted)	150-200 sq. ft. per gallon.

4. TECHNICAL DATA

COATING PROPERTIES

Viscosity	70 - 100 KU
Pot Life	24 - 48 hrs.
Tack-free Dry Time	3 - 5 hrs.
Pencil Hardness 3 days	#2

1021 SUMMER STREET • CINCINNATI, OHIO 45204 • PHONE (513) 921-8600

Solids	68% ± 1
Gloss (60° meter)	100+
Impact Resistance Direct	190 + in. lbs.

CHEMICAL RESISTANCE: EPO Coat VA resists corrosion due to spillage of most generally used acids, alkalies, salts and organic compounds.

Alkalies:	Caustic, pot ash, ammonia, lime, soda ash and others.
Mineral Acids:	Sulphuric acid, phosphoric acid, hydrochloric acid.
Organic Solvents:	Petroleum, coal tar thinners, turpentine and others.
Salts:	Alkalines, acid and neutral.
Oxidizing Acids and Salts:	Up to 15% nitric, chromic peroxide and bleach.
Water:	Tap, distilled, di-ionized.
Foods and Organic Compounds:	Sugar, mineral oils and greases, vegetable and animal fats and oils. Cheese. Detergent, soap.
Beverages:	Milk, fruit and vegetable juices.

5. INSTALLATION

PREPARATORY WORK: No primer is required for applying EPO Coat VA to most surfaces except metal where extreme corrosive resistance is required. Metal in extremely corrosive conditions should be primed with EPO Coat Zinc Rich Primer. Surfaces must be free from paint, grease, oil, laitance, and other contaminates prior to application. This may be done by shotblasting, acid cleaning, sandblasting, scarifying, detergent cleaning or grinding as applicable. New concrete must be free from laitance, sealers, curing compounds, etc. New concrete may be cleaned in the same manner as old concrete where required.

METHODS: EPO Coat VA may be applied by brush, roller or spray. Concrete and wood surfaces should receive a thin, penetrating first coat for maximum adhesion.

APPLICATION: Two coats of EPO Coat VA are recommended for most surfaces. When concrete or wood are to be coated, the first coat should be thinned one part mixed coating to one part thinner by volume. Thinner may be EPO Thinner or Methyl Ethyl Ketone (MEK).

MIXING: EPO Coat VA is mixed one part component A to one part component B by volume. The mixed coating should be allowed to stand (sweat-in) for approximately 30-60 minutes. It may then be reduced as required for application. Material that is to be brushed or roller coated will require little or no thinning.

EQUIPMENT CLEAN UP: Clean tools and equipment immediately with commercial grade lacquer thinner or EPO Thinner.

PRECAUTIONS: Flammable. Keep away from heat, open flame and pilot lights. Avoid prolonged contact with skin and breathing of vapor or spray mist. Use with adequate ventilation. Keep out of reach of children.

6. AVAILABILITY

EPO Coat VA is available from:

Commercial Chemical Company
1021 Summer St.
Cincinnati, OH 45204 — Ohio — 800-522-5866
513-921-8600 — Outside Ohio — 800-522-5867

7. GUARANTEE

The manufacturer warrants that the material meets the specifications listed.

8. TECHNICAL SERVICE

Installation crews are available directly from factory when desired, or trained technical representatives are available to assist and advise interested personnel in application procedures and specifications.

GARLAND FLOOR CO.
Epoxy Floors for Industry since 1959

Chemi-Cote UR-4000 series Polyurethane Coatings

Chemical Resistance Guide

The information presented in the chemical resistance guide is based on judgements derived from laboratory testing and field service performance at room temperature. The guide has been prepared as an aid to determine the potential value of Chemi-Cote UR-4000 series coatings in applications having chemical exposures. No guarantee of results is made or implied and no liability in connection with this information is assumed. In actual service, floors protected with Chemi-Cote UR-4000 series coatings are subjected to splash and spillage, as well as dilution effects of wash water, mixing with other solutions, wetting and drying cycles, temperature cycling and cleaning procedures.

The information presented herein should be supplemented by in-service testing. Further information regarding exposures to these chemicals or to chemicals not listed in this guide may be obtained by contacting Garland Floor Co.

Rating Code

E - (Excellent) - Continuous exposure for several weeks without adverse effects.
G - (Good) - Continuous exposure for several days.
F - (Fair) - Occasional repeated exposure, but floor washed at least once a day.
S/S - (Splash and Spillage) - Accidental spillage and floor is washed shortly afterwards.

FOOD CHEMICALS

Beer	E	Mayonaise	G
Caesin	E	Milk	E
Cheese, all	E	Molasses	E
Butter, Margarine	G	Mustard	E
Coffee, Tea	E	Olive Oil	E
Corn Syrup, Oil	G	Peanut Butter	E
Egg Yolk	E	Pectin	E
Fruit Juices	E	Salad Dressings	G
Glucose	E	Shortening	G
Glycerine	E	Soft Drinks	E
Horseradish	E	Sucrose (Sugar)	E
Jams and Jellies	E	Vegetable Oil	G
Ketchup	E	Vegetable Juices	E
Lard	F	Vinegar (Household)	E
Lecithin	E	Wine	E
Malt	E	Yeast	E

ACIDS

Acetic - 10%.....E
20%.....G
50%.....F

Benzoic - saturated.....E
Boric - saturated.....E

Chromic - 10%.....G
15%.....F
Citric - 50%.....E

Fatty.....E
Fluoboric.....G
Formic - 10%.....F

Hydrochloric - 10%.....E
37%.....F

Lactic - 20%.....G

Maleic - 30%.....G
40%.....F

Malic - 50%.....G
Monochloroacetic - 5%....G

Nitric - 10%.....E
20%.....G

Oleic.....E
Oxalic.....E

Perchloric - 30%.....F
Phosphoric - 50%.....G
85%.....S/S

Salicylic.....G
Stearic.....G
Sulfamic - 25%.....G
Sulfuric - 20%.....E
50%.....G
70%.....S/S

Tannic Acid.....E
Tartaric Acid.....E

ALKALIES & SALTS

Aluminum Chloride.....E
Ammonium Chloride.....E
Ammonium Hydroxide - 20%.E
Ammonium Nitrate.....E
Ammonium Persulfate.....E
Ammonium Sulfate.....E
Calcium Chloride.....E
Calcium Hydroxide.....E
Calcium Hypochlorite-15%.G
Copper Plating Cyanide...G
Copper Fluoroborate.....E
Ferric Chloride.....G
Ferric Sulfate.....G
Nickel Chloride.....E
Potassium Hydroxide
(up to 40 %)...E

Silver Nitrate.....G
Sodium Benzoate.....E
Sodium Bicarbonate.....E
Sodium Carbonate.....E
Sodium Chloride.....E
Sodium Glutamate.....E
Sodium Hydroxide
(up to 50%).....E
Sodium Hypochlorite
(up to 10 %).....G
Sodium Sulfate.....E
Sodium Sulfide.....E
Trisodium Phosphate.....E
Zinc Chloride.....E
Zinc Nitrate.....G

SOLVENTS & OTHER CHEMICALS

Acetone.....S/S
Acrylonitrile.....S/S
Amyl Acetate.....G

Benzene.....F
Brake Fluid (auto).....E
Butyl Acetate.....G
Butyl Alcohol.....G
Butyl Lactate.....G

Carbon Tetrachloride.....E
Chlorobenzene.....E
Cylcohexane.....E
Cyclohexanol.....E
Cyclohexanone.....G

Diacetone Alcohol.....E
Dibenzyl Phthalate.....E
Diethyl Phthalate.....E
Dimethyl Phthalate.....E
Dioctyl Phthlate.....E

Ethyl Acetate.....S/S
Ethyl Alcohol.....E
Ethylene Glycol.....E
Ether.....S/S

Formaldehyde.....E

Gasoline.....E
Glycol Ethers.....G
Glycol Ether Esters.....G
Glyoxyl.....E

Hydrogen Peroxide - 30%..G

Isopropyl Alcohol.....G

JP5 Jet Fuel.....E

Kerosene.....G

Lanolin.....E
Linseed Oil.....E
Methanol.....G
Methylene Chloride.....S/S
Methyl Ethyl Ketone....S/S
Methyl Isobutyl Ketone...F
Mineral Spirits.....E

Naptha.....G
Oils:
Cutting.....E
Sour Crude.....E

Perchloroethylene.....F
Petroleum.....E

Skydrol (500 A & B).....E

Tall Oil.....E
Tire Exudates.....E
Toluene.....G
Triacetin.....E
Trichloroethane.....G
Trichloroethylene.....S/S
Triethanolamine.....E
Triethylene Glycol.....E
Tung Oil.....E
Turpentine.....E

Urea.....E

Water.....E

Xylene.....G

Garland Floor Co.
4500 Willow Parkway Cleveland, Ohio 44125
Phone 216/883-4100 * WATTS 800-321-2395 • FAX 216/883-3079

Garland's heavy-duty epoxy industrial maintenance coatings have proven effective in providing protection to surfaces for a broad range of industrial users including:

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- Appliance Manufacturers
- Automotive Plants
- Bakeries
- Battery Manufacturers
- Beverage Manufacturers
- Candy Manufacturers
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- Chemical Plants
- Dairies
- Electronic Industries
- Food Processors
- Heavy Equipment Manufacturers
- Pharmaceutical Manufacturers
- Pulp & Paper Mills
- Textile Mills
- Tobacco Manufacturers

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(CHEMI-TOP RESURFACER)

-4457-

Typical Chemical Resistance Ratings

E (Excellent) – Continuous exposure for several weeks without adverse effects.
G (Good) – Continuous exposure for several days.
F (Fair) – Occasional repeated exposure, but floor washed at least once a day.
OS (Occasional Spillage) – Accidental spillage and floor is washed shortly afterwards.
NR (Not Recommended)

Acids

	Rating
Acetic – 5%	G
Acetic – 10%	F
Acetic – 20%	NR
Boric – Sat. 30%	F
Butyric – 10%	F
Chromic – 10%	G
Chromic – 15%	F
Chromic – 20%	OS
Citric – 50%	E
Cresylic	NR
Formic – up to 10%	OS
Formic – over 10%	NR
Fluoboric	F
Heptanoic	OS
Hydrochloric – 15%	G
Hydrochloric – 37%	F
Hydrofluoric – 5%	F
Hydrofluoric – 10%	OS
Hydrofluoric – 15%	NR
Hypochlorous – 5%	F
Lactic – up to 20%	F
Lactic – over 25%	OS
Maleic – 30%	F
Maleic – 40%	OS
Maleic – 60%	NR
Malic – 50%	E
Monochloroacetic – 5%	OS
Nitric – 10%	G
Nitric – 20%	OS
Nitric – over 30%	NR
Oleic	E
Oxalic – Sat.	E
Pelargonic	NR
Phosphoric – up to 50%	G
Phosphoric – Conc. 85%	NR
Picric – Sat.	E
Phthalic	F
Succinic – Sat.	E
Sulfuric – 20%	G
Sulfuric – 50%	F
Sulfuric – 70%	NR
Tannic – Sat.	G
Tartaric – Sat.	G

Caustics and Salts

	Rating
Aluminum Chloride – 50%	G
Ammonium Chloride – 50%	G
Ammonium Hydroxide – up to 20%	E
Ammonium Hydroxide – 40%	G
Ammonium Nitrate – Sat.	E
Ammonium Persulfate	E
Ammonium Sulfate – Sat.	G
Calcium Chloride – 50%	E
Calcium Hydroxide – Sat.	E
Calcium Hypochlorite – up to 15%	F
Copper Fluoroborate	E
Ferric Chloride	G
Ferrous Sulfate	G
Potassium Hydroxide – up to 40%	E
Sodium Benzoate	E
Sodium Carbonate (Soda Ash) – Sat.	E
Sodium Bicarbonate – Sat.	E
Sodium Bisulfate – Sat.	E
Sodium Bisulfite – Sat.	E
Sodium Chloride (salt)	E
Sodium Glutamate	E
Sodium Hydroxide – up to 30%	E
Sodium Hypochlorite – up to 10%	G
Sodium Propionate	E
Sodium Sulfate – 10%	E
Sodium Sulfide – 20%	E
Trisodium Phosphate – Sat.	E
Zinc Nitrate	G

Solvents and Other Agents

	Rating
Acetone	OS
Acrylonitrile	OS
Aniline	NR
Alcohol (Methyl)	OS
Alcohol (Ethyl, Propyl, Isopropyl, Butyl)	G
Amyl Acetate	G
Beer	E
Benzene	OS
Butyl Acetate	G
Butyl Lactate	G
Bromine	NR
Carbon Disulfide	NR
Carbon Tetrachloride	G
Chlorobenzene	G
Corn Oil	E
Cyclohexane	E
Cyclohexanol	E
Cyclohexanone	OS
Chloroform	NR
Diacetone Alcohol	E
Diethyl Phthalate	E
Dimethyl Phthalate	E
Ethyl Acetate	OS
Ethylene Glycol	G
Ether	OS
Ethylene Dichloride	NR
Formaldehyde	G
Gasoline	E
Glycerine	E
Glyoxal	E
Hydrogen Peroxide - 10%	E
JP5 Jet Fuel	E
Juices - Fruit	G
Juices - Vegetable	E

	Rating
Kerosene	OS
Lanoline	E
Lard	F
Linseed Oil	E
Mayonnaise	G
Methyl Ethyl Ketone	NR
Methyl Isobutyl Ketone	NR
Methylene Chloride	NR
Milk	E
Mineral Spirits	E
Muriatic Acid - 15%	G
Mustard	G
Naphtha	F
Naphthalene	G
Oils - Cutting	E
Oils - Mineral	E
Oils - Vegetable	G
Peanut Butter	E
Perchloroethylene	F
Phenol - 5%	NR
Pyridine	NR
Skydrol	G
Sucrose - Sat. (Sugar)	G
Toluene	F
Triacetin	E
Trichloroethane	G
Trichloroethylene	OS
Triethanolamine	G
Triethylene Glycol	E
Urea	E
Vinegar (Household)	G
Water	E
Wine	G
Xylene	G

This is a general guide of the chemical resistance to various agents of Chemi-Top industrial resurfacer. The information is based on published independent laboratory test results for the basic chemical structure of the product. While it is felt this information is reliable, many variables exist in actual field conditions which may present a greater attack on the product; whenever possible, a sample should be tested under actual or simulated conditions. Please contact the technical department when questionable conditions exist.

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ATO ATOCHEM

Technical Information

Splash & Spill

Dated: 2-88
Superceded: 3-84

CHEMICAL RESISTANCE OF PENNWALT EPOXY SYSTEMS

This table has been prepared as a guide to the serviceability of the following Pennwalt products

PENNTROWEL® EPOXY TOPPINGS(CE-140)
TUFCHEM® SPRAYABLE EPOXY(CE-224)
PENNTROWEL® EPOXY L/F SYSTEM(CE-245)
TUFCHEM® GROUT(CE-183)
PENNWALT® THIN SET ADHESIVE(CE-150)
PENNTROWEL® EPOXY BRICK MORTAR(CE-137)

This general information is offered as a helpful suggestion. The resistance table is believed to be reliable and is based on records of performance in the field and laboratory test data. However, it should be recognized that floors and walls are subject to various degrees of splash and spillage of the chemicals involved, as well as the effects of wash down water in combination with sanitizing chemicals and other solutions. Intermittent wetting and drying as well as temperature also affects the life expectancy of the epoxy system. Because the variable service conditions are beyond the control of Pennwalt, no guarantee of results is made and we assume no liability in connection therewith

160°F(71°C) in the KEY is established as the maximum temperature conditions for the below listed Pennwalt Epoxy Systems under *intermittent* splash and spill conditions

Exposures to 160°F(71°C) are acceptable continuously for 20 minutes. Top service temperature for continuous thermal condition is 140°F(60°C) or in accordance with the KEY rating

Where the resistance data is not listed or in the opinion of Pennwalt, it may be necessary to determine the suitability of the epoxy system by service testing. The chemical resistance chart may be revised on the basis of further testing

KEY	
R	Resistant to 160°F(71°C) Splash and Spill
LR	Resistant to 90°F(32°C) Splash and Spill
*	Resistant to 70°F(21°C) Splash and Spill
N	Not Resistant
C	Use Carbon Filled
**	Use "Nexus Veil" reinforcing cloth in L/F System

	TUFCHEM SPRAYABLE EPOXY (CE224)	P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE150)	P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Acetaldehyde	R	R	R	R	R	R
Acetic Acid 5%	R	R	R	R	R	R
Acetic Acid 5-10%	LR	LR	LR	LR	LR	LR
Acetic Acid, glacial	NR	NR	NR	NR	NR	NR
Acetic anhydride	NR	NR	NR	NR	NR	NR
Acetone	LR	LR	LR	LR	LR	LR
Acetylene	LR	LR	LR	LR	LR	LR

	TUFCHEM SPRAYABLE EPOXY (CE224)	P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE150)	P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Acrylic acid	NR	NR	NR	NR	NR	NR
Adipic Acid 25%	R	R	R	R	R	R
Alcohol ethyl	R	R	R	R	R	R
Allyl chloride	R	R	R	R	R	R
Aluminum chloride below 50%	R	R	R	R	R	R
Aluminum sulfate saturated	R	R	R	R	R	R
Amidosulfonic acid	R	R	R	R	R	R

ATOCHEM NORTH AMERICA, INC. 3 Parkway, Philadelphia, PA 19102 (215) 587-7185

	TUFCHEM SPRAYABLE EPOXY (CE224)	P.T. EPOXY LF SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Ammonia, aqueous 10%	R	R	R	R	R	R
Ammonia aqueous 30%	LR	LR	LR	LR	LR	LR
Ammonia, anhydrous	R	R	R	R	R	R
Ammonium chloride, carbonate, sulfate 50%	R	R	R	R	R	R
Ammonium hydroxide 30%	LR	R	LR	LR	LR	LR
Ammonium nitrate 50%	R	R	R	R	R	R
Ammonium persulfate 50%	R	R	R	R	R	R
Ammonium phosphate	R	R	R	R	R	R
Ammonium sulfide solution	R	R	R	R	R	R
Amyl acetate	R	R	R	R	R	R
Aniline	N	N	N	N	N	N
Antifreeze	R	R	R	R	R	R
Aqua regia	N	N	N	N	N	N
Barium Chloride, Saturated	R	R	R	R	R	R
Beer	R	R	R	R	R	R
Benzaldehyde	N	N	N	N	N	N
Benzene	R	R	R	R	R	R
Benzenesulfonic acid	N	N	N	N	N	N
Benzoic acid	LR	LR	LR	LR	LR	LR
Benzole-alcohol mixture	R	R	R	R	R	R
Benzoyl chloride	R	R	R	R	R	R
Benzyl acetate	LR	LR	LR	LR	LR	LR
Benzyl alcohol	NR	NR	NR	NR	NR	NR
Benzyl chloride 150°C	R	R	R	R	R	R
Bleach (see Sodium hypochlorite)						
Blood	R	R	R	R	R	R
Boric acid, any	R	R	R	R	R	R
Bromine Water 4%	R	R	R	R	R	R
Butyl acetate	R	R	R	R	R	R
Butyl alcohol	R	R	R	R	R	R
Butyric acid	NR	NR	NR	NR	NR	NR
Calcium bisulfite liquor	R	R	R	R	R	R
Calcium chlorate	NR	NR	NR	NR	NR	NR
Calcium chloride 50%	R	R	R	R	R	R
Calcium hydroxide **	R	R	R	R	R	R
Calcium hypochlorite **	R	R	R	R	R	R

	TUFCHEM SPRAYABLE EPOXY (CE224)	P.T. EPOXY LF SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Calcium nitrate, saturated	R	R	R	R	R	R
Calcium sulfate	R	R	R	R	R	R
Carbon dioxide	R	R	R	R	R	R
Carbon disulfide	LR	LR	LR	LR	LR	LR
Carbon monoxide	R	R	R	R	R	R
Carbon tetrachloride	LR	LR	LR	LR	LR	LR
Caustic (see Sodium hydroxide)						
Chlorinated lime	R	R	R	R	R	R
Chlorine (dry)	R	R	R	R	R	R
Chlorine (wet) 600 ppm	R	R	R	R	R	R
Chlorine water	R	R	R	R	R	R
Chloroacetic acid 100%	NR	NR	NR	NR	NR	NR
Chloracetic acid 10%	LR	LR	LR	LR	LR	LR
Chloroform	R	R	R	R	R	R
Chloronaphthalene	LR	LR	LR	LR	LR	LR
Chloronitrobenzene	LR	LR	R	LR	LR	LR
Chromic acid 5%	R	R	R	R	R	R
Chromic acid 5-10%	LR	LR	LR	LR	LR	LR
Citric acid 40%	R	R	R	R	R	R
Coolant brines	LR	LR	LR	LR	LR	LR
Copper acetate, saturated	R	R	R	R	R	R
Copper chloride, nitrate, sulfate	R	R	R	R	R	R
Cottage cheese	R	R	R	R	R	R
Cottonseed oil	R	R	R	R	R	R
Cresols	NR	NR	NR	NR	NR	NR
Crude oil	R	R	R	R	R	R
Cyclohexane	LR	LR	LR	LR	LR	LR
Cyclohexanone	R	R	R	R	R	R
Dichloroethylene	NR	NR	NR	NR	NR	NR
Diesel fuel	R	R	R	R	R	R
Diethylene glycol	R	R	R	R	R	R
Diethylenetriamine	R	R	R	R	R	R
Dimethylaminoethanol	R	R	R	R	R	R
Dimethyl formamide	LR	LR	LR	LR	LR	LR
Dinitrobenzene	NR	NR	NR	NR	NR	NR

CHEMICAL RESISTANCE TABLE NO.2

Solutions Common to the Plating Industry Floor and Wall Service (Not for Immersion)

	TUFCHEM SPRAYABLE EPOXY (CE224)	P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
AcidCopper	R	R	R	R	R	R
Acid Zinc	R	R	R	R	R	R
Aluminum bright dip— # 41 Phosphoric acid heat Bath alumabrite Concentrate #41	R	R	R	R	R	R
Aluminum Pickle—Northwest Al. Alume D.S.	R	R	R	R	R	R
Aluminum Pickling. Enthone— Nitric acid with Enthone actane # 70	NR	NR	NR	NR	NR	NR
Alkaline tin.	R	R	R	R	R	R
Anodizing Electrolyte — 15-18% sulfuric acid	R	R	R	R	R	R
Brass bright-dip — 50% nitric. 50% sulfuric	NR	NR	NR	NR	NR	NR
Cadmium bright dip — with nitric acid with Kenvert conversion additive	R	R	R	R	R	R
Cadmium plating bath	R	R	R	R	R	R
Calolume L. Cadmium cyanide bath	R	R	R	R	R	R
Chrome plating bath - approx. 45oz CR to gallon 45oz sulfuric	R	R	R	R	R	R
Chromium	R	R	R	R	R	R
Copper Fluoroborate C	R	R	R	R	NR	R
Copper Lume. Copper cyanide	R	R	R	R	R	R
Copper plating bath - cyanide with # 625 Allied Research additive	R	R	R	R	R	R
Copper plating bath - straight cyanide	R	R	R	R	R	R
Enthone stripper-S18	NR	NR	NR	NR	NR	NR
Iron Chloride	R	R	R	R	R	R
Rochelle salt. Copper cyanide	R	R	R	R	R	R
Udylite bright nickel #425	R	R	R	R	R	R
Watt's nickel	R	R	R	R	R	R
Zincalume. Cyanide zinc	R	R	R	R	R	R
Delchem 946	•	•	•	•	•	•
Enthone Stripper	NR	NR	NR	NR	NR	NR
Nuvite Take-off Stripper	NR	NR	NR	NR	NR	NR
A-29-S Stripper	NR	NR	NR	NR	NR	NR

NOTE: Top service temperature for continuous service is 140°F (60°C). Exposures to 160°F (71°C) acceptable for not more than 20 minutes.

Use this reference information as a guide only. The information given in the specifications and drawings is believed to be reliable but no guarantee is made nor can we assume any liability in connection with its use. Please contact the Corrosion Engineering Department for specific recommendations.

TECHNICAL DATA

ATO ATOCHEM elf aquitaine

-4457-

ATOCHEM NORTH AMERICA, INC.
THREE PARKWAY, PHILADELPHIA, PA 1910

Pennwalt

CHEMICAL RESISTANCE TABLE FOR PENNCOAT(R) 401 CE 264 High Solids Silicon Polymer Lining

The following section contains a tabular listing of chemical reagents in which PENNCOAT(R) 401 was immersed at a temperature of 80°F (27°C) for a period of six months.

This guide is intended as an aid in determining the potential usefulness of PENNCOAT(R) 401 as a protective barrier against chemical exposure. Each application should be evaluated according to is particular circumstances and conditions.

KEY: A = Suitable for constant immersion
B = Suitable for shorter term containment and continual spillage
C = Suitable for intermittent spills when followed promptly with water flushing
NR = Not Recommended

A

Acetic Acid, 10%	A
Acetic Acid, 30%	A
Acetic Acid, Glacial	A
Acetone	A
Acrylic Acid, up to 25%	A
Acrylonitrile	A
Alum (Aluminum Potassium Sulfate)	A
Aluminum Chloride	A
Aluminum Fluoride	A
Aluminum Hydroxide	A
Aluminum Nitrate	A
Aluminum Sulfate	A
Ammonia	A
Ammonium Bisulfite	A
Ammonium Chloride	A
Ammonium Hydroxide	A
Ammonium Nitrate	A
Ammonium Sulfate	A
n-Amyl Alcohol	A
Aniline	C

B

Barium Chloride	A
Barium Hydroxide	A
Barium Sulfate	A
Barium Sulfide	A
Benzene	A
Benzene Sulfonic Acid	A
Benzoic Acid	A
Black Liquor, Pulp Mill	A
Bleach Liquor, Pulp Mill	A
Boric Acid	A
Brine	A
Bromine, Liquid	C
Bromine Gas (Dry & Wet)	C
n-Butyl Alcohol	A
Butyl Cellosolve Solvent	A
n-Butyric Acid	B
Butyl Acetate	A

C

Cadmium Chloride	A
Calcium Chloride	A
Calcium Hypochlorite	A
Calcium Nitrate	A
Calcium Sulfate	A
Calcium Sulfite	A
Carbon Dioxide Gas	A
Carbon Dissulfide	B
Carbon Tetrachloride	A
Chlorine Dioxide	B
Chlorine Gas (Dry and Wet)	B
Chlorine Water	A
Chloroacetic Acid, 50%	C
Chlorobenzene	A
Chloroform	A
Chromic Acid, 15%	A
Chromic Acid, 50%	B
Citric Acid	A
Copper Chloride	A
Copper Cyanide	A
Copper Nitrate	A
Copper Sulfate	A
Corn Oil	A
Crude Oil, Sour	A
Crude Oil, Sweet	A
Cyclohexane	A
Cyclohexanol	A
Cyclohexanone	A

D

Dichlorobenzene	A
Dichloroethane	A
Diesel Fuel	A
Diethyl Benzene	B
Dimethyl Formamide (DMF)	A

E

Ethyl Acetate	A
Ethyl Alcohol	A
Ethyl Benzene	B
Ethyl Chloride	A
Ethylene Chloride	A
Ethylene Glycol	A

F

Fatty Acids	A
Ferric Chloride	A
Ferric Nitrate	A
Ferric Sulfate	A
Ferrous Chloride	A
Fluosilicic Acid	B
Formaldehyde	A
Formic Acid	B
Fuel Oil	A

G

Gasoline	A
Glycerine	A

H

Heptane	A
Hexane	A
Hydrobromic Acid	A
Hydrochloric Acid, 15%	A
Hydrochloric Acid, 37%	A
Hydrofluoric Acid	C
Hydrogen Peroxide	A
Hydrogen Sulfide	A

I

Isopropyl Alcohol	A

J

Jet Fuel	A

K

Kerosene	A

L

Lactic Acid	A
Lauryl Chloride	A
Lead Acetate	A
Linseed Oil	A
Lithium Bromide	A
Lithium Chloride	A
Lithium Hypochlorite	A

L

Lithium Hydroxide	A

M

Magnesium Bisulfite	A
Magnesium Carbonate	A
Magnesium Chloride	A
Magnesium Sulfate	A
Maleic Acid	A
Mercuric Chloride	A
Mercurous Chloride	A
Methyl Alcohol	A
Methyl Ethyl Ketone	A
Methylene Chloride	A
Mineral Spirits	A
Monochloroacetic Acid	A
Muriatic Acid	A

N

Naphtha	A
Naphthalene	A
Nitric Acid, 5%	A
Nitric Acid, 30%	B
Nitric Acid, 50%	C
Nitric Acid/Sulfuric Acid	C
Nitrobenzene	B
n-Octyl Alcohol	A

O

Oils	A
Oleum	B
Oleic Acid	A
Oxalic Acid	A

P

Perchloroethylene	A
Perchloric Acid	B
Phenol	B
Phosphoric Acid, 50%	A
Phosphoric Acid, 85%	A
Phosphorous Acid	B
Potassium Carbonate	A
Potassium Chloride	A
Potassium Dichromate	A
Potassium Hydroxide	A
Potassium Nitrate	A
Propionic Acid	A

S

Seawater	A
Silver Nitrate	A
Sodium Acetate	A
Sodium Bicarbonate	A
Sodium Bisulfate	A
Sodium Bisulfite	A
Sodium Carbonate	A
Sodium Chloride	A
Sodium Chlorite	A
Sodium Hydroxide, 10%	A
Sodium Hydroxide, 50%	A
Sodium Hypochlorite	A
Sodium Sulfate	A
Sodium Sulfide	A
Stannic Chloride	A
Stannous Chloride	A
Stearic Acid	A
Styrene	A
Sugar/Sucrose	A
Sulfur Dioxide	A
Sulfuric Acid, 10%	A
Sulfuric Acid, 50%	A
Sulfuric Acid, 98%	A

T

Tall Oil	A
Tannic Acid	A
Tartaric Acid	A
Tetrahdrofuran	A
Toluene	A
Toluene Sulfonic Acid	A
Trichloroethylene	A
Trisodium Phosphate	A

U

Urea	A

W

Water, Deionized	A
Water, Demineralized	A
Water, Distilled	A

X

Xylene	A

Z

Zinc Chloride	A
Zinc Sulfate	A

When significant amounts of trace impurities or combination of chemicals are to be resisted, we encourage our customers to test a sample under actual or simulated use conditions before a final decision is made on the suitability.

ATOCHEM North America can provide corrosion test coupons for customers to expose under actual service conditions or in the laboratory.

Use this reference information as a guide only. The information given is believed to be reliable, but no guarantee is made nor do we assume liability to connection with their use. Please contact the Corrosion Engineering Department for specific recommendations.

TECHNICAL DATA

PENNWALT
CHEMICALS ■ EQUIPMENT
HEALTH PRODUCTS
PENNWALT BUILDING, THREE PARKWAY, PHILADELPHIA, PA. 19102

-4457

Immersion

Dated: 2-88
Superceded: 3-84

CHEMICAL RESISTANCE OF PENNWALT EPOXY SYSTEMS

This table has been prepared as a guide to the serviceability of the following Pennwalt products:

PENNTROWEL® EPOXY TOPPINGS (CE-140)
TUFCHEM® SPRAYABLE EPOXY (CE-224)
PENNTROWEL® EPOXY L/F SYSTEM (CE-245)
TUFCHEM® GROUT (CE-183)
PENNWALT® THIN SET ADHESIVE (CE-158)
PENNTROWEL® EPOXY BRICK MORTAR (CE-137)

This general information is offered as a helpful suggestion. The resistance table is believed to be reliable and is based on records of performance in the field and laboratory test data. However, it should be recognized that floors and walls are subject to various degrees of splash and spillage of the chemicals involved, as well as the effects of wash down water in combination with sanitizing chemicals and other solutions. Intermittent wetting and drying as well as temperature also affects the life expectancy of the epoxy system. Because the variable service conditions are beyond the control of Pennwalt, no guarantee of results is made and we assume no liability in connection therewith.

160°(71°C) in the KEY is established as the maximum temperature conditions for the below listed Pennwalt Epoxy systems under *intermittent* splash and spill conditions.

Unless otherwise rated for Immerison(I), exposures to 160°F(71°C) are acceptable continuously for 20 minutes. Top service temperature for *continuous* thermal condition is 150°F(60°C) or in accordance with the KEY rating.

Where the resistance data is not listed, or if in the opinion of Pennwalt, it may be necessary to determine the suitability of the epoxy system by in-service testing. The chemical resistance chart may be revised on the basis of further testing.

KEY

- I Immersion or continually wet service
- R Resistant to Intermittent Splash & Spill service
- N Not Recommended for Splash & Spill service.
- F Fumes only service
- T Tests required for Splash & Spill service
- • Where not so indicated (I) tests are required for Immersion service
- C Use Carbon Grade
- •• Use Nexus Veil reinforcing in L/F System

1. 160°F(71°C) on concrete or steel
2. 160°F(71°C)
3. 140°F(60°C)
4. 90°F(32°C)
5. 70°F(21°C)

EXAMPLES

- I2 Can be used for immersion or continually wet services to 160°F(71°C).
- R2 Can be used for intermittent Splash & Spill service to 160°F(71°C).

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Acetaldehyde	R2	R2	R2	R2	R2	R2
Acetic Acid 5%	R2	R2	R2	R2	R2	R2
Acetic Acid 5-10%	R4	R4	R4	R4	R4	R4
Acetic Acid, glacial	N	N	N	N	N	N

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Acetic anhydride	N	N	N	N	N	N
Acetone	R4	R4	R4	R4	R4	R4
Acetylene	R4	R4	R4	R4	R4	R4
Acrylic acid	N	T	N	N	N	N

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Adipic Acid 25%	R2	I4	R2	R2	R2	R2
Alcohol, ethyl	R2	I3	R2	R2	I3	R2
Allyl chloride	R2	R2	R2	R2	R2	R2
Aluminum chloride, below 50%	R2	I4	R2	R2	I4	R2
Aluminum sulfate, saturated	R2	I3	R2	R2	I3	R2
Amidosulfonic acid	R2	R2	R2	R2	R2	R2
Ammonia, aqueous 10%	R2	R2	R2	R2	R2	R2
Ammonia, aqueous 30%	R4	R4	R4	R4	R4	R4
Ammonia, anhydrous	R2	I1	R2	R2	I3	R2
Ammonium chloride, carbonate, or sulfate 50%	R2	I1	R2	R2	I3	R2
Ammonium hydroxide 30%	R4	I2	R4	R4	I3	R4
Ammonium nitrate 50%	R2	I1	R2	R2	I3	R2
Ammonium persulfate 50%	R2	I4	R2	R2	I3	R2
Ammonium phosphate	R2	R2	R2	R2	R2	R2
Ammonium sulfide solution	R2	I1	R2	R2	I3	R2
Amyl acetate	R2	T	R2	R2	R2	R2
Aniline	N	N	N	N	N	N
Antifreeze	R2	R2	R2	R2	R2	R2
Aqua regia	N	N	N	N	N	N
Barium chloride, saturated	R2	I3	R2	R2	I3	R2
Beer	R2	R2	R2	R2	R2	R2
Benzaldehyde	N	N	N	N	N	N
Benzene	R2	I4	R2	R2	I4	R2
Benzenesulfonic acid	N	N	N	N	N	N
Benzoic acid	R4	I3	R4	R4	I3	R4
Benzole alcohol mixture	R2	R2	R2	R2	R2	R2
Benzoyl chloride	R2	I4	R2	R2	I4	R2
Benzyl acetate	R4	R4	R4	R4	R4	R4
Benzyl alcohol	N	N	N	N	N	N
Benzyl chloride	R2	I4	R2	R2	I4	R2
Bleach (see Sodium hypochlorite)						
Blood	R2	R2	R2	R2	R2	R2
Boric acid	R2	I3	R2	R2	I4	R2
Bromine water 4%	R2	R2	R2	R2	R2	R2
Butyl acetate	R2	R2	R2	R2	R2	R2
Butyl alcohol	R2	R2	R2	R2	R2	R2
Butyric acid	N	N	N	N	N	N

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Calcium bisulfite liquor	R2	I3	R2	R2	I3	R2
Calcium chlorate	N	N	N	N	N	N
Calcium chloride 50%	R2	I1	R2	R2	I3	R2
Calcium hydroxide **	R2	I1	R2	R2	I3	R2
Calcium hypochlorite **	R2	R2	R2	R2	R2	R2
Calcium nitrate, saturated	R2	I3	R2	R2	I3	R2
Calcium sulfate	R2	R2	R2	R2	R2	R2
Carbon dioxide	R2	R2	R2	R2	R2	R2
Carbon disulfide	R4	R4	R4	R4	R4	R4
Carbon monoxide	R2	R2	R2	R2	R2	R2
Carbon tetrachloride	R4	I4	R4	R4	I4	R4
Caustic (see Sodium hydroxide)						
Chlorinated lime	R2	R2	R2	R2	R2	R2
Chlorine (dry)	R2	R2	R2	R2	R2	R2
Chlorine (wet) 500 ppm	R2	R2	R2	R2	R2	R2
Chlorine water	R2	R2	R2	R2	R2	R2
Chloroacetic acid 100%	N	N	N	N	N	N
Chloracetic acid 10%	R4	R4	R4	R4	R4	R4
Chloroform	R2	R2	R2	R2	R2	R2
Chloronaphthalene	R4	R4	R4	R4	R4	R4
Chloronitrobenzene	R4	R4	R4	R4	R4	R4
Chromic acid 5%	R2	R2	R2	R2	R2	R2
Chromic acid 5-10%	R4	R4	R4	R4	R4	R4
Citric acid 40%	R2	I4	R2	R2	R2	R2
Coolant brines	R4	R4	R4	R4	R4	R4
Copper acetate, saturated	R2	R2	R2	R2	R2	R2
Copper chloride, nitrate, sulfate	R2	I1	R2	R2	I3	R2
Cottage cheese	R2	R2	R2	R2	R2	R2
Cottonseed oil	R2	I4	R2	R2	I4	R2
Cresols	N	N	N	N	N	N
Crude oil	R2	R2	R2	R2	R2	R2
Cyclohexane	R4	I3	R4	R4	I4	R4
Cyclohexanone	R2	I4	R2	R2	I4	R2
Dichloroethylene	N	N	N	N	N	N
Diesel fuel	R2	R2	R2	R2	R2	R2
Diethylene glycol	R2	R2	R2	R2	R2	R2
Diethylenetriamine	R2	R2	R2	R2	R2	R2

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Dimethylaminoethanol	R2	R2	R2	R2	R2	R2
Dimethyl formamide	R4	R4	R4	R4	R4	R4
Dinitrobenzene	N	N	N	N	N	N
Diphenyl or diphenyl oxide	R2	R2	R2	R2	R2	R2
Ether	R2	R2	R2	R2	R2	R2
Ethyl acetate	R2	R2	R2	R2	R2	R2
Ethyl alcohol	R2	I3	R2	R2	I4	R2
Ethylamine, 40% aq. sol	R4	R4	R4	R4	R4	R4
Ethyl chloride	N	N	N	N	N	N
Ethylene dichloride	N	N	N	N	N	N
Ethylene glycol	R2	I3	R2	R2	I3	R2
Fatty acids	R4	R4	R4	R4	R4	R4
Ferric chloride, below 50%	R2	I3	R2	R2	I3	R2
Ferric chloride, anhydrous	R2	R2	R2	R2	R2	R2
Ferric nitrate or sulfate	R2	I3	R2	R2	I3	R2
Fluosilicic acid 30% C	R2	R2	R2	R2	N	R2
Formaldehyde, below 37%	R2	I3	R2	R2	I4	R2
Formic acid 90%	N	N	N	N	N	N
Furmaric acid	R4	R4	R4	R4	R4	R4
Furfural	R2	R2	R2	R2	R2	R2
Furfuryl alcohol	R4	I4	R4	R4	I4	R4
Gallic acid	R2	R2	R2	R2	R2	R2
Gasoline	R4	I4	R4	R4	I3	R4
Glycerine	R2	I3	R2	R2	I3	R2
Glycol	R4	R4	R4	R4	R4	R4
Glycol acetate	R4	R4	R4	R4	R4	R4
Glycolic acid	N	N	N	N	N	N
Heptanoic acid	R4	R4	R4	R4	R4	R4
Hexachlorocyclopentadiene	N	N	N	N	N	N
Household ammonia (see ammonium hydroxide)						
Hydrochloric acid, below 16%	R2	I4	R2	R2	I3	R2
Hydrochloric acid, 16-25%	R2	R2	R2	R2	R2	R2
Hydrochloric acid, 26-34%	R3	R2	R3	R3	R3	R3
Hydrochloric acid, conc	R4	R3	R4	R4	R4	R4
Hydrofluobric acid C	R2	R2	R2	R2	N	R2
Hydrofluoric acid 10-20% C	R2	R2	R2	R2	N	R2
Hydrofluoric acid 20-70% C	R4	R4	R4	R4	N	R4

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Hydrogen peroxide 50%	R4	R4	R4	R4	R4	R4
Hydrogen sulfide	F3	F3	F3	F3	F3	F3
Hydroquinone	R2	R2	R2	R2	R2	R2
Hypochlorous acid	R4	R4	R4	R4	R4	R4
Iron sulfate, saturated	R2	I3	R2	R2	I3	R2
Jet fuel	R2	I3	R2	R2	I3	R2
Kerosene	R2	I3	R2	R2	I3	R2
Lactic acid 85%	R2	R2	R2	R2	R2	R2
Lard	R2	R2	R2	R2	R2	R2
Magnesium bisulfite	R2	R2	R2	R2	R2	R2
Magnesium chloride, saturated	R2	R2	R2	R2	R2	R2
Magnesium sulfate, saturated	R2	R2	R2	R2	R2	R2
Maleic acid, below 40%	R2	R2	R2	R2	R2	R2
Maleic acid 40%	R4	R4	R4	R4	R4	R4
Maleic anhydride	R2	R2	R2	R2	R2	R2
Mercuric chloride, saturated	R4	R4	R4	R4	R4	R4
Mercury	R2	I3	R2	R2	I3	R2
Methacrylic acid	N	N	N	N	N	N
Methyl acetate	R4	R4	R4	R4	R4	R4
Methyl alcohol	R2	I4	R2	R2	I4	R2
Methyl amine 40%	R2	R2	R2	R2	R2	R2
Methyl "Cellosolve"	R2	R2	R2	R2	R2	R2
Methyl chloride	N	N	N	N	N	N
Methy cyclohexanol	R2	R2	R2	R2	R2	R2
Methyl ethyl ketone	R4	R4	R4	R4	R4	R4
Methyl-naphthalene	R2	R2	R2	R2	R2	R2
Methylene chloride	N	N	N	N	N	N
Milk	R2	I1	R2	R2	I3	R2
Mineral oil	R2	I1	R2	R2	I3	R2
Monochlorobenzene	R4	R4	R4	R4	R4	R4
Motor oil	R2	R2	R2	R2	R2	R2
Muriatic acid	R3	R2	R3	R3	R3	R3
Naphthalene	R2	R2	R2	R2	R2	R2
Nickel chlorate, nitrate or sulfate	R2	R2	R2	R2	R2	R2
Nitric acid 5%	R3	R3	R3	R3	R3	R3
Nitric acid (above 10%)	N	N	N	N	N	N
Nitric oxide gases	N	N	N	N	N	N
Nitrobenzene	N	N	N	N	N	N

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Nitrosylsulfuric acid	N	N	N	N	N	N
Nitropropane	R4	R4	R4	R4	R4	R4
Oils (saponifiable)	R2	R2	R2	R2	R2	R2
Oleic acid	R2	R2	R2	R2	R2	R2
Oleum	N	N	N	N	N	N
Oxalic acid	R2	R2	R2	R2	R2	R2
Oxygen	R2	R2	R2	R2	R2	R2
Paradimethylaminobenzophenone	R4	R4	R4	R4	R4	R4
Paraffin	R2	R2	R2	R2	R2	R2
Perchloric acid	N	N	N	N	N	N
Perchloroethylene	R2	I4	R2	R2	I4	R2
Pelargonic acid	R2	R2	R2	R2	R2	R2
Petroleum	R2	R2	R2	R2	R2	R2
Phenol, below 5%	R5	R5	R5	R5	R5	R5
Phosgene	R4	R4	R4	R4	R4	R4
Phosphoric acid 85%	R2	R2	R2	R2	R2	R2
Phosphorous chlorides	R2	I3	R2	R2	I4	R2
Phthalic anhydride	R2	R2	R2	R2	R2	R2
Picric acid 5%	R4	R4	R4	R4	R4	R4
Picric acid 50%	N	N	N	N	N	N
Potassium bromide, saturated	R2	R2	R2	R2	R2	R2
Potassium carbonate, 25%	R2	I1	R2	R2	I3	R2
Potassium chlorate, 50%	R4	I3	R4	R4	I4	R4
Potassium chloride, nitrate or sulfate	R2	I1	R2	R2	R2	R2
Potassium cyanide, saturated	R2	I1	R2	R2	I3	R2
Potassium ferricyanide, saturated	R2	R2	R2	R2	R2	R2
Potassium hydroxide 50% **	R2	I1	R2	R2	I3	R2
Potassium nitrate, saturated	R2	I1	R2	R2	I3	R2
Potassium permanganate, below 5%	R2	R2	R2	R2	R2	R2
Potassium peroxide 5%	R2	R2	R2	R2	R2	R2
Potassium persulfate, saturated	R2	R2	R2	R2	R2	R2
Potassium sulfate saturated	R2	I1	R2	R2	I3	R2
Potassium sulfide	R2	R2	R2	R2	R2	R2
Prussic acid	R2	R2	R2	R2	R2	R2
Pyridine	R4	R4	R4	R4	R4	R4
Quinoline sulfate	R2	R2	R2	R2	R2	R2
Saccharin solutions	R2	R2	R2	R2	R2	R2
Salicylic acid	R4	R4	R4	R4	R4	R4
Salt, saturated	R2	I1	R2	R2	I3	R2

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Sodium acetate, saturated	R2	I1	R2	R2	I3	R2
Sodium bichromate (acidified)	N	T	N	N	N	N
Sodium chlorate	R2	I4	R2	R2	I3	R2
Sodium chloride, carbonate, bicarbonate, phosphate, nitrate, sulfate	R2	I1	R2	R2	I3	R2
Sodium hydroxide 50% **	R2	I1	R2	R2	I3	R2
Sodium hypochlorite, below 6% Cl **	R2	R2	R2	R2	R2	R2
Sodium hypochlorite 27% **	R4	R4	R4	R4	R4	R4
Sodium peroxide 5%	R4	R4	R4	R4	R4	R4
Stannic chloride	R4	R4	R4	R4	R4	R4
Stearic acid, any	R2	R2	R2	R2	R2	R2
Sugar, saturated	R2	I1	R2	R2	I3	R2
Sulfur chloride	N	N	N	N	N	N
Sulfur dioxide	R2	R2	R2	R2	R2	R2
Sulfuric acid 80%	R4	R4	R4	R4	R4	R4
Sulfuric acid 98%	N	N	N	N	N	N
Sulfurous acid, below 10%	R2	I4	R2	R2	I4	R2
Sulfur monochloride	R4	R4	R4	R4	R4	R4
Sulfuryl chloride	R4	R4	R4	R4	R4	R4
Tannin	R2	R2	R2	R2	R2	R2
Tar, tar oils	R4	R4	R4	R4	R4	R4
Tartaric acid, cold saturated	R2	I4	R2	R2	I4	R2
Tetrachloroethane	N	I4	N	N	N	N
Tetrachloromethane	N	N	N	N	N	N
Tetrahydrofuran	R4	R4	R4	R4	R4	R4
Toluene	R2	R2	R2	R2	R2	R2
Toluenesulfonic acid	R2	R2	R2	R2	R2	R2
Trichloroacetic acid	N	N	N	N	N	N
Trichloroethylene	R4	I4	R4	R4	I4	R4
Triethanolamine	R2	R2	R2	R2	R2	R2
Trisodium phosphate	R2	I1	R2	R2	I3	R2
Turpentine	R2	I4	R2	R2	I4	R2
Urea 20%	R2	I1	R2	R2	R2	R2
Urine	R2	R2	R2	R2	R2	R2
Vegetable oil	R2	R2	R2	R2	I3	R2
Vinegar	R2	I3	R2	R2	I4	R2
Water, fresh	R2	I3	R2	R2	I3	R2
Water, distilled	R2	I3	R2	R2	I3	R2
Xylene	R2	I4	R2	R2	I4	R2
Zinc chloride 50%	R2	R2	R2	R2	R2	R2

CHEMICAL RESISTANCE TABLE NO. 2

Solutions Common to the Plating Industry Floor and Wall Service

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Acid Copper	R2	R2	R2	R2	R2	R2
Acid Zinc	R2	R2	R2	R2	R2	R2
Aluminum bright dip — #41 Phosphoric acid heat Bath alumabrite Concentrate #41	R2	R2	R2	R2	R2	R2
Aluminum Pickle - Northwest Al. Alume D.S.	R2	R2	R2	R2	R2	R2
Aluminum Pickling, Enthone — Nitric acid with Enthone acclane #70	N	N	N	N	N	N
Alkaline tin	R2	R2	R2	R2	R2	R2
Anodizing Electrolyte — 15-18% sulfuric acid	R2	R2	R2	R2	R2	R2
Brass bright dip — 50% nitric, 50% sulfuric	R5	R5	R5	R5	R5	R5
Cadmium bright dip — with nitric acid with Kenvert conversion additive	R2	R2	R2	R2	R2	R2
Cadmium plating bath	R2	R2	R2	R2	R2	R2
Calolume L Cadmium cyanide bath	R2	R2	R2	R2	R2	R2
Chrome plating bath — approx. 45 oz CR to gallon 45 oz. sulfuric	R2	R2	R2	R2	R2	R2
Chromium	R2	R2	R2	R2	R2	R2
Copper Fluoroborate C	R2	R2	R2	R2	NR	R2
Copper Lume, Copper cyanide	R2	R2	R2	R2	R2	R2
Copper plating bath — cyanide with #625 Allied Research additive	R2	R2	R2	R2	R2	R2
Copper plating bath — straight cyanide	R2	R2	R2	R2	R2	R2
Enthone stripper — S18	N	N	N	N	N	N
Iron Chloride	R2	R2	R2	R2	R2	R2
Rochelle salt, Copper cyanide	R2	R2	R2	R2	R2	R2
Udylite bright nickel #425	R2	R2	R2	R2	R2	R2
Watt's nickel	R2	R2	R2	R2	R2	R2
Zincalume, Cyanide zinc	R2	R2	R2	R2	R2	R2
Delchem 946	R5	R5	R5	R5	R5	R5
Enthone Stripper	N	N	N	N	N	N
Nuvite Take-off Stripper	N	N	N	N	N	N
A-29-S Stripper	N	N	N	N	N	N

NOTE: Top service temperature for continuous service is 140°F (60°C). Exposures to 160°F (71°C) acceptable for not more than 20 minutes.

Use this reference information as a guide only. The information given in the specifications and drawings is believed to be reliable but no guarantee is made nor can we assume any liability in connection with its use. Please contact the Corrosion Engineering Department for specific recommendations.

PENNWALT

Corrosion Engineering Department • Three Parkway, Philadelphia, PA 19102 • (215) 587-7185

TECHNICAL DATA

PENNWALT -4457

PENNWALT BUILDING, THREE PARKWAY, PHILADELPHIA, PA. 19102

CE-233
4/87

CHEMICAL RESISTANCE OF URETHANE ASPHALT MEMBRANES

PENNGUARD (R) Adhesive/Membrane
TUFCHEM (R) II Membrane

Key: R - Resistant
NR - Not Resistant
C - Conditional

Acetic Acid	0 to 25%	R
Chromic Acid	0 to 35%	R
Citric Acid	0 to 35%	R
Hydrochloric Acid	0 to 35%	R
Nitric Acid	0 to 35%	R
Oleic Acid		NR
Phosphoric Acid	0 to 35%	R
Sulfuric Acid	0 to 35%	R
Acetone		NR
Benzene		NR
Carbon Tetrachloride		NR
Ethyl Acetate		NR
Ethylene Glycol		R
Methyl Chloride		NR
Methanol		R
Propanol		R
Toluene		NR
Xylene		NR
Water		R

Aluminum Hydroxide		NR
Calcium Hydroxide	Saturated	R
Sodium Hydroxide	0 to 35%	R
Aluminum Chloride	Up to 35%	C
Calcium Chloride	Up to 35%	R
Calcium Sulfate	Saturated	R
Magnesium Chloride	0 to 35%	R
Potassium Chromate	0 to 35%	R
Sodium Carbonate	0 to 35%	R
Sodium Chloride	Saturated	R
Sodium Phosphate	Saturated	R
Sodium Sulfate	Saturated	R
Ammonium Nitrate		R

Chemical resistance was determined by immersion in a solution of the listed chemicals for one year at 132 deg.F (55.5 deg. C). If the urethane asphalt membrane samples which were immersed in solution did not have significant weight gain or not physically affected by the solutions, they were deemed recommended for immersion in that particular environment.

TECHNICAL DATA

PENNWALT

-4457-

PENNWALT BUILDING, THREE PARKWAY, PHILADELPHIA, PA. 19102

CORROSION ENGINEERING DEPARTMENT
TELEX: 831-415
(215) 587-7185

CE-239
1/85

CHEMICAL RESISTANCE OF PENNWALT VINYL ESTER MORTAR AND PENNTROWEL VINYL ESTER L/F SYSTEM-SILICA

The general information is offered as a helpful suggestion and is based on tests believed to be reliable. No guarantee of results is made and we assume no liability in connection therewith. If you have a specific problem not covered in this chart, or wish more detailed information regarding effects of temperature, concentration or mixed chemical environments, please get in touch with us.

CHEMICAL	MAX CONTINUOUS SERVICE Temperature (°F)
Acetic Acid	210
Acetone	Not recommended
Adipic Acid	180
Aluminum Chloride, below 50%	210
Ammonia, aqueous 10%	210
Ammonia, aqueous 30%	100
Ammonia, anhydrous	210
Ammonium Chloride, Carbonate, Sulfate 50%	210
Ammonium Hydroxide 20%	100
Ammonium Nitrate, up to 50%	210
Aniline	70
Antifreeze	90
Beer	120
Benzene	100
Benzoyl Chloride	90
Bleach (see Sodium Hypochlorite)	
Blood	210
Brine (see Sodium Chloride)	
Boric Acid	210
Butyl Acetate	80
Calcium Chloride, up to 50%	210
Calcium Hypochlorite	100
Caustic (see Sodium Hydroxide)	
Carbon Disulfide	Not recommended
Carbon Tetrachloride	180
Chloroform	Not recommended
Chlorine (Dry)	210
Chlorine (Wet) 5000 ppm	210
Chlorine Water	210
Chromic Acid, up to 25%	150
Citric Acid, up to 40%	210
Copper Chloride, Nitrate or Sulfate	210
Cottage Cheese	210
Cottonseed Oil	210
Crude Oil	210
Cyclohexane	150
Cyclohexanone	90
Diesel Fuel	210
Diethylene Glycol	210
Diethylenetriamine	90

CHEMICAL	MAX CONTINUOUS SERVICE Temperature (°F)
Dimethylaminoethanol	90
Dimethyl Formamide	Not recommended
Ether	90
Ethyl Acetate	70
Ethyl Alcohol	100
Ethylene Dichloride	80
Ethylene Glycol	210
Ferric Chloride, below 50%	210
Ferric Chloride, anhydrous	160
Ferric Nitrate or Sulfate	210
Fluosilicic Acid	Not recommended
Formaldehyde, below 37%	150
Formic Acid, 90%	100
Fumaric Acid	210
Furfural	Not recommended
Gasoline	180
Glycerine	210
Glycolic Acid	100
Heptanoic Acid	210
Household Ammonia (see Ammonium Hydroxide	
Hydrochloric Acid, below 10%	250
Hydrochloric Acid, 10 to 32%	210
Hydrofluoric Acid	Not recommended
Hydrogen Peroxide, 50%	160
Hypochlorous Acid	100
Jet Fuel	180
Kerosene	180
Lactic Acid, up to 85%	210
Lard	210
Maleic Acid, up to 40%	250
Maleic Anhydride	150
Methyl Alcohol	70
Methyl "Cellosolve"	90
Methyl Ethyl Ketone	70
Milk	210
Mineral Oil	250
Motor Oil (see Crude Oil)	
Muriatic Acid, see Hydrochloric Acid)	
Nickel Chloride, Nitrate or Sulfate	210
Nitric Acid, below 5%	180
Nitric Acid, 5 to 40%	80
Nitropropane	70
Oleic Acid	210
Oleum	Not recommended
Oxalic Acid	210
Perchloric Acid, up to 30%	100
Perchloroethylene	120
Pelargonic Acid, any	210
Phenol, below 5%	70
Phosphoric Acid, up to 85%	210
Phthalic Anhydride	100
Potassium Chloride, Nitrate or Sulfate	210
Potassium Hydroxide, below 25%	150
[illegible] 25 to 50%	180

CHEMICAL	MAX CONTINUOUS SERVICE Temperature (°F)
Salt, Saturated Solution	210
Sodium Bicarbonate	180
Sodium Carbonate	180
Sodium Chloride	210
Sodium Nitrate	210
Sodium Sulfate	210
Sodium Sulfide	210
Sodium Hydroxide, below 25%	180
Sodium Hydroxide, 25 to 50%	150
Sodium Hypochlorite, up to 6% Cl_2	180
Sodium Hypochlorite, 6 to 27%	160
Stearic Acid	210
Sulfur Dioxide	210
Sulfuric Acid, below 40%	210
Sulfuric Acid, 40 to 50%	180
Sulfuric Acid, 50 to 70%	160
Sulfuric Acid, 93%	Not recommended
Sulfurous Acid, below 10%	120
Sugar, Saturated Solution	210
Tetrahydrofuran	Not recommended
Toluene	100
Toluenesulfonic Acid	120
Trichloroethylene	Not recommended
Trichloroacetic Acid	210
Triethanolamine	120
Trisodium Phosphate, any	210
Urine	210
Vegetable Oil	210
Vinegar	210
Water, Fresh	210
Water, Distilled	210
Xylene	120

TECHNICAL DATA

PENNWALT

-4457-

PENNWALT BUILDING, THREE PARKWAY, PHILADELPHIA, PA. 19102

CORROSION ENGINEERING DEPARTMENT
(215) 587-7185

CHEMICAL RESISTANCE OF PENNWALT MORTARS

CE-122

Supercedes 4/76 6/86

R – Resistant
NR – Not Recommended
– – Not Tested
C – Conditional, Test Required

This general information is offered as a helpful suggestion and is based on tests believe to be reliable. No guarantee of results is made and we assume no liability in connectio therewith. If you have a specific problem not covered in this chart, or wish more detaile information regarding effects of temperature, concentration or mixed chemic environments, please get in touch with us.

TYPE MORTAR	SILICA & SILICATE	RESIN**						SULFUR	
		FURAN		MODIFIED PHENOLIC		PHENOLIC			
Pennwalt Name & Maximum Service Temp.	K-14® 2500°F.*** / H.E.S.® 1650°F. / NBG® 1850°F. / Cordok® 1650°F.	Furalac Standard 350°F.	FN® 400°F. Furalac Oxygen Permit 350°F.	Aspik® CV 300°F.	Aspik® CN 350°F.	Silica Filled Rapgular 375°F.	Carbon Filled Rapgular 375°F.	Sulfur 200°F.	Carbon Sulfur 200°F.
CHEMICALS									
Acetaldehyde	R	R	R	R	R	R	R	R	R
Acetic Acid, under 10%	R	R	R	R	R	R	R	R	R
Acetic Acid, Glacial	R	R	R	R	R	R	R	NR	NR
Acetic Anhydride	R	NR	NR	R	R	R	R	NR	NR
Acetone	R	R	R	R	R	NR	NR	NR	NR
Acetone Oil	R	R	R	R	R	NR	NR	NR	NR
Acetyl-Bromide	R	R	R	R	R	R	R	R	R
Acetyl-Chloride	R	R	R	R	R	R	R	R	R
Acetylene-Dichloride	R	R	R	R	R	R	R	NR	NR
Acetyl Salicylic Acid	R	R	R	R	R	R	R	R	R
Aluminum Bromide	R	R	R	–	–	NR	NR	R	R
Aluminum Chloride, Sulfate & Alums	R	R	R	R	R	R	R	R	R
Aluminum Fluoride	NR	NR	R	NR	R	NR	R	NR	R
Ammonium Bromide	R	R	R	R	R	NR	NR	NR	NR
Ammonium Carbonate	R	R	R	R	R	R	R	NR	NR
Ammonium Chloride, Sulfate	R	R	R	R	R	R	R	R	R
Ammonium Fluoride	NR	NR	R	NR	R	NR	R	NR	R
Ammonium Hydroxide	NR	R	R	R	R	NR	NR	NR	NR
Ammonium Nitrate (Neutral Solutions)	R	R	R	R	R	R	R	R	R
Ammonium Persulfate	R	R	R	R	R	R	R	R	R
Ammonium Phosphates	R	R	R	R	R	R	R	R	R
Ammonium Sulfide	R	R	R	R	R	R	R	NR	NR
Ammonium Tungstate	R	R	R	R	R	R	R	R	R
Amyl Acetate, Alcohol	R	R	R	R	R	R	R	NR	NR
Aniline	R	NR	NR	R	R	NR	NR	NR	NR
Aniline Hydrochloride	R	R	R	R	R	R	R	R	R
Antimony Chloride	R	R	R	R	R	R	R	R	R
Antimony Oxychloride	R	R	R	R	R	R	R	R	R
Antimony Potassium Tartrate	R	R	R	R	R	R	R	R	R
Aqua Regia	R	NR	NR	NR	NR	NR	NR	NR	NR

TYPE MORTAR	SILICA & SILICATE	RESIN**						SULFU
		FURAN		MODIFIED PHENOLIC		PHENOLIC		
Pennwalt Name & Maximum Service Temp.	K-14® 2500°F.*** / M.E.S.® 1650°F. / HB® 1650°F. / Corrtek® 1650°F.	Furalac Standard 330°F.	FN® 470°F. / Furalac Oxygen Permit 350°F.	Amplin® CV 300°F.	Amplin® CN 350°F.	Silica Filled Regular 375°F.	Carbon Filled Regular 375°F.	Sulfur 200°F.
CHEMICALS								
Arsenic Compounds, Neutral or Acid	R	R	R	R	R	R	R	R
Barium Chloride	R	R	R	R	R	R	R	R
Barium Hydroxide	NR	R	R	R	R	NR	NR	NR
Barium Sulfide	R	R	R	R	R	NR	NR	NR
Benzaldehyde—Neutral or Acid	R	R	R	R	R	NR	NR	R
Benzene (Benzol)	R	R	R	R	R	R	R	NR
Benzene Sulfonic Acid (or Chloride)	R	R	R	R	R	R	R	NR
Benzoic Acid	R	R	R	R	R	R	R	R
Benzyl Acetate	R	R	R	R	R	NR	R	R
Benzyl Alcohol	R	R	R	R	R	NR	NR	R
Benzyl Chloride	R	R	R	R	R	R	R	NR
Boric Acid 5%	R	R	R	R	R	R	R	R
Bromine	R	NR	NR	NR	NR	NR	NR	R
Bromine Water, Saturated	R	R	R	R	R	R	R	R
Butanol	R	R	R	R	R	R	R	NR
Butyl Acetate	R	R	R	R	R	R	R	NR
Butyl Carbitol	R	R	R	R	R	NR	NR	NR
Butyric Acid	R	R	R	R	R	R	R	NR
Calcium Chloride	R	R	R	R	R	R	R	R
Calcium Hydroxide	NR	R	R	R	R	NR	NR	NR
Calcium Hypochlorite	R	NR	NR	NR	NR	NR	NR	NR
Calcium Nitrate (Neutral Solutions)	R	R	R	R	R	R	R	R
Calcium Sulfate	R	R	R	R	R	R	R	R
Carbon Bisulfide	R	R	R	R	R	R	R	NR
Carbon Dioxide	R	R	R	R	R	R	R	R
Carbon Oxychloride (Phosgene)	R	R	R	R	R	R	R	R
Carbon Tetrachloride	R	R	R	R	R	R	R	NR
Caustic Soda & Potash 25%	NR	R	R	NR	R	NR	NR	NR
Chloroacetic Acid 10%	R	R	R	R	R	R	R	NR
Chloral (Trichloroacetic aldehyde)	R	R	R	NR	NR	NR	NR	NR
Chlorbenzene	R	R	R	R	R	R	R	NR
Chlorine Dioxide, Water Solution	R	NR	NR	NR	NR	NR	NR	NR
Chlorine, Liquid	R	NR	NR	NR	NR	NR	NR	NR
Chlorine, Gas	R	NR	NR	R	R	NR	NR	NR
Chlorine Water, Saturated	R	R	R	R	R	R	R	NR
Chloroform	R	R	R	R	R	R	R	NR
Chloronaphthalene	R	R	R	R	R	NR	NR	NR
Chlorosulfonic Acid	R	NR	NR	R	R	NR	NR	R
Chromic Acid 10%	R	NR	NR	NR	NR	NR	NR	NR
Chromic Chloride	R	R	R	R	R	R	R	R
Chromium Potassium Sulfate	R	R	R	R	R	R	R	R
Citric Acid	R	R	R	R	R	R	R	R
Copper Acetate, Chlorides & Sulfate	R	R	R	R	R	R	R	NR
Copper Nitrate (Neutral Solutions)	R	R	R	R	R	R	R	NR
Cresol	R	R	R	R	R	NR	NR	NR

TYPE MORTAR	SILICA & SILICATE	RESIN**						SULFUR	
		FURAN		MODIFIED PHENOLIC		PHENOLIC			
Pennwalt Name & Maximum Service Temp. / CHEMICALS	K-14® 2500°F.*** / Corrtuk® 1650°F. / M.E.S.® 1650°F. / HB® 1650°F.	Furane Standard 330°F.	FN® 428°F. Furane Green Panel 350°F.	Aplit® CV 300°F.	Aplit® CN 356°F.	Silica Filled Regular 375°F.	Carbon Filled Regular 375°F.	Sulfur 200°F.	200°F.
Ether	R	R	R	R	R	R	R	NR	N
Ethyl Acetate	R	R	R	R	R	R	R	NR	N
Ethyl Alcohol	R	R	R	R	R	NR	NR	R	
Ethylamine 40%	R	R	R	R	R	NR	NR	R	
Ethyl Bromide	R	R	R	R	R	NR	NR	NR	NR
Ethyl Chloride & Ethylene Dichloride	R	R	R	R	R	R	R	NR	N
Ethylene Disulfonic Acid	R	R	R	R	R	R	R	R	
Ethylene Oxide	R	R	R	R	R	R	R	R	R
Ethyl Ether	R	R	R	R	R	R	R	NR	NR
Ethyl Sulfate	R	R	R	R	R	R	R	R	R
Ethyl Sulfuric Acid	R	R	R	R	R	R	R	R	R
Fatty Acids	R	R	R	R	R	R	R	NR	NR
Ferric Chloride, Nitrate, Sulfate	R	R	R	R	R	R	R	R	R
Ferri- & Ferrocyanides	R	R	R	R	R	R	R	R	R
Fluoboric Acid	NR	NR	R	NR	R	NR	R	NR	R
Fluorine Gas, Anhydrous	R	NR	NR	NR	NR	NR	NR	NR	NR
Fluosilicic Acid	NR	NR	R	NR	R	NR	R	NR	R
Formaldehyde	R	R	R	R	R	R	R	R	R
Formic Acid & Compounds	R	R	R	R	R	R	R	NR	NR
Gallic Acid	R	R	R	R	R	R	R	R	R
Glycol Monoacetate	R	R	R	R	R	R	R	NR	NR
Hydrazine Sulfate	R	R	R	R	R	NR	NR	NR	NR
Hydriodic Acid	R	NR	NR	NR	NR	NR	NR	NR	NR
Hydrobromic Acid	R	R	R	R	R	R	R	R	R
Hydrochloric Acid	R	R	R	R	R	R	R	R	R
Hydrocyanic Acid	R	R	R	R	R	R	R	R	R
Hydrofluoric Acid 50%	NR	NR	R	NR	R	NR	R	NR	R
Hydrogen Peroxide 1%	R*****	NR	R	R	R	R	R	R	R
Hydrogen Peroxide 10%	R	NR	NR	NR	NR	NR	NR	NR	NR
Hydrogen Peroxide 25%	R	NR	NR	NR	NR	NR	NR	NR	NR
Hydrogen Sulfide	R	R	R	R	R	R	R	R	R
Hypochlorous Acid	R	NR	NR	NR	NR	NR	NR	NR	NR
Iodine	R	NR	NR	NR	NR	NR	NR	NR	NR
Iodoform	R	R	R	R	R	NR	NR	R	R
Lactic Acid & Compounds	R	R	R	R	R	R	R	R	R
Lead Chloride	R	R	R	R	R	R	R	R	R
Lead Nitrate (Neutral Solutions)	R	R	R	R	R	R	R	R	R
Magnesium Chloride, Nitrate, Sulfate	R	R	R	R	R	R	R	R	R
Maleic Acid & Compounds	R	R	R	R	R	R	R	R	R
Manganese Chloride, Oxides & Sulfates	R	R	R	R	R	R	R	R	R
Mercuric Chloride	R	R	R	R	R	R	R	R	R
Methanol (Methyl Alcohol)	R	R	R	R	R	NR	NR	R	R
Methyl Acetate	R	R	R	R	R	R	R	NR	NR
Methylbutyleneglycol Acetate	R	R	R	R	R	NR	NR	NR	NR
Methyl Cyclohexanol	R	R	R	NR	R	NR	NR	NR	NR
Methylene Chloride	R	R	R	R	R	R	R	NR	NR
Methyl Sulfate	R	R	R	R	R	R	R	NR	NR
Methyl Sulfonic Acid	R	R	R	R	R	R	R	R	R

TYPE MORTAR	SILICA & SILICATE	RESIN**						SULFUR	
		FURAN		MODIFIED PHENOLIC		PHENOLIC			
Pennwalt Name & Maximum Service Temp.	K-14® 2500°F.*** / H.E.S.® 1650°F. / HB® 1850°F. / Cordal® 1650°F.	Furalac Standard 300°F.	FA® 428°F. Furalac Green Panel 350°F.	Aquaflex® CV 300°F.	Aquaflex® CN 356°F.	Silica Filled Regular 375°F.	Carbon Filled Regular 375°F.	Sulfur 200°F.	Carbon Sulfur 200°F.
CHEMICALS									
Molybdenum Acids & Oxides	R	R	R	R	R	R	R	R	R
Naphthalene (Sulfonated)	R	R	R	R	R	R	R	R	R
Naphthalenesulfonic Acid	R	R	R	R	R	R	R	R	R
Naphtholsulfonic Acid	R	R	R	R	R	R	R	R	R
Nickel Chloride & Sulfate	R	R	R	R	R	R	R	R	R
Nitric Acid 5%	R	NR	NR	C	C	NR	NR	R	R
Nitrobenzene	R	R	R	R	R	R	R	NR	NR
Nitrogen Oxides	R	NR	NR	NR	NR	NR	NR	R	R
Nitroglycerine	R	NR	NR	NR	NR	NR	NR	NR	NR
Nitrophenol	R	R	R	NR	R	NR	NR	R	R
Nitrotoluene	R	NR	NR	NR	R	NR	NR	NR	NR
Oils — Vegetable, Mineral, Animal	R	R	R	R	R	R	R	NR	NR
Oleic Acids & Compounds (Esters)	R	R	R	R	R	R	R	R	R
Oxalic Acids & Compounds	R	R	R	R	R	R	R	R	R
Paradimethylaminobenzophenone	R	R	R	R	R	R	R	NR	NR
Paraffin Wax	R	R	R	R	R	R	R	NR	NR
Perchloric Acid 25%	R	NR	NR	NR	NR	NR	NR	NR	NR
Phenol (20% Solution)	R	R	R	R	R	NR	NR	NR	NR
Phenol Sulfoacids	R	R	R	R	R	R	R	R	R
Phosphoric Acid	R	R	R	R	R	R	R	R	R
Phosphorous Bromide	R	NR	NR	NR	NR	NR	NR	R	R
Phosphorous Chloride & Oxychloride	R	R	R	R	R	R	R	R	R
Phthalic Acid	R	R	R	R	R	R	R	R	R
Picric Acid 50% in Water	R	R	R	R	R	R	R	R	R
Potassium Bichromate	R	R	R	R	R	R	R	oR	oR
Potassium Bromide 40%	R	R	R	R	R	R	R	R	R
Potassium Carbonate	NR	R	R	R	R	R	R	NR	NR
Potassium Chlorate 6.5%	R	R	R	R	R	R	R	R	R
Potassium Chloride, Nitrate, Sulfate	R	R	R	R	R	R	R	R	R
Potassium Cyanide	NR	R	R	R	R	R	R	oR	oR
Potassium Ferri & Ferro Cyanide	R	R	R	R	R	R	R	R	R
Potassium Hydroxide 50%	NR	R	R	R	R	NR	NR	NR	NR
Potassium Oxalate	R	R	R	R	R	R	R	R	R
Potassium Permanganate 10%	R	R	R	R	R	R	R	R	R
Potassium Persulfate & Sulfate	†R	R	R	R	R	R	R	R	R
Potassium Peroxide 5%	NR	NR	NR	R	R	NR	NR	NR	NR
Pyridine	R	R	R	R	R	R	R	NR	NR
Salicylic Acid	R	R	R	R	R	R	R	R	R
Selenium Compounds—Acid or Neutral	R	R	R	R	R	R	R	R	R
Silicon Tetrachloride	R	R	R	R	R	R	R	R	R
Sodium Acetate	R	R	R	R	R	R	R	R	R
Sodium Bicarbonate	R	R	R	R	R	R	R	R	R
Sodium Bichromate 50%	R	R	R	R	R	R	R	R	R
Sodium Bisulfate, Bisulfite	R	R	R	R	R	R	R	R	R
Sodium Carbonate 18%	NR	R	R	R	R	NR	NR	NR	NR

*OK up to 40% at 160°F. Test higher concentrations and temperatures. oOK cold, test hot.

TYPE MORTAR	SILICA & SILICATE	RESIN**						SULFU
		FURAN		MODIFIED PHENOLIC		PHENOLIC		
Pennwalt Name & Maximum Service Temp.	K-14® 2500°F.*** HLES® 1650°F. HB® 1650°F.* Corbel® 1650°F.	Furalac Standard 300°F.	Furalac Green Panel 350°F.	Aquik® CV 300°F.	Aquik® CN 356°F.	Silica Filled Regular 375°F.	Carbon Filled Regular 375°F.	Sulfur 200°F.
CHEMICALS								
Sodium Chloride, Nitrate	R	R	R	R	R	R	R	R
Sodium Chromate	R	R	R	R	R	R	R	R
Sodium Chlorosulfonate	R	R	R	R	R	R	R	R
Sodium Hydroxide 25%	NR	R	R	NR	R	NR	NR	NR
Sodium Hypochlorite	NR	NR	NR	#NR	#NR	NR	NR	NR
Sodium Oxalate	R	R	R	R	R	R	R	R
Sodium Peroxide 5%	NR	NR	NR	NR	NR	NR	NR	NR
Sodium Sulfate	R	R	R	R	R	R	R	R
Sodium Sulfide	†NR	R	R	NR	R	NR	NR	NR
Sodium Tartrate	R	R	R	R	R	R	R	R
Sodium Thiosulfate	R	R	R	R	R	R	R	R
Stearic Acid	R	R	R	R	R	R	R	•R
Sulfuric Acid 70% @ 100°C	R	R	R	R	R	R	R	≈R
Sulfur Chloride	R	NR	NR	R	R	R	R	R
Sulfur Molten	R	R	R	R	R	R	R	NR
Sulfurous Acid	R	R	R	R	R	R	R	R
Sulfur Oxides	R	R	R	R	R	R	R	R
Sulfuryl Chloride (Sulfur Oxychloride)	R	NR	NR	NR	NR	NR	NR	R
Tartaric Acid & Compounds	R	R	R	R	R	R	R	R
Tetrachloroethane	R	R	R	R	R	R	R	NR
Tin Chlorides	R	R	R	R	R	R	R	R
Tin Sulfates	R	R	R	R	R	R	R	R
Titanium Chlorides, Sulfate	R	R	R	R	R	R	R	R
Toluene (Toluol)	R	R	R	R	R	R	R	NR
Toluenesulfonic Acid	R	R	R	R	R	R	R	R
Trichloroacetic Acid	R	R	R	R	R	NR	NR	‡NR
Trichloroethylene	R	R	R	R	R	R	R	NR
Trisodium Phosphate	†NR	R	R	R	R	NR	NR	NR
Urea	R	R	R	R	R	R	R	R
Uric Acid	R	R	R	R	R	R	R	R
Xylene (Xylol)	R	R	R	R	R	R	R	NR
Zinc Chloride, Nitrate, Sulfate	R	R	R	R	R	R	R	R

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- • Same chemical resistance with reduced physical strength above 750°F. (399°C)
- •• See separate tables for polyester and epoxy mortars
- ••• Pennwalt K14® Mortar has similar chemical resistances to CORLOK® B Mortar and HB® Mortar with some exceptions. Check with your Pennwalt representative for specific chemical resistances.
- •••• CORLOK B Mortars should be tested for resistance in 1% range. All Mortars resistant in 10% and 25% range.
- ⊛ Resistant up to 40% at 160°F (71°C). Test higher concentrations and temperatures.
- $ Up to 2% concentration.
- ¢ Limited resistance at 48% concentration.
- ◆ Resistant to 100°F (38°C). Test for higher temperatures.
- △ Strong oxidizers must not be added because elemental bromine would be freed that would make the rating of a resin mortars Not Resistant.
- ■ Polyester Mortar probably resistant to boiling point in all three concentrations. Epoxy toppings may be considered up to 10% but verify by test.
- ✦ H.E.S.® and HB® Mortars will resist some concentration See Addenda.
- # Attack is slow at 1% or less.
- ✦ Resistant to 20% at 100°F. (38°C)
- & Resistant intermittent to 100°F. (38°C)
- ☐ Resistant intermittent to 160°F. (71°C)
- ≈ Up to 302°F. (150°C)

ADDENDA

H.E.S. and HB Mortars differ from other siliceous, silicate, or silica mortars in resisting exposures between pH 0.0 and pH8.0 with the exception of acid fluorides and HF acid. In addition, they can be used in glycol acetate, potassium sulfate or persulfate, sodium sulfide and trisodium phosphate, all of which will damage other siliceous mortars.

"Use this reference information as a guide only. The information given in the resistance chart is believed to be reliable, but no guarantee is made nor can we assume liability in connection with their use. Please contact the Corrosion Engineering Department for specific recommendations."

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Epoxies

BULLETIN TD-2

CORROSION RESISTANCE TEST DATA

JANUARY, 1990
(Replaces Jan. 1988)

TD-2 CORROSION RESISTANCE TEST DATA

The proper selection of coatings for specific exposures requires the best combination of science, art, experience and certain engineering fundamentals. Protective coatings for immersion and severe service are selected much in the same manner as other materials of construction involved in a chemical environment.

EFFECTIVE LIFE OF COATINGS depends on many factors, a few of which are listed below as a check-list to consider in the process of selecting the proper coating:

A. Chemical resistance of coating film.
B. Surface preparation and accessibility.
C. Film thickness — continuity and quality depending on skilled application.
D. Design of tankage and equipment.
E. Physical abuse — abrasion — impingement — liquid velocities — impact.
F. Electro-chemical, cathodic protection.
G. Thermal shock-cyclical heating and cooling.
H. Temperature limits and operating characteristics.
I. Impurities and combinations of reagents.

The foregoing information, plus guidelines from Field Histories (both successful and failures), narrows the field to one or more generic types of linings.

The coatings listed are classified in the "thin film" range and are not to be used in total and continuous immersion in the chemicals that produce an extreme corrosion rate on mild steel. The following data denotes an extreme corrosion rate "in excess of 50 mils per year" by a + symbol (refer to National Association of Corrosion Engineers, Corrosion Data Survey, Metals Section). Another rough guide is to ascertain from previous severe service whether or not this tank would have a foreshortened life without any protective lining – this range could be from a matter of weeks where heavy pitting might occur to five years. Thin film linings in the range of 5 mils to 35 mils would normally not be used where aggressive organic and inorganic acids are to be involved. In general, weak acids with less than a pH of 4 are considered corrosive and thin films are normally not recommended.

INSTRUCTIONS FOR USE OF TD-2

The test data published in this bulletin was derived by conducting immersion tests in closed containers. 1" x 5" x 1/8" mild steel panels were coated with a specific coating at the nominal mil thickness recommended for immersion service. The panels were immersed in one-half of their length in the liquid. The holes in the test coupons are not patched and there is a void in the coating from the hanging hook.

At the beginning of the test, panels were inspected at 24 hours. Thereafter, inspection of the panels was at the following intervals: 1 week; 2 weeks; 1 month; 2 months; 4 months; 6 months; 8 months; 10 months; and 1 year.

Prior to 1972, all tests were discontinued at 6 months. Commencing January 1972 all test data is accumulated for a 1 year period. 6 month tests are indicated by a < symbol.

By using coded symbols, the following data (in chart form) allows the user to determine the effect of the environment on the specific coating. The chart is based on immersion exposure (space does not allow reporting the effect of vapor and interface stage). Although a failure may be indicated and, if not too rapid, a judgment may be made if the coating is useful in protection against fumes, splash and spills. Each page shows the symbols and description of exposure and effect. The following notes will aid in interpretation of results:

1 = SLIGHT SOFTENING

This is not considered a true failure as in most cases it is only a surface softening, the coating is not readily removable from the surface and, when removed from the environment, it generally comes back to its original hardness. The chart indicates that it should not be used for total and continuous immersion service. It is possible that the coatings showing this degree of softening might be used at the discretion of the user.

2 = SEVERE SOFTENING

The guidelines are that it may be easily removed from the surface and would not be recommended for continuous service even though the coating might appear to harden after being removed from the environment.

3 = BLISTERED 5 = DISSOLVED 6 = CRACKED
8 = SEVERE ETCHING 9 = SWELLING 10 = PERMEATION

Would be interpreted as not being suitable for immersion service and would be considered a failure when immersion service is contemplated.

4 = DISCOLORATION

Not considered a failure.

7 = SLIGHT ETCHING

This is a noted effect to the coating film and would normally not be considered a failure. This effect is limited to slight surface etching only, with no measurable loss of film thickness. Coatings showing this degree of etching might be used at the discretion of the user.

The information presented is to be used as a guide to preliminary selection and an indication of the chemical resistance range of the coatings. Evaluation under actual conditions and field service is the next step in the process of proper selection. Consult our Home Office or PLASITE representative in your area for information on further tests and field history.

All data, statements and recommendations made herein are based upon information we believe to be reliable, but are made without any representations, guarantee or warranty of accuracy and are made without recourse as to all patent rights. Our products are sold on the condition that the user himself will evaluate them [illegible] our recommendations, technical terms, their suitability for his own purposes before adoption. All [illegible] regarding the use of our products or process are not to be construed as recommendation for the [illegible] of any patent or by [illegible] of any applicable law or regulation.

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CHEMICAL EXPOSURE	TEMP	C-725 (Epoxy)	1246	3066	3070	6001	7100	7111	7122 (Epoxy Phenolic)	7133 (Epoxy)	7155HHB	7156 (Epoxy)	9060 (Epoxy)	9080 (Epoxy)	9500	9570
Acetaldehyde	70 F	F 3 1 Da		OK**			F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da						
Acetic Acid (Glacial)	100 F			<OK+	OK+										OK+4	
Acetic Acid (Glacial)	150 F														F 6 1 Mo	
Acetic Acid 0.5%	100 F	F 3 6 Mo							F 3 8 Mo				OK+4	OK+4		
Acetic Acid 1%	100 F								F 3 2 Mo							
Acetic Acid 5%	100 F	F 3 1 Wk		<OK+	OK+		F 3 1 Wk		F 3 1 Wk				F 3,4 2 Wk	F 3 1 Mo	OK+4	
Acetic Acid 10%	100 F	F 3 1 Da		<OK+	OK+		F 3 1 Wk		F 3 1 Wk	F 3 3 Wk					F 3 8 Mo	
Acetic Anhydride	70 F			OK**	OK		F 3 1 Wk	F 3 2 Wk	F 1,3 1 Wk	F 5 9 Da						
Acetone	100 F		F 2 6 Mo	OK**	OK	F 3 8 Mo					F 3 40 H	F 3 40 H	OK4		OK	OK
Acetophenone	100 F			<OK	OK	<OK	F 5 1 Wk	F 3 1 Wk	F 3 1 Wk	F 2 2 Mo			OK 4	F 5 1 Da	OK	OK
Acrylic Acid (Glacial)	100 F			OK+	OK+											
Acrylic Acid 20%	100 F			OK+	OK+										F 3 2 Mo	OK4
Acrylic Acid 20%	150 F			OK+	OK+										F 3 1 Wk	F 3 1 Yr
Acrylic Acid 50%	150 F				OK+4											
Acrylic Acid 60%	100 F			OK+	OK+										F 3 1 Mo	OK 4
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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TD-2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Acrylic Acid 60%	150 F			OK+	OK+										F 3 72 H	F 3 1 Wk
Acrylic Acid 80%	100 F			OK+	OK+										F 3 1 Mo	OK4
Acrylic Acid 80%	150 F			OK+	OK+										F 3,6 72 H	F 3,6 72 H
Acrylic Syrup	70 F			OK**					OK**							
Acrylonitrile	70 F			<OK			F 2 1 Wk	F 2 1 Wk	F 5 1 Wk	F 5 1 Wk						
Acrylonitrile	100 F				OK								F 3 1 Da		OK	
Activated Carbon	70 F			<OK			<OK		<OK	<OK						
Activated Carbon	100 F				OK							OK	OK	OK	OK	OK
Adipic Acid (Dry)	70 F			<OK					OK**					OK		
Adipic Acid 60% in Ethyl Alcohol	70 F			<OK			F 3 6 Wk	F 1,3 10 Da	F 1,3 3 Wk	F 1,3 3 Wk						
Alkyl Glycidyl Ether	150 F	OK	OK	OK	OK	OK		F 3 1 Yr	OK	F 3 4 Mo	F 3 1 Yr	OK 4	OK 4	OK 4	OK	OK
Alkyl Glycidyl Ether Sulfonate 58%; Sodium Chloride 2%; Water 40%	150 F	F 5,9 2 Wk	F 3 10 Mo	OK	OK	OK		F 2,9 24 H	F 1,3,5 1 Mo	F 2,3,5 1 Mo	F 3 1 Wk	F 2 1 Yr	OK 4	F 5 1 Yr	OK 4	OK 4
Allyl Chloride	100 F			OK+	OK+								F 3,4 1 Wk	F 3 1 Da	OK+ 4	F 3,[illegible] 1 Yr
Allyl Glycidyl Ether	70 F			<OK			F 5 1 Mo	F 5 1 Mo	F 5 1 Mo	F 5 1 Mo						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Almond Oil	70 F									F 3 3 Da						
Aluminum Acetate 25%	70 F						F 3 1 Mo	F 3 2 Wk	F 3 1 Mo	F 3 1 Mo						
Aluminum Ammonium Sulfate 50%	70 F						<OK+	F 3 2 Mo	<OK+	<OK+						
Aluminum Ammonium Sulfate 50%	150 F														OK	OK
Aluminum Chloride 13%; Benzol 2%	70 F			<OK+			OK+ 4 Mo		F 3,4 4 Mo	F 3,4 4 Mo						
Aluminum Chloride 29%	70 F			<OK+			<OK+	<OK+	<OK+	OK+ 7 Mo	<OK+	<OK+				
Aluminum Chloride 29%	100 F												OK+	OK+ 4		
Aluminum Chloride 29%	150 F														OK+	OK+
Aluminum Fluoride 1%	100 F								OK				OK		OK	OK
Aluminum Fluoride 5%	100 F								OK				OK		OK	OK
Aluminum Fluoride 5%	150 F														OK	OK
Aluminum Fluoride 10%	100 F								F 3 1 Yr				OK		OK	OK
Aluminum Fluoride 20%	100 F								F 3 1 Yr				OK		OK	OK
Aluminum Nitrate 50%	70 F						OK+ 8 Mo	OK+4 8 Mo	OK+ 8 Mo	OK+4 8 Mo						
Aluminum Nitrate 50%	100 F												OK 1,4	OK 1,4		
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Aluminum Nitrate 50%	150 F														OK	
Aluminum Potassium Sulfate	70 F						OK+ 7 Mo	F 3 2 Mo	OK+ 7 Mo	OK+ 7 Mo						
Aluminum Sulfate 8.3% pH3	100 F		OK+	OK+	OK+	OK+			OK+	OK+	F 3 2 Wk					
Aluminum Sulfate 8.3% pH 3	150 F		OK+	OK+		OK+			F 3 6 Mo	F 3 4 Mo	F 3 2 Wk					
Aluminum Sulfate 48.5% pH 2.5	150 F		OK+	OK+	OK+	OK+			OK+	OK+	OK+					
Aluminum Sulfate 49%	100 F			OK+		OK+			OK+	OK+			OK+4	OK+4		
Aluminum Sulfate 49%	150 F			OK+		OK+			OK+	OK+			F 3,4 2 Mo	OK+4		
Ammonium Carbonate 25%	70 F			OK			F 1,3 5 Mo	<OK	<OK	F 3 6 Wk						
Ammonium Chloride (Dry)	250 F			<OK 4		<OK 4			<OK 4							
Ammonium Chloride 30%	100 F														OK	
Ammonium Chloride 50%	70 F						<OK+		<OK+	<OK+						
Ammonium Dichromate 50%	70 F						OK 7 Mo	OK 1 7 Mo	OK 1 7 Mo	OK 4 7 Mo						
Ammonium Hydroxide 2%	150 F															F 3,4 8 Mo
Ammonium Hydroxide 5%	70 F			<OK			F 3 2 Wk		F 3 2 Mo	F 3 1 Mo						
Ammonium Hydroxide 5%	100 F					F 3 3 Mo			F 3 1 Wk				F 3 2 Wk	F 3 2 Mo	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Ammonium Hydroxide 10%	100 F			OK	OK										OK	OK
Ammonium Hydroxide 29%	100 F			OK 4	OK4		F 3 1 Wk	F 3 5 Da	F 3 1 Wk	F 3 1 Wk			F 3 2 Wk		F 3 1 Yr	F 3 1 Mo
Ammonium Hydroxide 29%	150 F			F 3 1 Mo	OK 4					F 3 24 H						
Ammonium Nitrate 5%	100 F								OK							
Ammonium Nitrate 50%	70 F			<OK			OK 7 Mo	OK 9 Mo	OK 7 Mo	OK 9 Mo						
Ammonium Nitrate 50%	100 F												OK	OK		
Ammonium Nitrate 65%	150 F	OK	OK	OK 4	OK 4	OK 4		OK 4	OK	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK 4
Ammonium Nitrate 83%	100 F			OK**	OK				OK**	OK 7 Mo					OK	OK
Ammonium Nitrate 83%	180 F		OK	OK 4	OK 4	OK 4			OK 4	OK 4	OK 4	OK 4			OK 4	OK 4
Ammonium Nitrate 83%	200 F		OK	OK 4	OK 4	OK 4			OK 4		OK 4	OK 4			OK 4	OK 4
Ammonium Nitrate 83%	220 F		OK 4	OK 4	OK 4	OK 4					F 3,4 1 Yr	F 3,4 1 Yr			OK 4	OK 4
Ammonium Perchlorate 10%	100 F												OK	OK	OK	OK
Ammonium Persulfate 10%	100 F								F 3,9 6 Mo	F 3,9 6 Mo			F 3 1 Mo	OK 1,4		
Ammonium Persulfate 10%	150 F								F 3 3 Mo	F 1,3 1 Wk			F 3 2 Wk	F 3 6 Mo		
Ammonium Persulfate 50%	70 F						OK+4 7 Mo	F 5 1 Mo	F 3 2 Mo	OK+4 7 Mo						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Ammonium Persulfate 50%	150 F															OK
Ammonium Phosphate 40%	150 F		OK	OK	OK			OK 4	F 3 1 Yr	F 4,5 8 Mo	OK	OK 4	F 3 2 Wk	OK 4		OK
Ammonium Phosphate, Monobasic 50%	70 F			OK 8 Mo			OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 8 Mo						
Ammonium Sulfamate 46%	100 F		<OK					<OK		<OK	<OK					
Ammonium Sulfate Dry	70 F							OK**4 7 Mo								
Ammonium Sulfate 6%; Sodium Sulfate 6%	150 F	<OK	<OK	<OK			<OK	<OK 4	<OK	<OK 4						
Ammonium Sulfate 8%	150 F														OK	OK
Ammonium Sulfate 8.3% pH 3.5	100 F			OK+		OK+			OK+	OK+	OK+		OK+	OK+		
Ammonium Sulfate 8.3% pH 3.5	150 F			OK+		OK+			F 3 6 Mo	F 3 6 Mo	OK+		OK+4	OK+4		
Ammonium Sulfate 65%	100 F	OK 4	OK	OK		OK		OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK
Ammonium Sulfate 65%	150 F	OK+4	OK+4	OK+4		OK+4		F 5 10 Mo	OK+4	OK+4	OK+4	OK+4	OK+4	OK+4	OK+4	OK+4
Ammonium Sulfide 40-45%	100 F		OK	OK	OK			OK 4	OK 4	OK 4,7			OK 4	OK 4	OK 4	OK 4
Ammonium Sulfite 50%	70 F						OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 8 Mo						
Ammonium Sulfite 50%	100 F												OK	OK		
Ammonium Thiocyanate 50%	100 F								OK	OK 4			OK 4	OK		
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Ammonium Thiocyanate 55%	100 F		OK	OK	OK	OK		F 3 11 Mo	OK 4	OK 4	OK 4	OK 4			OK	OK
Ammonium Thiosulfate 60%	100 F	OK+		OK+		OK+		OK+4	OK+	OK+4	OK+				OK+	OK+
Ammonyx Cetac (Stepan Co.)	180 F	F 3,9 1 Mo	F 2 4 Mo	OK	OK	OK 4		F 1,3,9 24 H	F 1,3 3 Mo	F 3 2 Mo	F 3 2 Mo	F 3,8 3 Mo	F 3 10 Mo	F 3 10 Mo	OK 4	OK 4
Amyl Acetate	70 F			<OK			<OK	<OK	<OK	<OK					OK	OK
Aniline	205 F			OK 4	OK 4										F 5 1 Wk	F 5 1 Da
Animal Fat Solution 45%	180 F								OK	OK 4			OK 4	F 3 1 Yr		
Apple Butter	70 F									<OK						
Apple Concentrate	100 F	OK		OK	OK				OK	F 3 6 Mo			F 3 4 Mo	OK		
Apple Juice (MOTT'S)	150 F			OK	OK				OK 4	F 3 4 Mo		F 3 4 Mo				
Aqua Regia	70 F			F 5 6 Mo		F 5 2 Mo	F 5 1 Mo	F 5 1 Wk	F 5 3 Wk	F 5 3 Wk						
Arsenic Acid 50%	70 F						F 3 6 Mo	F 3,4 2 Wk	OK+1,7 6 Mo	OK+7 6 Mo						
Barium Chloride 50%	70 F						<OK	<OK	<OK	<OK						
Barium Hydroxide 50%	70 F						<OK	F 3 3 Wk	<OK	<OK						
Barium Nitrate 50%	70 F						OK 2 Wk	F 3 3 Wk	OK 2 Wk	OK 2 Wk					OK	
Barium Nitrate 50%	150 F														OK	
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Barium Sulfide 20%	150 F														OK	OK
Benzaldehyde	100 F			F 6 4 Mo				F 5 1 Da	F 5 1 Da				F 4,5 2 Wk	F 5 1 Da	OK 4	F 3,4 2 Wk
Benzene	100 F		OK	OK	OK	OK		OK 4	OK 4	F 3 1 Yr	OK 4	OK 4	OK 4	F 3 72 H	OK	OK
Benzene	150 F								F 1,3 2 Mo				OK 4	F 3 72 H	OK	OK
Benzene Sulfonyl Chloride 98.5%; Methanol 1.5%	100 F	F 3,9 24 H		OK 4	OK 4	OK 4		F 2,9 24 H	F 2,9 1 Wk	F 3 24 H	F 2,5 1 Wk	F 3 24 H	F 5 1 Yr	F 3,9 24 H	F 5 1 Yr	F 2 2 Wk
Benzoyl Chloride	100 F	F 1,3 4 Mo	F 5 2 Wk	OK+4		F 4,5 2 Mo	F 5 1 Mo	F 5 2 Wk	F 5 1 Mo	F 5 2 Wk						
Benzyl Chloride	100 F			OK+ 9 Mo		F 6 4 Mo			F 3 1 Wk	OK+4 9 Mo	F 3 2 Mo					
Benzyl Dichloride (Benzal Chloride)	100 F			OK 4 9 Mo		F 3 4 Mo			F 3 2 Mo	OK 4 9 Mo						
Borax Solution	70 F						<OK	<OK	<OK	<OK						
Boric Acid 1%	150 F	<OK	<OK	<OK	OK	<OK	<OK		<OK	<OK 4						
Boric Acid 3%	100 F					<OK			<OK	<OK						
Boric Acid 3%	150 F					<OK			<OK	<OK						
Boric Acid 25%	70 F					<OK+	<OK+	<OK+	<OK+	<OK+						
Boric Acid 25%	100 F												OK+	OK+	OK+	OK+
Brake Fluid (Gold Bond Heavy Duty)	100 F															OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Brake Fluid (DOT 3)	100 F												OK 4			
Brake Fluid HD557	100 F			<OK	OK	<OK		F 3 1 Wk	F 3 1 Wk							
Brake Fluid HD557	150 F			<OK	OK	<OK		F 3 1 Wk	F 3 1 Wk							
Brake Fluid Silicone SBF-1001	100 F		OK	OK	OK	OK		OK 4	OK	OK	OK	OK		OK 4	OK	OK
Brake Fluid Silicone SBF-1001	150 F		OK	OK	OK	OK		F 3,4 6 Mo	OK	F 3,4 6 Mo	F 3,6 1 Yr	OK 1,4		OK 4	OK	OK
Brewer's Yeast	40 F									<OK						
Brine Solution (SEE: Sodium Chloride)																
Bromochloromethane (Methylene Chlorobromide)	70 F			<OK			F 5 1/2 H	F 2,3 2 Wk	F 2,3 1 Da	F 5 1/2H						
Burgundy Wine (SEE: Wine Fortified)																
1,3-Butadiene Gas	100 F								OK**							
1,4 Butanediol (SEE: 1,4 Butylene Glycol)																
Butterscotch Topping	70 F			<OK		<OK				<OK						
n-Butyl Acetate	70 F			<OK			<OK	<OK 1,4	<OK 1,4	<OK 1						
n-Butyl Acetate	100 F				OK								OK		OK	OK
n-Butyl Acrylate	100 F	<OK 1		<OK	OK			<OK 1	<OK 1	<OK 1			OK	F 3 1 Wk	OK	OK
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n-Butyl Alcohol	70 F			<OK			<OK 1	<OK 1	<OK 1	<OK 1						
n-Butyl Alcohol	100 F				OK			OK 1					OK	OK	OK	OK
Butyl Alcohol 10%; Ammonium Hydroxide 5%	180 F			F 3 2 Mo				FC/F 3 4 Da								
Butyl CARBITOL® (SEE: Diethylene Glycol Monobutyl Ether) (Union Carbide)																
Butyl CELLOSOLVE® (SEE: Ethylene Glycol Monobutyl Ether) (Union Carbide)																
Butyl FORMCEL® (Celanese)	70 F			<OK			F 1,3 4 Mo	<OK 1	F 1,3 4 Mo	F 1,3 1 Mo						
Butyl Oxitol (Shell)	100 F	F 1,3 1 Wk	F 3 4 Mo	OK	OK	F 6 1 Yr		F 2 24 H	F 2,3 6 Mo	F 2,3 6 Mo	F 3 24 H	OK 1	OK 4	F 3 1 Wk	OK	OK
Butylamine	100 F	F 5 1 Da		F 3 1 Yr		F 5 2 Mo		F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Mo	F 5 1 Da
Butylamine 50%	100 F	F 3 1 Da		F 3 8 Mo		F 3 4 Mo		F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 4 Mo	F 3 1 Wk
1,3-Butylene Glycol	100 F	<OK		<OK	OK			<OK	<OK	<OK						
1,4-Butylene Glycol (1,4-Butanediol)	100 F	OK		OK	OK			F 3 8 Mo	OK	OK	OK	OK	OK	OK	OK	OK
1,4-Butylene Glycol (1,4-Butanediol)	150 F	OK		OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
Butyraldehyde	100 F			OK	OK	F 3 6 Mo		F 3,5 2 Da	F 3,5 2 Da	F 3,5 2 Da	F 3,5 2 Da	F 3,5 1 Wk	F 3 2 Wk	F 3 2 Wk	OK 4	F 3 2 Mo
Butyraldehyde	150 F			<OK	OK				F 3 1 Da							
Butyric Acid	70 F			<OK+			F 5 2 Da	F 5 2 Da	F 5 2 Da	F 5 1 Wk						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Butyric Acid	100 F			OK	OK										OK	OK
Butyric Acid	150 F														F 3,4 8 Mo	F 3,4 2 Wk
Butyric Acid 5%	100 F	F 3 1 Da							F 3 1 Wk	F 1,3 1 Da			F 3 1 Da	F 3 1 Wk	OK	OK
Butyric Acid 50%	100 F	F 5,6 1 Da							F 3,6 1 Da	F 5 1 Da			F 5 1 Da	F 3,6 1 Da		F 3 1 Mo
Butyrolactone	100 F			OK	OK			F2,3,9 1 Da	F2,3,9 1 Da				F 5 1 Mo		OK	F 5 6 Mo
Calcium Carbonate (Dry)	100 F	OK							OK**					OK		
Calcium Carbonate (Saturated)	100 F													OK**		
Calcium Bromide 10%	100 F	OK						OK	OK	OK 4						
Calcium Chloride 40%	212 F			<OK			OK 2 Mo	OK 2 Mo	OK 2 Mo	OK 2 Mo						
Calcium Chloride 50%	70 F			<OK		<OK	<OK	<OK	<OK**	<OK						
Calcium Chloride 50%	100 F												OK	OK		OK
Calcium Hydroxide 5%	100 F								F 3 10 Mo							
Calcium Hydroxide 10%	100 F	F 3 9 Mo		<OK	OK 4	<OK	F 3 6 Mo	F 3 5 Mo	F 3 2 Da	<OK	F 3 2 Da	<OK	F 3 2 Mo	OK	OK	OK
Calcium Hydroxide 10%	150 F	F 3 4 Mo		OK 4	OK 4	<OK	F 3 3 Mo		F 3 2 Da	F 3 4 Mo	F 3 2 Da	<OK	F 3 1 Da	F 3 10 Mo	OK	OK
Calcium Hydroxide 25%	100 F	F 3 6 Mo		<OK		<OK	F 3 3 Mo	<OK	F 3 2 Da	F 3 1 Mo	F 3 2 Da	<OK	F 3 1 Mo	OK	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Calcium Hydroxide 25%	150 F	F 3 2 Mo		<OK		<OK	F 3 2 Wk	<OK	F 3 2 Da	F 3 4 Mo	F 3 2 Da	<OK	F 3 1 Yr	F 3,4 10 Mo	OK	OK
Calcium Hydroxide 50%	100 F	F 3 1 Yr		<OK		<OK	F 3 3 Mo	F 3 5 Mo	F 3 2 Da	F 3 1 Mo	F 3 2 Da	<OK	F 3 1 Mo	OK	OK	OK
Calcium Hydroxide 50%	150 F	F 3 5 Mo		OK		OK	F 3 3 Mo	OK	F 3 2 Da	F 3 4 Mo	F 3 2 Da	OK	F 3 1 Mo	F 3,4 10 Mo	OK	OK
Calcium Hypochlorite 1%	70 F	F 3 4 Mo							F 3 2 Mo	F 3 2 Mo		OK				
Calcium Hypochlorite 5%	70 F						F 5 2 Wk	F 5 4 Da	F 5 2 Wk	F 5 1 Wk						
Calcium Hypochlorite 15%	100 F	OK+4							F 3,4 1 Yr	F 3,4 6 Mo		F 3,4 4 Mo	F 3,4 4 Mo			OK+4
Calcium Lignosulfonate	100 F		OK	OK		OK	OK 4		F 3 6 Mo	F 3,4 8 Mo	F 3 6 Mo	F 3,4 8 Mo	OK	OK	OK	OK
Calcium Lignosulfonate	150 F		F 2 6 Mo	OK		OK 4	F 3,4 2 Wk		F 3,4 2 Wk	F 3,4 2 Wk	F 3,4 2 Wk	F 3,4 2 Wk	F 3,4 4 Mo	F 3,4 4 Mo	F 3,4 8 Mo	OK 4
Canola Oil (Canbra Foods)	100 F			OK	OK				OK	OK 4		OK	OK 4	OK	OK	OK
Canola Oil, Crude (Canbra Foods)	100 F			OK	OK				OK	OK 4		OK	OK 4	OK 4	OK	OK
Caprolactam, Molten - BASF (2-oxohexamethyleneimine)	200 F			OK	OK	F 5 1 Wk		F 3,5 24 H	F 5 24 H	F 5 24 H	F 3,5 24 H	F 3,5 24 H	F 5 24 H	F 5 24 H	F 5 1 Mo	F 5 1 Wk
Caproic Acid	100 F														OK	OK
Caproic Acid	150 F														OK 4	OK 4
Caramel Coloring, pH 2.5 to 3.5 (Sethness)	120 F			OK	OK				F 3 6 Mo	F 3,4 6 Mo		F 3,4 10 Mo	F 3,4 1 Yr	OK	OK	
Caramel Coloring, pH 2.8 to 3.2	150 F	F 3 6 Mo		OK	OK					F 3 1 Yr						
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Carbon Disulfide	100 F		OK	OK	OK	OK	F 3 18 H	F 1,3 3 Wk	F 3 18 H	F 3,4 4 Mo	F 3,4 5 Mo	F 3 2 Mo	F 3 1 Wk	F 3 72 H	OK	OK
Carbon Tetrachloride	100 F		F 6 6 Mo	OK**	OK	<OK	F 3 6 Mo	<OK	<OK				OK		OK	OK
Carbon Tetrachloride	130 F					OK			OK	F 3 1 Mo					OK	OK
Castor Oil	70 F			<OK		<OK				<OK			OK	OK	OK	OK
Cation Exchange Water (SEE: Water, Demineralized)																
Caustic Liquor	100 F	F 3 2 Mo	<OK	F 5 1 Wk			F 2 6 Mo	F 3 1 Da	F 3 1 Mo	<OK 4						
Cell Liquor (SEE: Sodium Chloride 14%; Sodium Hydroxide 10%)																
CELLOSOLVE® (SEE: Ethylene Glycol Monoethyl Ether)																
CELLOSOLVE® Acetate (SEE: Ethylene Glycol Monoethyl Ether Acetate)																
Cherry Soda Concentrate 70%	70 F			<OK		<OK				<OK						
Chlorine 500 ppm in water	100 F								F 3 6 Mo							
Chlorine Water 0.4%	70 F						F 1,3 2 Wk	F 3 2 Da	F 3 6 Mo	F 5 1 Mo						
2-Chloro, 4-Nitrotoluene	212 F		F 3 2 Da	OK	OK	OK 4						F 1,3,9 2 Mo			OK 4	
Chloroaniline	70 F						F 5 4 Da	F 3 4 Da	F 5 18 H	F 3 1 Wk						
Chlorobenzene	70 F			OK	OK								OK	F 3 2 Mo	OK	OK
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Chloroform	70 F			<OK**			F 3 12 H	F 2 10 Mo	F 3 12 H	F 3 12 H						
Chloroform	100 F			OK	OK				F 5 1 Da				F 5 1 Da		OK	
Chlorosulfonic Acid	70 F						F 5 5 Min	F 5 7 Min	F 5 5 Min	F 5 5 Min						
CHLOROTHENE ® (SEE: 1,1,1-Trichloroethane)																
CHLORWAX 40 ®	100 F	OK 10 Mo		OK 10 Mo		OK 10 Mo		OK 10 Mo	OK 10 Mo	OK 10 Mo						
Chocolate Syrup	70 F			<OK		<OK										
Choline Chloride 70%	100 F			<OK					<OK	<OK						
Chromic Acid 10%	70 F			<OK•			F 5 3 Da	F 5 3 Da	F 5 3 Da	F 5 3 Da						
Chromic Acid 10%	100 F			OK+4	OK+4								F 4.8 2 Da	F 4.8 2 Da	OK•	
Chromic Acid 20%	100 F														OK+4.7	
Chromic Acid 25%	180 F														F 5 1 Da	
Chromic Acid 30%	70 F			<OK+			F 5 3 Da	F 5 3 Da	F 5 3 Da	F 5 3 Da						
Chromic Acid 50%	70 F			<OK+			F 5 3 Da	F 5 3 Da	F 5 3 Da	F 5 3 Da						
Chromic Acid 75%	180 F			F 8 1 Da	F 8 1 Da										F 5 1 Da	
Chromium Trioxide (Dry)	180 F			F 2 1 Da	F 2 1 Da										F 2 1 Da	
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Citric Acid 10%	100 F												F 3 2 Mo		OK+	
Citric Acid 25%	100 F														OK+	
Citric Acid 50%	70 F						<OK+	<OK+	<OK+	<OK+						
Citric Acid 50%	100 F												OK 4	OK 4	OK	OK
Clay (Saturated)	100 F								OK**					OK**		
Cobalt Acetate 40%	150 F														F 3 1 Yr	OK
Coconut Oil Refined Edible (COBEE 76®)	150 F	<OK		<OK	OK	<OK	<OK	<OK	<OK	<OK						
Cod Liver Oil	70 F			<OK		<OK				<OK						
Coffee, Instant Freeze Dried 26% (Gen. Foods)	100 F			<OK		<OK			<OK	<OK						
Cola Concentrate (COKE®)	70 F			OK**		<OK				<OK						
Cola Concentrate (RC®)	70 F			<OK		<OK				<OK						
Condensed Milk	70 F			<OK		<OK				<OK						
Copper Acetate 50%	70 F			<OK			OK 8 Mo	F 1,3 1 Mo	F 3 2 Mo	F 3 2 Mo						
Copper Chloride 50%	70 F						OK 4 8 Mo	OK 4 8 Mo	OK 4 8 Mo	OK 4 8 Mo						
Copper Liquor	180 F	<OK		<OK		<OK	<OK	<OK	<OK	<OK						
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Copper Sulfate 10%	100 F			<OK+		<OK+	<OK+	<OK+	<OK+	<OK+						
Copper Sulfate 10%	150 F			<OK+		<OK+	<OK+	<OK+	<OK+	<OK+						
Copper Sulfate 20%	100 F	<OK+	<OK+	<OK+		<OK+	<OK+	<OK+4	<OK+	<OK+						
Copper Sulfate 50%	100 F		<OK+	<OK+		<OK+	<OK+	<OK+	<OK+	<OK+			OK 4	F 3 1 Yr		
Copper Sulfate 50%	150 F		<OK+	<OK+		<OK+	<OK+	<OK+	<OK+	<OK+						
Corn Oil	100 F	OK	OK	OK	OK	OK			OK	OK		OK	OK	OK	OK	OK
Corn Oil	180 F	OK	OK	OK	OK	OK			OK	OK		OK	OK	OK	OK	OK
Corn Oil (MAZOLA®)	70 F			<OK		<OK				<OK					OK	OK
Corn Oil (MAZOLA®)	150 F	OK		OK	OK	OK		OK	OK 4	OK	OK	OK	OK	OK	OK	OK
Corn Oil (MAZOLA®)	210 F			OK	OK				F 1,3 1 Yr						OK	OK
Corn Steep Liquor	100 F									<OK						
Corn Steep Liquor	150 F									F 3 4 Mo						
Corn Syrup	150 F			<OK		<OK				OK**			OK 4	OK 4	OK	
Corn Syrup, Fructose Corn Syrup, Hi Fructose	100 F									OK**					OK	
(ISOMEROSE 100®) Clinton Corn Products	100 F									OK**4			OK 4	OK		
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Corn Syrup, High Fructose (ISOMEROSE 100®) Clinton Corn Products	150 F									OK			OK 4		OK	OK
Corn Syrup, High Fructose (ISOMEROSE 550®) Clinton Corn Products	100 F	OK		OK	OK					OK**4		OK	OK 4	OK		
Corn Syrup, High Fructose (ISOMEROSE 550®) Clinton Corn Products	150 F									OK			OK 4		OK	OK
Cough Syrup (VICKS®)	70 F			<OK			<OK	<OK	<OK	<OK						
Cransweets	70 F									<OK						
Creosote Oil 97%	100 F			OK					OK 4				OK 4		OK	OK
Creosote Oil 97%	150 F			OK					F 2,9 1 Mo				OK 4		OK	OK
Mono-butyl-meta-Cresol	150 F			OK	OK										OK	OK 4
Mono-butyl-meta-Cresol	180 F			OK 4	OK 4										F 7 1 Yr	F 7 1 Yr
Cresylic Acid	100 F	F 3 1 Da	F 3,5 2 Mo	OK	OK	OK		F 5 1 Da	F 5 1 Wk	F 5 1 Wk	F 3,5 1 Da	F 5 1 Da	F 8 2 Wk	F 3,5 1 Da	OK	OK 4
Cresylic Acid	150 F	F 5 1 Da	F 5 1 Wk	OK	OK	F 3,5 1 Mo		F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Wk	F 5 1 Da	F 5 2 Mo	F 5 2 Wk
Cumene (Witco)	100 F			OK		OK						OK	OK	OK	OK	OK
Cutting Oil	140 F			<OK		<OK	<OK	<OK	<OK	<OK						
Cyclohexane	70 F			<OK												
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Cyclohexanone	100 F	F 5 2 Wk		<OK	OK			F 5 1 Wk	F 5 4 Mo							
Cyclohexene	70 F			<OK				<OK 1								
Cyclohexene	100 F			OK	OK								OK 4 8 Mo	F 1.3 1 Mo	OK	OK 8 Mo
Cyclohexylamine	100 F												F 2 1 Da	F 5 1 Da		F 5 2 Mo
Decyl Alcohol (1-Decanol)	70 F			<OK	OK	<OK	<OK	<OK	<OK	<OK			OK		OK	OK
DESMOPHEN 670-90® Mobay Chemical	150 F			OK				F 3 1 Yr	OK	F 2.4 1 Yr	OK 4	F 4.5 1 Yr	OK	OK 4	OK	OK
DESMOPHEN 800® Mobay Chemical	150 F			OK				OK 4	OK	OK 4	OK 4	F 2.9 1 Yr	OK 4	OK 4	OK	OK
Detergent (CHIFFON®)	150 F	<OK					<OK		<OK	<OK					OK	OK
Detergent (JOY®)	100 F	OK		OK		OK		OK	OK	OK						
Detergent (JOY®)	150 F	F 3 1 Yr		OK 4		OK		F 3 2 Wk	OK	F 3 1 Mo	F 3 1 Yr					
Detergent (PALMOLIVE®)	100 F	OK		OK		OK		OK 4	OK	OK 4	OK					
Detergent (PALMOLIVE®)	150 F	OK		OK		OK		OK 4	OK	F 3 1 Yr	F 3 1 Yr					
Detergent 10% (FAB®)	180 F			F 3 7 Mo			<OK		<OK						OK	OK
Detergent Paste (TIDE®)	70 F			<OK		<OK	<OK	F 3 3 Wk	F 3 2 Wk	<OK					OK	OK
Detergent 1% (TIDE®)	180 F		<OK						<OK	<OK					OK	OK
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Deacetone Alcohol	70 F			<OK		<OK		<OK	<OK	<OK			OK		OK	OK
1,2-Diaminopropane	70 F			OK 8 Mo			F 5 1 Da	F 5 1 Da	F 5 1 Da							
1,2-Dibromo 1,1-Dichloroethane	100 F												OK		OK	OK 4
1,2-Dibromoethane	100 F												OK 4		OK	OK 4
Dibutyl Phthalate	70 F			<OK		<OK	<OK	<OK	<OK				OK		OK	OK
Dichlorobutane	100 F							OK**								
Dichlorodintene	100 F			OK**	OK											
1,2-Dichloroethane	100 F												OK		OK	OK
Diesel Fuel	100 F							OK**	OK**				OK 4	OK 4	OK	OK
Diethanolamine	100 F	OK	OK	OK	OK		OK	F 3 2 Wk	OK	OK			OK	OK 4	OK	OK
Diethanolamine	150 F	F 3 6 Mo	OK	OK 4	OK4	OK	F 3 1 Mo	F 3 5 Da	F 3 1 Mo	OK						
Diethyl Ether	70 F												OK		OK	OK
Diethyl Sulfate	100 F		F 2 6 Mo	<OK	OK			F 2 6 Mo	F 2 6 Mo	F 2 4 Mo						
Diethylene Glycol (Shell)	100 F	F1,3,9 2 Wk	OK	OK	OK	OK		F 1,9 24 H	F 3 6 Mo	OK	F 1,3 1 Wk	OK	OK 4	OK	OK	OK
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Diethylene Glycol	150 F		F 3 1 Yr	OK	OK			F 3,4 72 H	F 2,3 2 Mo		F 3 72 H	F 3,4 2 Mo	F 3,4 10 Mo	F 3,4 2 Mo	OK 4	OK 4
Diethylene Glycol	270 F			<OK 4			F 3,5 1 Wk	F 1,3 1 Wk	F 3,5 1 Wk				F 3,4 2 Mo	F 3,4 2 Wk		
Diethylene Glycol 50%	70 F						<OK	<OK	<OK	<OK						
Diethylene Glycol 50%	100 F												OK	OK		
Diethylene Glycol Mono-butyl Ether (Butyl CARBITOL®)	100 F	F 1,3 1 Mo		<OK	OK			F 1,3 1 Wk	F 2 4 Mo	F 2,4 4 Mo						
Diethylenetriamine	70 F						F 5 3 Da	F 5 3 Da	F 5 3 Da	F 5 3 Da			F 5 2 Wk	F 5 4 Da	F 5 3 Mo	F 5 12 Da
Diethylenetriamine	100 F	F 5 1 Da		OK	OK			F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 3 1 Da	F 3 1 Da	F 5 4 Mo	F 3 1 Wk
Diethylenetriamine	150 F	F 5 1 Da		F 3 10 Mo		F 3 10 Mo		F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da		F 5 1 Da
Difluorophosphoric Acid	70 F						F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da						
Diisopropanolamine	100 F							F 1,3 4 Mo								
Dimethylacetamide	Amb.							F 2,3 1 H	F 2,3 1 H				F 5 2 Wk			
Dimethylacetamide	212 F			F 5 2 Wk	F 5 2 Wk								F 5 4 H			
Dimethylamine 1%	100 F		F 3 1 Yr	OK 4					F 3 4 Mo	F 3 1 Mo		OK	F 3 4 Mo	OK	OK 4	OK
Dimethylamine 25%	100 F												F 3 1 Mo		OK	F 3 1 Mo
Dimethylethanolamine (Dimethylaminoethanol)	70 F			<OK			F 3 2 Wk	F 1,3 18 H	F 3,5 3 Da	<OK 1						
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Dimethylformamide (Tech.)	70 F			<OK			F 5 12 H	F 5 12 H	F 5 12 H	F 5 12 H					F 5 2 Wk	F 5 72 H
Dimethylformamide	100 F			OK 4	OK 4								F 5 1 Da		F 5 2 Wk	F 5 1 Da
2-6 Dimethyl Phenol	150 F			OK	OK 4										F 2 1 Yr	F 5 1 Wk
Dimethyl Sulfoxide	100 F			OK 4	OK 4								F 5 1 Da		F 5 1 Mo	F 5 1 Da
Dioctyl Phthalate	140 F			<OK	OK		OK 7 Mo	OK 4 7 Mo	OK 7 Mo	OK 7 Mo			OK 4	OK	OK	OK
Dipropylene Glycol	100 F	<OK		<OK	OK	<OK		<OK 1	<OK 1	<OK 1,4			OK 4	OK	OK	OK
Dipropylene Glycol	150 F	F 2,4 4 Mo		<OK	OK	<OK				F 3,4 2 Mo			F 3,4 1 Yr	F 3 2 Mo		
Dipropylene Glycol Monomethyl Ether (DPM)	100 F	F 3 3 Wk		OK	OK	OK		F 2 72 H	OK 1			F 2 72 H	OK	F 3 3 Wk	OK	OK
Disodium Phosphate 5% (SEE: Sodium Phosphate, Di-Basic)																
Effluent Glycol	100 F			<OK				<OK 4								
EMERY 3004	150 F	OK		OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
EMERY 3004	210 F			OK	OK										OK	OK
Epichlorohydrin	100 F			<OK	OK			FC/F 3 2 Da					F 3,4 2 Mo		F 3 6 Mo	F 5 5 Mo
Epichlorohydrin	150 F			<OK	OK			FC/F 3 2 Da					F 5 1 Da		F 5 1 Wk	F 5 1 Da
Ethanol (SEE: Ethyl Alcohol)																
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Ethanolamine (Monoethanolamine)	100 F		F 3 2 Wk	F 5 6 Mo	F 3 1 Yr		F 3 5 Da	F 3 5 Da	F 3 2 Mo	F 3 2 Mo				F 3 4 Da	OK 1,4	F 5 2 Wk
Ethanolamine (Monoethanolamine)	150 F	F 3 5 Da	F 5 5 Da	F 5 1 Wk			F 3 5 Da	F 3 5 Da	F 3 5 Da	F 3 5 Da						F 5 1 Mo
Ethyl Acetate	70 F			<OK		<OK	<OK 1	<OK 1	<OK 1	<OK 1						<OK
Ethyl Acetate	100 F				OK								OK 4	F 3 2 Da	OK	
Ethyl Acrylate	70 F			<OK			<OK 1	<OK 1	<OK 1	<OK 1					OK	OK
Ethyl Alcohol	100 F		<OK	<OK	OK	<OK	F 3 6 Mo	<OK	OK 1	<OK 1	F 3 1 Wk	F 3,4 10 Mo	OK	F 3 1 Wk	OK	OK
Ethyl Alcohol	150 F		<OK	<OK	OK	<OK	F 3 6 Mo	<OK	F 3 1 Da	<OK 1			F 3,4 8 Mo	F 3 2 Da	OK	OK
Ethyl Alcohol 5%	100 F			<OK	OK										OK	OK
Ethyl Alcohol 5%	150 F			<OK	OK										OK	OK
Ethyl Alcohol 10%	100 F			<OK	OK								OK	OK	OK	OK
Ethyl Alcohol 10%	150 F			<OK	OK								F 3,4 4 Mo	F 3,4 4 Mo	OK	OK
Ethyl Alcohol 20%	100 F			<OK	OK								<OK		OK	OK
Ethyl Alcohol 20%	150 F			<OK	OK								<OK		OK	OK
Ethyl Alcohol 50%	212 F			OK	OK											
Ethyl Chloroformate	100 F														F 9 8 Mo	F 6 2 Wk
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Ethyl Silicate	100 F			OK**	OK	<OK		<OK	<OK						OK	OK
Ethyl Thiochloroformate	100 F			OK 4	OK			F 5 1 Wk	F 5 1 Wk	F 4,5 1 Wk	F 3,4 1 Wk	F 3,4 1 Wk	OK 4	F 3,4 1 Wk	OK 4	F 3 1 Wk
Ethylamine 70%	70 F						F 1,3 1 Mo	F 3 18 H	F 1,3 2 Da	F 3 18 H						
Ethylamine 70%	100 F														F 5 1 Wk	F 6 1 Da
Ethylene Dibromide	100 F	OK 1							OK 1	OK 4	OK					
Ethylene Dichloride	100 F			<OK	OK		F 1,3 2 Mo	<OK 1	F 1,3 1 Da	F 5 1 Da	F 2,3 1 Da		FC OK 4	F 3 2 Da	OK	OK
Ethylene Glycol	100 F	F 3,4 1 Yr	OK	OK**	OK	OK		F 3 8 Mo	OK**	OK	F 3 1 Yr	OK	OK	OK	OK	OK
Ethylene Glycol	150 F	F 3 1 Mo	OK	OK	OK	OK		F 3 2 Wk	F 3 1 Yr	F 3 4 Mo	F 3 2 Wk	F 3 2 Wk	OK 4	OK 4		OK
Ethylene Glycol	200 F			OK 4	OK 4										OK	F 3 10 Mo
Ethylene Glycol	210 F														OK 4	
Ethylene Glycol	250 F		F 2,3 2 Mo	F 3 9 Mo		F 3 9 Mo		F 3 48 H	F 3 1 Wk	F 3 48 H	F 3,4 1 Wk					
Ethylene Glycol 30%	210 F			OK	OK			F 3 1 Yr				F 3 1 Yr	OK 4	F 3 1 Yr	OK	OK
Ethylene Glycol 50%	70 F			<OK		<OK	<OK	<OK	<OK	<OK						
Ethylene Glycol 50%	100 F												OK 4	OK 4	OK	OK
Ethylene Glycol 50%	150 F			OK	OK						OK**				OK	OK
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Ethylene Glycol Mono-butyl Ether (Butyl CELLOSOLVE®)	70 F			<OK	OK		F 1,3 2 Wk	OK 1	F 1,3 5 Mo	<OK 1					OK	
Ethylene Glycol Mono-butyl Ether (Butyl CELLOSOLVE®)	100 F	F 3 1 Wk	F 3 1 Wk	OK	OK	F 6 1 Yr		F 2,3 2 Mo	F 2,3 2 Mo	F1,3,4 2 Mo	F 3 72 H	F 5 72 H	F 2 8 Mo	F 3 1 Wk	OK	OK
Ethylene Glycol Mono-ethyl Ether (CELLOSOLVE®)	100 F	F 3 72 H	F 1,3 1 Mo	OK	OK	F 3 1 Yr		F 3 72 H	F 3 72 H	F 2,3 2 Mo	F 3 72 H	F 5 72 H	F 3 4 Mo	F 3 72 H	OK	F 5 1 Yr
Ethylene Glycol Mono-ethyl Ether Acetate (CELLOSOLVE® Acetate)	100 F	<OK 1		<OK	OK	<OK		<OK 1	<OK 1	<OK 1						
Ethylene Glycol Mono-methyl Ether (Methyl CELLOSOLVE®)	100 F	F 3 72 H	F 3 1 Wk	OK	OK	F 3 6 Mo		F 3 72 H	F 2,3 2 Mo	F2,3,4 2 Mo	F 3 72 H	F 3 72 H	F 3 4 Mo	F 3 72 H		F 5 4 Mo
Ethylene Glycol Mono-propyl Ether (EP) (Propyl CELLOSOLVE®)	100 F	F 3 72 H		OK	OK	OK		F 2 72 H	F 2 3 Wk			F 2,4 72 H	OK 4	F 3,4 72 H	OK	OK
Ethylenediamine	70 F						F 5 3 Da	F 5 3 Da	F 5 3 Da	F 5 3 Da						
Ethylenediamine	100 F				F 3 4 Mo								F 5 1 Da	F 5 1 Da	OK 4	F 5 2 Wk
Ethylenediamine-tetraacetic acid (VERSENE 100®)	100 F	<OK		<OK 7		<OK			<OK	<OK		<OK			OK	OK
Ethylenediamine-tetraacetic acid (VERSENE 100®)	150 F		F 3 6 Mo					<OK1,4	F 1,3 6 Mo	<OK 1					OK	OK
2-Ethylhexanol	100 F	<OK		<OK	OK			<OK	<OK	<OK					OK	OK
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2-Ethylhexyl Acrylate	100 F	<OK		<OK	OK			<OK	<OK	<OK						
2-Ethylhexyl Chloro-formate	100 F			OK**	OK											
Fatty ester (Septan C-65) BASF	Amb.	OK 4	OK	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK
Ferric Ammonium Citrate Solution	100 F			OK+	OK			OK+	OK+	OK+4						
Ferric Chloride 40%	150 F			<OK+4					<OK+4	F 3,4 4 Mo			F 3,4 6 Mo	F 3,4 1 Mo	OK+	OK+
Ferric Chloride 50%	70 F			<OK+			<OK+	F 3 3 Mo	<OK+	<OK+						
Ferric Chloride 50%	100 F												F 3,4 10 Mo			
Ferrous Sulfate 50%; Hydrochloric Acid 2%	100 F	<OK+	<OK+	<OK+			<OK+	<OK+4	<OK+	<OK+						
Fertilizer (Dry)	100 F	OK**							OK**							
Fertilizer (Liquid)	100 F								OK**							
Fish Oil	180 F	OK 4		OK	OK	OK		OK	OK 4	OK 4	OK 4					
Fluoboric Acid 10%	100 F								F 3 3 Mo	F 1,3,5 1 Mo			F 3 6 Mo	F 3,9 3 Mo		
Fluoboric Acid 10%	150 F								F 3 1 Wk	F 3,5 24 H			F 3 1 Wk	F 3,9 1 Wk		
Formaldehyde 37%	100 F			OK**	OK	OK	F 3 1 Mo	F 3 4 Mo	F 3 2 Mo				F 3 3 Mo	F 3 6 Mo	OK	OK
Formaldehyde 37%	150 F			OK 4	OK		F 1,3 2 Da		F 1,3 1 Da	F 1,3 1 Da			F 3 2 Wk		F 3,4 1 Yr	F 4,10 1 Yr
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Formaldehyde 40% Sol. in Isobutyl Alcohol	100 F	F 3 2 Wk		<OK	OK			F 2,3 1 Mo	F 3 2 Mo	F 2,5 2 Wk						
Formaldehyde 50%	100 F			OK	OK											
Formaldehyde 50%	150 F			OK	OK										F 3 8 Mo	
Formaldehyde Uninhibited 50%	170 F			OK	OK											OK 8 Mo
Formaldehyde 50%; Methanol 1%	100 F			OK	OK											
Formic Acid 10%	70 F			OK+			F 2,3 3 Da	F 2,3 3 Da	F 2,3 1 Wk	F 2 3 Da						
FREON MF® (DuPont)	70 F			<OK				<OK	<OK							
FREON TF® (DuPont)	70 F			<OK				<OK	<OK							
Fuel Oil	100 F			<OK	OK	<OK		OK**	OK**				OK	OK	OK	OK
Furfural	70 F			<OK			F 1,3 2 Wk	F 1,3 2 Wk	F 1,3 2 Wk	F 2,5 3 Mo						
Furfuryl Alcohol	70 F			<OK			F 3 1 Wk	F 1,3 1 Mo	F 3 1 Wk	F 1,3 1 Mo						
Furfuryl Alcohol	100 F				OK								F 5 2 Wk		OK	
Furfuryl Amine	70 F			<OK			F 5 1 Wk	F 5 1 Wk	F 5 1 Wk	F 5 1 Wk						
Gasoline (Leaded)	100 F	<OK		<OK	OK	<OK	<OK	OK**	OK**	<OK			OK 4		OK	<OK
Gasoline (Leaded)	150 F	<OK		<OK	OK	<OK	<OK		<OK						<OK	OK
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Gasoline (Premium-No Lead)	100 F	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK 1,4	OK 4	OK	OK 4	OK
Gasoline (Unleaded) 80% Methanol 20%	100 F	F 2 2 Wk	F 2,3 2 Wk	OK	OK	OK		F 2 72 H	F 3 72 H	F 5 72 H	F 3 72 H	F 2,3 72 H	OK 1	F 3 72 H	OK	OK
Gasoline (Unleaded) 90% Ethanol 10%	100 F	OK 1	F 1,3 72 H	OK	OK	OK		OK 1	OK 1	F 3 72 H		F 2 72 H	OK 4	F 3 72 H	OK	OK
Gasoline (Unleaded) 90% Methanol 10%	100 F	F 2 72 H	F 1,3 2 Wk	OK	OK	F 3 8 Mo		F 2 72 H	F 2 72 H	F 5 72 H	F 3 72 H	F 2 72 H	OK 1,4	F 3 24 H	OK	OK
Gasoline (Unleaded) 95% Methanol 5%	100 F	F 2 72 H	F 2 72 H	OK	OK	OK		F 2 72 H	F 2 72 H	F 5 72 H	OK 4	F 2 72 H	OK 4	F 3 72 H	OK	OK
Gasoline (White)	70 F			<OK		<OK	<OK	<OK	<OK	<OK					OK	OK
Gin, 80 Proof	100 F			OK	OK					F 3 1 Wk			OK 4	F 3 6 Mo	OK	OK
Gluconic Acid 50%	70 F									<OK 4						
Gluconic Acid 50%	140 F									<OK 4						
Glucose	70 F			<OK	OK	<OK				<OK						
Glycerine (Glycerol)	70 F			OK**		<OK	OK 9 Mo	OK 9 Mo	OK 9 Mo	OK 9 Mo						
Glycerine (Glycerol)	100 F				OK								OK	OK		
Glycerine (Glycerol)	200 F			<OK	OK	<OK	<OK	<OK 4		<OK 4						
Glycidyl Phenyl Ether	70 F			<OK			F 2,5 2 Mo	F 2,5 1 Mo	F 2,5 2 Mo	F 2,5 1 Mo						
Glycolic Acid 70% (SEE: Hydroxyacetic Acid)																
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Glyoxal Resin (SUNKEM #183®)	100 F			<OK			<OK	<OK	<OK	<OK						
Glyoxal 30%	70 F		OK	OK	OK		OK 4	OK 4	OK	OK 4						
Grape Juice	100 F								OK**	OK						
Grape Pop Conc.	70 F									<OK						
Grapefruit Juice (Fresh)	40 F									<OK						
Grapefruit Juice (Fresh)	100 F									F 3 1 Yr			F 3,4 1 Yr	OK		
Grapefruit Juice (Fresh Concentrate	150 F									F 3 6 Mo			F 3,4 8 Mo	F 3,4 8 Mo		
Grapefruit Juice (MINUTE MAID®)	40 F									<OK						
Grapefruit Juice (MINUTE MAID®)	100 F								OK 4	F 3 1 Yr						
Grapefruit Juice (MINUTE MAID®)	150 F									F 3 6 Mo						
Halogenated Polyester Resin (Co-Rezyn 1664®) Inter-plastic Corp.	Amb.			OK					F 1,3 1 Yr				OK			OK
Heptane	70 F			OK	OK			OK					OK		OK	OK
Heptanoic (Heptoic) Acid	120 F	F 3 2 Wk	F 3 2 Wk	<OK		<OK	F 3 2 Wk	F 2 1 Wk	F 3 2 Wk	F 3 2 Wk						
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Heptanoic (Heptoic) Acid 10%	100 F												F 3 2 Wk	F 3 6 Mo	OK	OK
Heptanoic (Heptoic) Acid 10%	150 F														OK	OK
Herbicide (BASAGRAM®) BASF	100 F			OK 4	OK 4				OK			OK 4	OK 4	OK 4	OK	OK
Herbicide (Blazer®) BASF	Amb.	OK	OK	OK	OK	OK		OK	OK	OK 4	OK	OK	OK	OK	OK	OK
Hexane	100 F			OK	OK			OK	OK						OK	OK
Hexane Sulfonic Acid	150 F			OK 4	OK	OK		F 2,4 4 Mo	F 2 2 Mo	F 2,5 2 Mo						
Hexylene Glycol	100 F	<OK		<OK	OK			<OK	<OK	<OK					OK	OK
Honey	70 F									<OK						
Horseradish	70 F									F 3 2 Mo						
Hydraulic Fluid - Emulsion Fluid (HOUGHTO-SAFE 5406®) Stauffer	140 F			<OK	OK	<OK	F 3 4 Da	F 3 4 Da	<OK 1	F 3 4 Mo						
Hydraulic Fluid - Fire Resistant Jet Aircraft Type (SKYDROL 500B®) Stauffer Chemical	100 F	F 3 1 Mo		<OK	OK	<OK	F 3 1 Mo	F 3 6 Mo	F 3 6 Mo	<OK						
Hydraulic Fluid - Fire Resistant Jet Aircraft Type (SKYDROL 500B®) Stauffer Chemical	150 F	F 3 1 Wk		<OK	OK	<OK	F 2 1 Wk	F 3 2 Wk	F 2 6 Mo	F 2 6 Mo						
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Hydraulic Fluid (FYRQUEL EHC®) Stauffer Chemical	100 F												OK		OK	OK
Hydraulic Fluid (FYRQUEL 220®) Stauffer Chemical	150 F		OK	OK	OK	OK		F 5 4 Mo	F 5 1 Yr	F 5 6 Mo	F 5 1 Yr	F 5 6 Mo	F 3 4 Mo	F 6 1 Yr	OK	OK 4
Hydraulic Fluid-Phosphate Ester Type (HOUGHTO-SAFE 1120®) Stauffer	140 F			<OK	OK	<OK	F 2 6 Mo	F 2 6 Mo	F 2 6 Mo	F 3 4 Mo						
Hydraulic Fluid - Water Glycol Type (HOUGHTO-SAFE 620®) Stauffer	140 F			<OK	OK	<OK	F 3 1 Mo	OK 4	F 3 2 Mo	F 3 1 Mo						
Hydraulic Oil (SEE: Oil, Hydraulic)																
Hydrochloric Acid 5%	100 F												F 3 1 Mo			F 3,4 6 Mo
Hydrochloric Acid 10%	100 F	F 3,4 2 Mo	<OK+	<OK+	OK+	<OK+	F 3,4 1 Mo		F 3,4 2 Wk				F 3 2 Mo	F 3,4 2 Mo	OK+	
Hydrochloric Acid 10%	150 F	F 3,4 2 Wk	F 3 2 Mo	<OK+		<OK+	F 3 1 Wk		F 3 1 Wk							
Hydrochloric Acid 20%	100 F	F 3 2 Mo	F 3 4 Mo	<OK+	OK+	<OK+	F 3 1 Mo		F 3 1 Mo					F 3,4 4 Mo		
Hydrochloric Acid 20%	150 F	F 3,4 1 Wk	F 3 1 Mo	<OK+		F 3 1 Mo	F 3 1 Wk		F 3,4 1 Wk							
Hydrochloric Acid 30%	100 F		F 3,4 1 Mo	<OK+	OK+	F 5 2 Mo	F 3 1 Wk		F 3 1 Mo						F 3 1 Wk	F 4,5 2 Mo
Hydrochloric Acid 30%	150 F		F 3 1 Wk	<OK+		F 3 1 Mo	F 3 1 Da		F 3 1 Da						F 3 1 Wk	F 3,6 1 Wk
Hydrochloric Acid 36-37%	70 F			<OK+			F 3 2 Wk	F 3 5 Da		F 3 6 Mo						
Hydrochloric Acid 37%	100 F				OK+											
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Hydrochloric Vapors 1%	100 F								F 3 1 Yr							
Hydrofluoric Acid 10%	70 F						F 3 5 Da	F 3 20 H	F 3 5 Da	F 3 1 Da						
Hydrofluosilicic Acid (Conc.)	100 F	F 3,4 1 Mo		<OK+	OK+		<OK+	<OK+4	<OK+	<OK+1,4						
Hydrofluosilicic Acid 25%	70 F		OK+ 4 Mo	OK+ 4 Mo	OK+ 4 Mo	OK+		F 2,3 4 Mo	OK+4	OK+4	F 3 4 Mo	F 3,6 8 Mo	OK+	OK+4	OK+4	OK+4
Hydrofluosilicic Acid Solution 25%	100 F	OK+7 11 Mo	OK+ 11 Mo	OK+ 11 Mo		OK+ 11 Mo		OK+7 11 Mo	OK+7 11 Mo	OK+4 11 Mo						
Hydrogen Peroxide 3%	100 F		F 3 6 Mo	F 8 6 Mo		F 3 1 Mo	F 3 1 Mo	F 2 1 Wk	F 3 2 Mo				F 3 2 Wk			
Hydrogen Peroxide 3%	150 F		F 3 2 Mo			F 3 1 Mo	F 3 1 Mo		F 3 2 Mo							
Hydrogen Peroxide 70%	100 F				F 8 2 Wk										F 3 1 Da	F 5 1 Da
Hydrogen Peroxide 70% (FMC Corp.)	100 F				F 5 2 Wk										F 3 24 H	F 5 24 H
Hydroquinone	70 F			<OK			<OK 4	<OK 4	<OK 4	<OK 4						
Hydroxyacetic Acid (Glycolic Acid)	100 F			OK**	OK											
Hydroxyacetic Acid 70% (Glycolic Acid)	140 F			<OK+			F 1,3 18 H	F 1,3 18 H	F 1,3 18 H	F 1,3 2 Da						
Hydroxylamine Sulfate 24% (BASF)	150 F			OK+4	OK+4				F 3 4 Mo		F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	OK 4	OK 4
Hydroxylamine Sulfate 30% (BASF #547254)	150 F			OK+4	OK+4 9 Mo				F 3 4 Mo		F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	OK 4	F 3 1 Yr
Hydroxylamine Sulfate 30% (BASF #584900)	150 F			OK+4	OK+4 10 Mo				F 3 4 Mo		F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	OK 4	OK 4
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Iodine 5% : Water 95%	100 F	F 3,4 1 Wk	F 3 10 Mo			F 3 10 Mo		F 3,4 1 Wk	F 3,4 2 Wk	F 3,4 1 Da		F 3,4 4 Da	F 3,4 1 Mo	F 3,4 6 Mo	OK 4	OK 4
Iridate 10%	140 F			<OK	OK		F 5 2 Wk	F 3,4 2 Da	F 5 2 Wk	F 3,4 1 Wk						
Iron Arsenic Sludge (Oak Mitsui)	70 F								OK			OK	OK 4	OK		OK
Iron Arsenic Sludge (Oak Mitsui)	150 F								F 3 2 Mo			F 3 10 Mo	F 3 2 Wk	F 3 2 Mo		OK
Isobutyl Alcohol	70 F			<OK		<OK	<OK	<OK	<OK	<OK					OK	OK
Isobutyraldehyde (Isobutyl Aldehyde)	70 F			<OK		<OK			F 3 1 Da							
Isooctyl Alcohol	70 F			<OK		<OK	<OK	<OK	<OK						OK	OK
Isophorone	70 F			<OK		<OK	<OK 1	<OK 1	<OK 1	<OK 1					OK	OK
Isophorone	100 F			OK	OK				F 2,5 2 Mo				OK	F 3 1 Mo	OK 4	OK
Isopropyl Acetate	70 F			<OK		<OK	<OK	<OK	<OK	<OK					OK	OK
Isopropyl Alcohol	70 F			<OK		<OK	<OK	<OK	<OK	<OK	OK					OK
Isopropyl Alcohol	100 F				OK							OK	OK	F 3 2 Mo	OK	OK
Isopropyl Alcohol	150 F			OK	OK			OK 1,4					F 3 6 Mo		OK	OK
Jet Fuel (#4 and #7)	100 F	OK						OK**	OK	OK 4	OK 4		OK 4	OK	OK	OK
Kaolin (Saturated) (China Clay)	100 F								OK**					OK	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
KARO® Syrup	70 F			<OK		<OK				<OK						
Kerosene	70 F	<OK		<OK		<OK	<OK	<OK	OK**	<OK						
Kerosene	100 F				OK								OK	OK	OK	OK
KEVLAR®	140 F			<OK			<OK 4	<OK 4	<OK 4	<OK 4						
KYMENE 367® (Hercules)	100 F			OK	OK				OK 4		F 3,4 2 Mo	F 3,4 8 Mo	OK	OK	OK	OK
KYMENE 525® (Hercules)	100 F			OK+	OK+				F 1,3 2 Mo		F 3,4 1 Wk	F 1,3 1 Mo	F 3 2 Wk	F 3 2 Wk	OK+	OK+
KYMENE 557® (Hercules)	100			OK	OK		F 3 8 Mo	OK 1	F 3 8 Mo	OK 4						
KYMENE 557-H® (Hercules)	100 F			OK	OK				OK		F 3 3 Mo	F 3 1 Yr	OK	OK	OK	OK
KYMENE 709® (Hercules)	100 F		<OK 1	<OK	OK		F 1,3 2 Wk	F 1,3 2 Wk	F 1,3 1 Mo	F 1,3 2 Wk						
KYMENE 760-35® (Hercules)	100 F			OK	OK				OK		OK	OK	OK	OK	OK	OK
KYMENE 917® (Hercules)	100 F			OK	OK		OK	OK	OK	OK						
KYMENE S-2064® (Hercules)	150 F					F 3 10 Mo									F 3 10 Mo	F 3 10 Mo
KYMENE 2399® (Hercules)	100 F			OK	OK				OK		F 3 2 Wk	OK	OK	OK	OK	OK
Lactic Acid (Conc.)	70 F			<OK+			<OK+1	F 2,3 6 Mo	<OK+1	F 2,3 6 Mo						
Lactic Acid 2%	100 F			OK+					OK+	OK+4			OK+	OK+		
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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ID-2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Lactic Acid 10%	140 F			<OK+			F 3 1 Wk	F 3 1 Da	F 3 2 Mo	F 3 1 Da						
Lard	70 F			<OK		<OK				<OK						
Lard	150 F	OK	OK	OK	OK	OK			OK	F 2 1 Yr		F 3 1 Yr	OK 4	OK 4	OK	OK
Latex (GenTac 118®) DiversiTech General	100 F			OK					OK	OK		OK	OK	OK	OK	OK
Latex (GenTac 118®) DiversiTech General	150 F			OK					F 3 3 Mo	F 3 3 Mo		F 3 6 Mo	F 3 6 Mo	F 3 6 Mo	OK	OK 4
Latex (GenFlo 576®) DiversiTech General	100 F			OK					OK	OK		OK	OK	OK	OK	OK
Latex (Genflo 576®) DiversiTech General	150 F			OK					F 3 1 Yr	F 3 4 Mo		OK	OK	OK	OK	OK
Latex (GenFlo 2538®) DiversiTech General	100 F			OK					OK	F 3 4 Mo		OK	OK	OK	OK	OK
Latex (GenFlo 2538®) DiversiTech General	150 F			OK					F 3 6 Mo	F 3 1 Mo		OK	OK	OK	OK	OK
Latex (GenFlo 7116®) DiversiTech General	100 F			OK					OK	OK		OK	OK	OK	OK	OK
Latex (GenFlo 7116®) DiversiTech General	150 F			OK 4					F 3 6 Mo	F 3 1 Mo		OK	OK	OK	OK	OK
Latex (GenFlo 8057®) DiversiTech General	100 F			OK					OK	OK		OK	OK	OK	OK	OK
Latex (GenFlo 8057®) DiversiTech General	150 F			OK					F 3 1 Yr	F 3 1 Yr		OK 4	OK	OK	OK	OK
Latex (AC-22®) Rohm & Haas	100 F			<OK												
Latex (AC-22®) Rohm & Haas	150 F			<OK												
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Latex (AC-61®) Rohm & Haas	100 F	•								OK						
Latex (E-206®) Rohm & Haas	100 F	<OK					<OK	<OK	F 3 4 Da	<OK						
Latex (AC-388®) Rohm & Haas	100 F			<OK												
Latex (AC-388®) Rohm & Haas	150 F			<OK												
Latex (S-2000®) Shell	100 F	<OK		<OK		<OK	<OK		<OK	<OK						
Latex (S-2105®) Shell	100 F	<OK	<OK	<OK		<OK	<OK		<OK	<OK						
Latex (S-7852®) Shell	100 F	<OK	<OK	<OK		<OK	<OK		<OK	<OK						
Latex (1R-700®) Shell	100 F	<OK	<OK	<OK		<OK	<OK		<OK	<OK						
Latex (1R-700®) Shell	150 F	F 3 1 Wk	<OK	<OK		<OK	<OK		<OK	<OK						
Latex (UCAR WC-130®) Union Carbide	100 F			<OK			F 3 6 Mo		F 3 4 Mo	<OK 4						
Latex (UCAR 131®) Union Carbide	100 F			<OK			F 3 6 Mo		F 3 4 Mo	<OK						
Latex (UCAR 180®) Union Carbide	100 F			<OK			F 3 6 Mo		F 3 6 Mo	<OK						
Latex (UCAR 360®) Union Carbide	100 F			<OK			F 3 2 Mo		<OK	<OK						
Latex (UCAR 680®) Union Carbide	100 F			<OK			<OK		<OK	<OK						
Latex (UCAR 891®) Union Carbide	100 F			<OK			<OK		<OK 1	<OK						
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Latex (UCAR 893®) Union Carbide	100 F			<OK			<OK 1		<OK	<OK						
Latex (UCAR® Paper Coating Binder) Union Carbide	100 F			<OK			<OK		<OK	<OK						
Latex (Butadiene Styrene B-2146®) Batex	70 F						<OK	F 3 6 Mo	<OK	<OK						
Latex (Butadiene Styrene #176®) Firestone	70 F								<OK	<OK						
Latex Natural Rubber	70 F		<OK				<OK	<OK	<OK	OK**						
Lauric Acid 100%	150 F	F 2,9 2 Wk		OK	OK			F 2 1 Da	F 2 2 Wk	F 5 1 Wk	F 2,3 2 Wk	F 5 1 Wk	F 5 1 Wk	F 1 1 Yr	OK	OK
Lauric Acid 20%	150 F	F 9 1 Da		OK	OK			F 9 1 Da	F 9 1 Da	F 5 1 Da	F 9 1 Da	F 5 1 Da	F 5 1 Da	F 9 1 Da	OK	F 3 1 Yr
Lauryldimethylamine	100 F							<OK 1								
Leachate (landfill) (NOTE: Chemical composition of leachates varies!)	100 F								OK			OK 4	OK 4	OK 4		OK
Light Water (FC-196®) 3M Company	100 F			OK	OK	OK	F 3 3 Wk	F 3 3 Wk	F 3 3 Wk	F 3 3 Wk						
Light Water (FC-200®) 3M Company	100 F			OK	OK	OK	F 3 1 Mo	F 3 3 Wk	F 3 1 Yr	F 3 4 Mo						
Light Water (FC-203®) 3M Company	100 F	F 3 6 Mo		OK	OK	<OK		F 3 2 Wk	F 3 6 Mo	F 3 6 Mo	F 3 2 Mo	F 3 1 Wk	OK 4	F 3,4 6 Mo	OK	OK
Light Water (FC-203A®) 3M Company	100 F	F 3 2 Mo	OK	OK	OK			F 1,3,4 1 Wk	F 1,3,4 2 Mo	F 3,4 3 Wk	F 3,4 3 Wk	F 3,4 3 Wk	OK 4	OK 4	OK	OK
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Light Water (FC-203CE®) 3M Company	100 F	F 2 2 Wk		OK	OK			F 3 1 Da	F 3 2 Mo	F 1,3,4 1 Mo	F 3 1 Da	F 3,4 1 Da	F 3,4 6 Mo	F 3,4 6 Mo	OK	OK
Light Water (FC-206®) 3M Company	100 F	<OK		<OK	OK	<OK		F 3 1 Mo	F 3 6 Mo	F 3 4 Mo	F 3 4 Mo					
Light Water (FC-600®) 3M Company	100 F	F 3,4 2 Mo	OK	OK	OK			F 1,3 1 Wk	F 3,4 1 Yr	F 3,4 3 Wk	F 3,4 3 Wk	F 3,4 3 Wk	OK 4	OK 4	OK	OK
Light Water - Fluoroprotein 3% National Foam Systems	100 F	OK 4		OK	OK			OK 4	OK 4		OK 4	OK 4	OK 4	OK 4	OK	OK
Light Water - Fluoroprotein 3% Nat'l Foam Systems	150 F	OK 4		OK	OK			OK 4	F 3,4 9 Mo		F 3,4 9 Mo	F 3,4 9 Mo	OK 4	OK 4	OK	OK
Light Water - Fluoroprotein 6% Nat'l Foam Systems	100 F	OK 4		OK	OK			OK 4	OK		OK 4	OK 4	OK 4	OK 4	OK	OK
Light Water - Fluoroprotein 6% Nat'l Foam Systems	150 F	OK 4		OK	OK			F 3,4 8 Mo	F 4,10 10 Mo		F 3,4 8 Mo	F 3,4 8 Mo	OK 4	OK 4	OK	OK
Light Water - Fluoro-protein 3% (LORCON®) Wormald Con. Inc.	100 F	OK 4		OK	OK			OK 4	OK 4		F 3,4 1 Yr	F 3,4 1 Yr	OK 4	OK	OK	OK
Light Water - Fluoro-protein 3% (LORCON®) Wormald Con. Inc.	150 F	OK 4		OK	OK			F 3,4 3 Wk	OK 4		F 3,4 4 Mo	F 3,4 3 Wk	OK 4	OK 4	OK	OK
Lime (Chopped)	100 F			OK		<OK				OK 4						
Limestone (Saturated)	100 F								OK**							
Linseed Oil	70 F			<OK		<OK	<OK	<OK	<OK	<OK						
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Liquor, Black Sulfite Process	150 F			F 3,5 9 Mo	F 3,5 9 Mo											
Liquor, Black Modified (Dresser Megabar) Sulfite Process	170 F			F 3 1 Yr				F 3,4 1 Yr	F 3,4 1 Wk		F 3,4 1 Wk	F 3,4 2 Wk	F 3,4 1 Wk	F 3,4 1 Wk	F 3 3 Mo	F 3 6 Mo
Liquor, Black (Thilmany) Sulfate Process	185 F														OK 4	OK 4
Liquor, Weak Black (P&G)	150 F				F 3,4 8 Mo											
Liquor, Weak Black (P&G)	200 F				F 3,6 3 Mo											
Liquor, Weak Black (P&G) Sulfite Process	205 F														F 3 2 Mo	F 3 1 Mo
Liquor, Strong Black (P&G) Sulfite Process	205 F														F 3,4 4 Mo	F 3,4 4 Mo
Liquor, Green (Thilmany)	185 F														OK 4	OK 4
Liquor, Green	190 F			F 5 1 Da		<OK 4										
Liquor, White (Thilmany)	185 F														OK 4	OK 4
Liquor, White	200 F											F 3 1 Mo				OK
Lithium Chloride 40%	150 F														OK	OK
LP Gas	70 F								OK**							
Lubricant (TURBO 15®) MIL-L-78088 Shell	70 F			<OK			<OK	<OK	<OK	<OK						
Lubricating Oil (SEE: oil, lubricating)																
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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LUDOX LS®	100 F							F 3 2 Mo	F 3 2 Mo	F 3 2 Mo	OK					
LUDOX LS®	150 F							F 3 2 Mo	F 3 2 Mo	F 3 2 Mo	OK					
LUSOL®	70 F						OK 1,4 8 Mo	OK 1,4 8 Mo	OK 1,4 8 Mo	OK 1,4 8 Mo						
Magnesium Chloride 40%	212 F			OK 2 Mo			OK 2 Mo	OK 2 Mo	OK 2 Mo	OK 2 Mo						
Magnesium Chloride 50%	70 F			<OK		<OK	<OK	<OK	<OK	<OK					OK	OK
Magnesium Hydroxide 10%	150 F		OK	OK	OK 4	OK		OK 4	F 3 6 Mo	F 3 2 Mo	F 3 8 Mo	OK	F 3 1 Wk	F 3 10 Mo	OK	OK 4
Magnesium Hydroxide 10%	200 F		F 3 1 Yr	OK	OK 4	OK 4		F 3 8 Mo	F 3 8 Mo	F 3 1 Mo	F 3 1 Mo	OK	F 3 1 Wk	F 3 1 Mo	OK 4	OK 4
Magnesium Hydroxide 20%	70 F						F 3 6 Mo	F 3 3 Mo	OK 8 Mo	F 3 3 Mo						
Magnesium Hydroxide 50%	100 F	F 3 1 Yr		<OK				<OK	<OK	<OK	<OK	<OK	OK	OK	OK	OK
Maleic Acid 50%	70 F			<OK			F 3 1 Da	F 3 4 Da	F 3 2 Wk	F 3 1 Mo						
Maleic Acid 50%	150 F			OK	OK										F 3 1 Da	F 3 1 Da
Maleic Anhydride	150 F			OK	OK							F 3 2 Wk			OK	OK
Maleic Anhydride	150 F	F 2 10 Da	F 1,3 2 Mo	<OK		<OK		F 2 2 Mo	F 2 10 Da	F 2 1 Mo						
Maleic Anhydride	250 F		F 1,3 4 Mo	OK	OK										F 3 2 Mo	F 3 6 Mo
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Manganese Ammonium Sulfate	150 F						<OK	<OK	<OK	<OK 4						
Melamine	100 F								OK**							
Methacrylic Acid (Tech.)	100 F			<OK+											OK+	
Methacrylic Acid Crude	100 F			OK**	OK											
Methacrylic Acid Glacial	Amb.								F 3 3 Wk				F 3,5 2 Mo	F 3 3 Wk		
Methacrylic Acid 50%	150 F			F 5 6 Mo	F 5 6 Mo											
Methanesulfonic Acid	100 F			OK 4	OK 4											
Methanesulfonic Acid 70%	Amb.								OK 4							
Methanesulfonic Acid 70%	100 F			OK					F 3,4 1 Yr						OK 4	F 4,5 2 Mo
Methanesulfonic Acid 70%	150 F			OK 4												
Methanesulfonic Acid Anhydrous	100 F		F 5 1 Da	OK 4		OK 4			F 5 1 Da			F 5 1 Da	F 5 1 Da	F 5 1 Da	F 8 1 Da	F 3,5 1 Da
Methanesulfonic Chloride	100 F		F 5 1 Wk	OK 4	OK 4	OK 4			F 5 1 Da			F 5 1 Da	F 5 1 Wk	F 5 1 Da	F 4,5 4 Mo	F 5 1 Mo
Methanesulfonyl Chloride	100 F		F 5 1 Wk	OK 4	OK 4	OK 4			F 5 1 Da			F 5 1 Da	F 5 1 Wk	F 5 1 Da	F 4,5 4 Mo	F 5 1 Mo
Methanesulfonyl Chloride	150 F			OK	OK											
Methanol	100 F	F 3 8 Mo	OK 1	OK	OK	OK		OK 1,4	OK 1	F 3 72 H	F 3 72 H	F 3 72 H	OK 4	F 3 1 Da	OK	OK
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Methanol	150 F	F 3,4 1 Wk	F 3 8 Mo	OK	OK	OK		F 3,4 1 Wk	F 3,4 1 Mo	F 3,4 1 Mo	F 3 72 H	F 3 72 H	F 3,4 2 Mo	F 3 1 Mo	OK	F 3,4 8 Mo
Methanol 20%; Water 80%	100 F			OK	OK								OK		OK	OK
Methanol 20%; Water 80%	150 F			OK	OK								F 3 8 Mo		OK	OK
Methanol 38.1%; Chloroform 1.2%; Water 60.7%	120 F			OK	OK										OK	OK
Methanol 50%	100 F							<OK			OK			F 3 6 Mo	OK	OK
Methanol 50%; Hydrochloric Acid 5%; Water 45%	100 F												F 1,3 1 Da			F 3,4 2 Mo
Methanol 75; Hydrochloric Acid 5%; Water 20%	100 F												F 1,3 1 Wk			F 3,4 2 Mo
Methanol 86.5%; Hydrochloric Acid 5%; Water 8.5%	100 F												F 3,4 1 Wk			F 3,4 2 Mo
Methanol 93% Acetic Acid (DI Water 2%)	100 F								F 1,3 1 Da						F 3 10 Mo	F 3 6 Mo
Methanol 95%; Acetic Acid 5%	100 F								F 3 1 Da						F 3 1 Yr	
Methyl Acrylate	100 F	<OK 1		<OK	OK			<OK 1	<OK 1	<OK 1						
Methyl Amylketone	100 F			OK	OK			OK 1,4								
Methyl-bis-amino propylamine (Hercules)	100 F		F 3,5 1 Mo	OK 4	OK 4	OK			F 2,3 2 Wk			F 2,3 5 Mo	F 2,5 5 Mo	F 2,5 1 Wk	OK 4	OK 4
Methyl CELLOSOLVE® (SEE: Ethylene Glycol Monomethyl Ether)																
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Methyl Chloroformate	100 F			OK**	OK								F 2,4 1 Mo	F 3,4 1 Da	F 4,5 1 Mo	F 4,5 2 Wk
Methyl Ethyl Ketone	100 F	F 2 1 Da		<OK	OK	F 3 3 Mo	F 2 1 Da		F 2 1 Da				OK 1	F 5 1 Da	OK	OK
Methyl Ethyl Ketone	150 F	F 2 1 Da		<OK	OK		F 2 1 Da		F 2 1 Da				F 3 2 Mo	F 5 1 Da		
Methyl Ethyl Ketone 20%; Water 80%	100 F			OK	OK								F 1,3 1 Da		OK	OK
Methyl Ethyl Ketone 20%; Water 80%	150 F			OK	OK								F 1,3 1 Da			F 3,6 1 Da
Methyl FORMCEL® (55% Formaldehyde in Methanol) Celanese	100 F	F 3 2 Mo		<OK				<OK 1	<OK	<OK 1						
Methyl Isobutyl Ketone (MIBK)	70 F			<OK												
Methyl Isobutyl Ketone (MIBK)	100 F				OK				OK 1				OK 4	F 3,4 4 Da	OK	OK
Methyl Tert-Butyl Ether (MTBE)	100 F							OK 4	OK				OK			OK
Methyldiethanolamine 50%	100 F								OK				OK			
Methylene Chloride	100 F			OK**	OK	F 3 24 H	F 3 5 Da	F 3 1 Wk	F 3 5 Da	F 5 1 Da			F 3,5 72 H	F 5 72 H	OK	F 1,6 1 Yr
Methylene Chlorobromide (SEE: Bromochloromethane)																
N-methyl-2-pyrrolidone (M-PYROL®)	100 F			OK	OK			F 5 72 H	F 5 72 H				F 5 72 H		OK	F 3 1 Wk
Milk Whey	100 F	<OK	<OK	<OK			<OK	<OK 4	<OK	<OK 4						
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Milk Whey	150 F	<OK	<OK	<OK			<OK	<OK	<OK	F 3,4 6 Mo						
Mineral Oil	70 F			<OK		<OK	OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 8 Mo			OK	OK	OK	OK
Mineral Oil	205 F		OK	OK	OK	OK		OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK
Mineral Spirits	100 F	<OK		OK**	OK	<OK	<OK		<OK	<OK	<OK		OK	OK	OK	OK
Mineral Spirits	150 F	<OK		OK**	OK	<OK	<OK		<OK	<OK					OK	OK
Molasses	70 F			<OK		<OK				<OK						
Molasses	100 F			<OK	OK	<OK	<OK	<OK	<OK	<OK						
Molasses (Beet) A. E. Staley	100 F	OK 4	OK	OK	OK	OK		OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK
Molasses (Beet) Upjohn	110 F			OK	OK				OK 4	OK 4			OK 4	OK 4	OK	OK
Molasses (Cane) A. E. Staley	100 F	OK 4	OK	OK	OK	OK		OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK
Molasses (Table)	150 F			OK	OK				F 3,4 1 Mo	F 3,4 72 H			F 3,4 1 Mo	F 3,4 1 Mo	OK 4	
Monochloroacetic Acid 5%	100 F														OK+	
Monoethanolamine (SEE: Ethanolamine)																
Morpholine	100 F	F 5 5 Da	F 5 5 Da	OK	OK		F 5 5 Da	F 5 5 Da	F 5 5 Da	F 5 5 Da						
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Morpholine	150 F	F 5 5 Da	F 5 5 Da	OK			F 5 5 Da	F 5 5 Da	F 5 5 Da	F 5 5 Da						
Mustard - Yellow FRENCH'S	100 F								F 3 2 Mo	F 3 2 Mo						OK+
Mustard - Yellow FRENCH'S	150 F			<OK+	OK+				F 3 1 Wk	F 3 1 Wk	F 3 1 Wk					
Naptha Sour	100 F								OK**				OK		OK	
Naphthenic Acid	100 F	OK		OK		OK		OK	OK	F 3 1 Mo	OK					
NEODENE 6® (Shell)	100 F		OK	OK	OK				OK	OK 4	OK	OK	OK	OK	OK	OK
NEODENE 8® (Shell)	100 F		OK	OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
NEODENE 18® (Shell)	100 F		OK	OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
NEODOL 23-12® (Shell)	100 F		OK	OK	OK				OK	OK	F 3 1 Yr	OK	OK 4	OK 4	OK	OK
NEODOL 25® (Shell)	100 F		OK	OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
NEODOL 25® C2-C15 Alcohol (Shell)	150 F			<OK	OK	<OK					OK					
NEODOL 25-3® (Shell)	100 F		OK	OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
NEODOL 25-3® - Alcohol Ethoxylate (Shell)	100 F			<OK	OK			F 2 10 Mo	OK	OK	OK	OK	OK	OK	OK	OK
NEODOL 25-3® - Alcohol Ethoxylate (Shell)	150 F			<OK	OK	<OK					F 3 9 Mo					
NEODOL 25-3A® (Shell)	100 F		OK	OK	OK				OK	F 1,3 8 Mo	F 3 3 Mo	OK 4	OK 4	OK	OK	OK
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NEODOL 25-3A® (Shell)	150 F			<OK 4	OK	OK+	F 3 2 Wk	F 3 2 Wk	F 3 1 Mo	F 3 1 Mo						
NEODOL 25-3S® (Shell)	100 F		OK 4	OK 4	OK 4				OK	F 1,3 6 Mo	F 3 4 Mo	F 3 6 Mo	OK 4	OK	OK	OK 4
NEODOL 25-3S® (Shell)	150 F			<OK 4	OK	F 3 6 Mo	F 3 1 Mo	F 3 2 Wk	F 3 1 Mo		F 3 1 Mo					
NEODOL 25-9® - Nonionic Surfactant (Shell)	150			<OK	OK	<OK					F 3 9 Mo					
NEODOL 25-12® (Shell)	150 F	F 3 4 Mo	F 3 4 Mo	<OK	OK	<OK		<OK	<OK	<OK						
NEODOL 45-13® (Shell)	100 F		OK	OK	OK				OK	OK	F 3 4 Mo	OK	OK 4	OK	OK	OK
Nickel Acetate 50%	70 F			<OK			OK 8 Mo	F 3 2 Wk	OK 8 Mo	OK 8 Mo						
Nickel Chloride 50%	70 F			<OK			OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 4 8 Mo						
NIPAR S30® (SEE: 1-Nitropropane 50%; 2-Nitropropane 50%)																
Nitric Acid 5%	70 F			<OK+			<OK+	F 3 1 Wk	F 3 4 Mo	F 3 4 Mo						
Nitric Acid 5%	100 F	F 3,4 2 Wk		<OK+	OK+		F 3,4 2 Wk		F 3,4 2 Wk				F 3,4 2 Wk	F 3,4 2 Wk		
Nitric Acid 5%	150 F	F 3,4 2 Wk		<OK+			F 3,4 2 Wk		F 3,4 2 Wk							
Nitric Acid 10%	100 F		<OK+4	<OK+	OK+	<OK+	F 3 2 Da		F 3 1 Da					OK+4	F 3,4 4 Mo	
Nitric Acid 10%	150 F		F 3 1 Mo	<OK+		F 2,6 2 Mo	F 3 1 Da		F 3 1 Da							
Nitric Acid 20%	100 F		F 3 4 Mo	<OK+		F 2,6 2 Mo	F 3 2 Da		F 3 2 Da							
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Nitric Acid 20%	150 F		F 2 4 Wk	F 5 72 H	F 5 72 H	F 3 2 Wk	F 3 2 Da		F 3 2 Da							
Nitric Acid 25%	70 F			<OK+			F 3 4 Mo	F 3 1 Da	F 3 2 Wk	F 3 2 Wk						
Nitric Acid 40%	100 F		F 3 1 Wk			F 5 1 Wk	F 5 2 Da		F 5 2 Da							
Nitric Acid 70% (conc.)	70 F						F 3 1 Da			F 3 1 Da						
p-Nitrochlorobenzene (Dupont)	212 F		F 3,6 2 Da	OK	OK	F 3 24 H						F 3 1 Wk			OK 4	
Nitrogen Fertilizer Solution (SEE: Urea Ammonium Nitrate)																
1-Nitropropane	70 F			<OK		<OK	<OK 1	<OK 1	F 2,3 2 Da						OK	OK
2-Nitropropane	100 F			OK	OK								F 2 1 Mo	F 3 1 Da	F 2 1 Yr	F 1,3 1 Yr
1-Nitropropane 50%; 2-Nitropropane 50% (NIPAR S-30®)	100 F	F 3,4 4 Mo		OK		OK		F 2 72 H	F 2,4 6 Mo			F 3,4 72 H	OK 4	F 3,4 72 H	OK 4	OK 4
Nonylphenol	100 F	<OK	<OK	<OK	OK	<OK		<OK	<OK		<OK	<OK	OK	OK	OK	OK
Nonylphenol	150 F	F 5 6 Mo	F 5 6 Mo	<OK	OK	<OK		F 5 6 Mo	F 5 6 Mo		F 5 6 Mo	F 5 6 Mo	F 5 6 Mo	F 4,5 4 Mo		
Nonylphenol	180 F			<OK	OK		F 5 1 Mo	F 2,4 2 Mo	F 5 1 Mo	F 5 1 Wk						
Nonylphenoxy Polyoxyethylene Ethanol	70 F						<OK	<OK	<OK	<OK						
Nylon Resin Pellets	100 F								OK**							
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OAKITE 62® Sol. (pH 10)	140 F						F 3,4 6 Mo	<OK 4	F 3,4 2 Wk	F 3,4 6 Mo						
OAKITE 84-A®	70 F						<OK 4	<OK 4	<OK 4	<OK 1,4						
OAKITE 84-A®	180 F						F 3,4 7 Mo	F 3,4 4 Mo	F 3,4 7 Mo	F 3 1 Mo						
OAKITE Compound 31® (Acid), 10%	70 F									OK+1,4 7 Mo						
OAKITE Compound 62® (Alkali)	70 F									OK 4 7 Mo						
OAKITE Compound 162® (Alkali)	70 F									OK 4 7 Mo						
n-Octadecanoic Acid 90% (SEE: stearic Acid)																
Octanoic Acid 100%	100 F	F 3 6 Mo							F 1,3 6 Mo	F 5 1 Da			OK	F 3 6 Mo	OK	OK
Octanoic Acid 100%	150 F	F2,3,4 6 Mo							F 2,5 1 Wk	F 3,5 1 Da			F 5 1 Mo	F 3 1 Wk	OK	OK
n-Octyl Alcohol	70 F			<OK		<OK	<OK	<OK	<OK	<OK						
n-Octyl Mercaptan	100 F	OK	OK	OK	OK	OK		OK	OK	F 3 6 Mo	F 3 6 Mo	OK 4	OK	F 3 1 Yr	OK	OK
n-Octyl Mercaptan	150 F	F 3 2 Wk	F 3 8 Mo	OK	OK	F 3,4 8 Mo		F 3 4 Mo	F 3 2 Wk	F 3 1 Wk	F 3 2 Wk	F 3 1 Wk	F 3,4 1 Yr	F 3 1 Wk	OK	OK
Oil, Sour Crude (Light Arabian)	100 F	<OK		<OK	OK	<OK		<OK	<OK	<OK	OK					
Oil, Sour Crude (Light Arabian)	150 F	<OK		<OK	OK	<OK		<OK 4	<OK	<OK 4	OK					
Oil, Sour Crude (Light Arabian)	180 F	OK		OK	OK	OK		OK 4	OK	OK 4	<OK				OK	OK
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Oil, Sour Crude (Prudhoe Bay)	100 F	<OK		<OK	OK	<OK		<OK 4	<OK	<OK	<OK					
Oil, Sour Crude (Prudhoe Bay)	150 F	<OK		<OK	OK	<OK		<OK 4	<OK	<OK 4	<OK					
Oil, Sour Crude (Prudhoe Bay)	180 F	OK		OK	OK	OK		OK 4	OK	OK 4	OK					
Oil, Sour Crude (Prudhoe Bay)	210 F	OK 4	OK	OK	OK	OK	OK	OK	OK		OK 4	OK	OK 4	OK 4	OK	OK
Oil, Sour Crude (West Texas)	100 F	<OK		<OK	OK			<OK	OK**	<OK	<OK		OK		OK	OK
Oil, Sour Crude (West Texas)	150 F	<OK		<OK	OK	<OK		<OK 4	<OK	<OK 4	OK		OK		OK	OK
Oil, Sour Crude (West Texas)	180 F	OK 4		OK 4	OK	OK		OK 4	OK	OK 4	OK		OK		OK	OK
Oil, Crude (Wyoming)	180 F												OK 4			
Oil, Crude (Wyoming)	210 F												OK 4	OK 4	OK	OK
Oil, Hydraulic	100 F	OK		OK	OK			OK	OK			OK	OK	OK	OK	OK
Oil, Hydraulic	150 F	OK		OK	OK			OK 4	OK			OK	OK	OK	OK	OK
Oil, Lubricating	70 F			<OK		<OK	<OK	<OK	<OK	<OK						
Oil, Lubricating	150 F			<OK	OK			<OK								
Oil, Lubricating	180 F			<OK	OK			<OK								
Oil, Turbine-Synthetic (JET 254®) Mobil	180 F	OK		OK	OK			OK 4	OK 4		F 3 2 Mo	OK 4	OK 4	OK 4	OK	OK
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Oil (Water Soluble)	140 F			OK 7 Mo			OK 4 7 Mo	OK 4 7 Mo	F 3,4 5 Mo	F 3,4 5 Mo						
Oleic Acid	Amb.								OK				OK			
Oleic Acid	70 F			<OK			<OK	<OK	<OK	<OK						
Oleic Acid	100 F												OK		OK	
Oleic Acid	150 F			<OK					F 3 1 Mo	F 3 1 Mo						
Oleic Acid 74%; Corn Oil 26%	150 F		OK	OK		OK			F 5 4 Mo	F 5 1 Wk		F 5 1 Wk	OK 4	F 3.5 6 Mo	OK	
Oleic Acid 74%; Corn Oil 26%	130 F		OK	OK		OK			F 2,4 8 Mo	F 5 1 Wk		F 5 1 Wk	OK 4	OK 4	OK	
Oleomargarine	70 F			<OK		<OK				<OK						
Olive Oil	70 F			<OK		<OK				<OK						
Orange Conc. (SUNKIST®)	100 F			<OK		<OK				<OK 4			OK 4	OK 4	OK	OK
Orange Soda (Conc.)	70 F			<OK		<OK				<OK						
Ortho-chloronitrobenzene	180 F			OK				<OK 1	<OK 1							
Oxalic Acid	70 F			<OK+			<OK+	<OK+	<OK+	<OK+						
Oxalic Acid 10%	150 F	OK+4				OK 4		F 3 1 Mo	F 3 1 Yr	F 3 1 Mo	F 3 6 Mo					
2-oxohexamethyleneimine (SEE: Caprolactam, Molten)																
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Palm Oil (Canbra Foods Ltd)	150 F			OK	OK				OK	OK 4		OK	OK 4	OK 4	OK	OK
Palm Oil, Crude	250 F	F 3 7 Mo		OK	OK	OK				F 3 1 Mo						
Palm Oil of Foots	250 F	F 3 2 Mo		OK		OK				F 5 2 Wk						
Palmitic Acid	150 F												OK 6	OK 4	OK	OK
Palmitoleic Fatty Acid	200 F			OK		OK			F 3 2 Wk	F 5 48 H						
Paraffin Wax	150 F			OK	OK			OK	OK			OK	OK	OK		
Paraformaldehyde 50%	150 F			OK	OK		F 3 2 Wk	F 3 2 Wk	F 3 2 Wk	F 3 2 Wk						
Paraldehyde	70 F			<OK			<OK	<OK	<OK	<OK						
Peanut Butter	70 F			<OK		<OK				<OK						
Peanut Oil	70 F			<OK		<OK				<OK						
PENNSTOP #1866®	150 F			<OK		<OK										
2,4-Pentanedione	100 F				OK											
Pepper	70 F			<OK		<OK				<OK						
Perchloroethylene (SEE: Tetrachloroethylene)																
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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PERMACOL #120®	70 F			<OK			<OK 4	F 3,4 1 Mo	F 3 2 Wk	F 3,4 1 Mo						
Permalastic Adhesive	100 F			<OK				F 1,3 4 Mo	<OK 1	<OK						
Petroleum Jelly (SONOJELL #4)	180 F	OK		OK	OK	OK		OK	OK	OK		OK	OK	OK	OK	OK
Phenol 0.5%	100 F			OK	OK								OK	OK	OK	OK
Phenol 2%	100 F			OK	OK										OK	
Phenol 3%	100 F			OK	OK								F 3,4 8 Mo		OK	
Phenol 5%	100 F			OK	OK			F 3 72 H					F 4,5 2 Wk	F 4,5 2 Wk	OK 4	OK 1,4
Phenol 10%	100 F			OK	OK								F 5 1 Da	F 5 1 Da	F 5 2 Mo	F 4,5 2 Wk
Phenol 15%	100 F			OK	OK										F 5 2 Mo	
Phenol 50%	100 F			OK	OK			F 5 72 H					F 5 1 Da	F 5 1 Da		F2,4,5 1 Wk
Phenol 50%	150 F			OK	OK											
Phenol 90%	70 F			OK**	OK		F 2,3 1 Da	F 3 2 H	F 2,3 1 Da							
Phenol 90%	100 F		F 5 48 H	OK**	OK	F 3 1 Wk							F 5 1 Da	F 5 1 Da	F 4,5 4 Mo	F 4,5 2 Wk
Phenol-formaldehyde	100 F			OK**	OK											
Phenylenediamine 50%	70 F			<OK			<OK 4	<OK 1,4	<OK 1,4	<OK 4						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Phenylhydrazine	70 F			<OK+			F 5 1 Wk	F 5 1 Wk	F 5 1 Wk	F 5 1 Wk						
1-Phenyl-2-methyl-1,2-propane diamine	70 F			<OK			<OK	F 2 3 Mo	<OK	<OK 1						
Phosphoric Acid .5%	100 F						OK 7									
Phosphoric Acid 10%	100 F	<OK+4	<OK+	<OK+	OK+	<OK+	F 2,3 4 Mo		<OK+1				F 3 2 Wk	OK+4	OK+	OK+
Phosphoric Acid 10%	150 F	F 3 4 Mo	<OK+	<OK+		<OK+	F 1,3 2 Mo		F 3 2 Mo							
Phosphoric Acid 20%	100 F												F 3 1 Wk			
Phosphoric Acid 30%	70 F			<OK+		<OK+	<OK+	F 3 2 Mo	<OK+	F 3 4 Mo						
Phosphoric Acid 30%	150 F			<OK+		<OK+			F 3 1 Mo							
Phosphoric Acid 40%	100 F	F 3 1 Mo		<OK+	OK+	<OK+	F 3 1 Mo		F 3 1 Mo							
Phosphoric Acid 54%	100 F			<OK+4		OK+										
Phosphoric Acid 60%	100 F		<OK+	<OK+	OK+	<OK+	F 3 2 Wk		F 3 2 Wk							
Phosphoric Acid 60%	150 F		<OK+	<OK+		<OK+	F 3 2 Wk		F 3 2 Wk							
Phosphoric Acid 76%	100 F														F 3,4 4 Mo	
Phosphoric Acid 85%	70 F			<OK+				F 2,3 1 Wk	F 3 4 Da	F 3 4 Mo						
Phosphoric Acid 85%	100 F				OK+											
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Phosphoric Acid 85%	200 F			<OK+4												
Phosphoric Acid 86%	150 F			OK+4	OK+4											
Phosphorus Trichloride	100 F			OK**	OK											
Phthalic Acid 90%	70 F			<OK			<OK	<OK	<OK	<OK						
Phthalic Anhydride	350 F		F 5 1 Wk	<OK 4												
Phthalic Anhydride 80%	70 F			<OK			F 3 5 Da	F 3 1 Mo	F 3 3 Mo	F 3 3 Mo						
Pine Gum (Diluted)	70 F						<OK	F 3 6 Mo	<OK	<OK						
Pine Gum (Diluted)	140 F						F 3 4 Mo	F 3 4 Mo	F 3 1 Mo	F 3 4 Mo						
Plant Regulator (PIX®) BASF	150 F			OK 4	OK 4,7				F 3,4 10 Mo			OK 4	OK 4	OK 4	OK 4	OK 4
Polyamide, Aqueous Borne	180 F			OK 7 Mo			F 3 1 Wk	F 3 1 Wk	F 3 1 Wk	F 3 1 Wk						
POLY-EM 10® Anionic	140 F			<OK 4			F 3,4 1 Mo	<OK 4	<OK	<OK						
POLY-EM 20®	100 F	<OK					F 3 3 Da	<OK 4	<OK	<OK						
Polyethylene Glycol	100 F			<OK	OK		F 2 4 Mo	F 3 1 Wk	F 3 1 Wk	F 3 6 Mo						
Polyethylene - Resin with PVA Traces	100 F	OK**							OK**							
Polyol (PERMAPOL P-820®)	150 F			OK				OK 4	OK 4	OK	OK 4	OK	OK	OK 4	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Polyol (NIAX 1025®) PPG	150 F			OK				OK	OK	OK	OK 4	OK	OK 4	OK 4	OK	OK
Polyol (NIAX L-112®) PPG	150 F			OK				OK	OK	OK 4	OK	OK	OK 4	OK 4	OK	OK
Polyolefin (Dry) Resin	100 F								OK**							
Polypropylene (Dry) Resin	100 F	OK**							OK**							
POLYTEX 669® (Celanese)	100 F			OK 11 Mo			F 3 9 Mo		F 3 9 Mo	F 3 9 Mo						
Polyvinyl Acetate Emulsion	70 F			<OK			F 2,3 3 Mo	F 2,3 1 Wk	F 3 6 Wk	F 3 6 Wk						
Polyvinyl Acetate with stabilizer	150 F			<OK			F 3 1 Wk	F 3 1 Wk	F 3 1 Wk	F 3 1 Wk						
Potassium Bromide	70 F			<OK 4			OK 7 Mo	OK 4 7 Mo	OK 7 Mo	OK 7 Mo						
Potassium Chloride (Dry)	100 F								OK**							
Potassium Chloride 50%	180 F	OK 4	F 3 1 Yr	OK 4		F 3 8 Mo	F 3 2 Mo	F 3 1 Yr	OK 4	F 3 8 Mo		F 3 8 Mo	OK 4	OK 4	OK	OK
Potassium Ferrocyanide 10%	100 F	OK 4	OK	OK 4		OK		OK 1	OK	OK 4		OK 4	OK 4	OK		OK
Potassium Ferrocyanide 10%	150 F	F 3 10 Mo	OK 4	OK 4		OK 4		F 3,4 1 Yr	F 3,6 1 Yr	F 3 10 Mo		F 3 1 Yr	OK	OK		OK
Potassium Ferrocyanide 25%	150 F														OK	
Potassium Fluoride	100 F	OK 1		OK 4		OK		OK 4	OK 4	OK 4						
Potassium Hydroxide 10%	100 F	F 3 1 Wk					F 3 6 Mo	F 3 1 Da	<OK	<OK	F 2,3,4 1 Yr		F 3 1 Yr	OK		OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Potassium Hydroxide 10%	140 F		<OK	F 5 1 Da				F 3 1 Da	<OK 4	<OK						OK
Potassium Hydroxide 44%; Acrylic Acid 21%; Water 35%	100 F								OK	OK			OK	OK 4	OK 4	OK
Potassium Hydroxide 45%	100 F									OK 1		F 2 2 Wk	OK 4	OK 9		
Potassium Hydroxide 45%	150 F	F 3 4 Mo	<OK	F 5 1 Da		F 5,8 1 Yr		F 3 1 Wk	F 3 2 Mo	F 3 4 Mo	F 3 1 Da	F 2 1 Da	OK 4	OK 4,9		OK
Potassium Hydroxide 50%	150 F	F 3 4 Mo	OK 4	F 5 1 Da		F 5,8 1 Yr		F 3 1 Mo	F 3 2 Mo	F 3 1 Yr	F 3 1 Wk	F 3 1 Yr	F 3 8 Mo		OK 4	OK**
Potassium Hydroxide 50%	180 F		F 3 2 Mo	F 3 1 Da	F 3 1 Da	F 3 1 Wk		F 3,4 1 Da	F 3,4 4 Mo	F 3,4 4 Mo	F 3,4 1 Da	F 3,4 1 Wk	F 3,4 4 Mo	F 3,4 4 Mo	F 3,5 1 Yr	OK 4,7
Potassium Nitrate 50%	70 F						OK 8 Mo	OK 4 8 Mo	OK 8 Mo	OK 8 Mo						
Potassium Permanganate 5%	150 F														OK	OK
Potassium Phosphate, Tri-basic (Tripotassium Phosphate)	150 F			<OK 4		<OK 4										
Potassium Phosphate 50%	100 F	OK	OK	OK 4		OK		OK 4	OK	OK 4	OK 4	OK	OK	OK		OK
PRESTONE®	200 F			<OK 4	OK			F 3 1 Wk	F 3 1 Wk						OK	OK
1,2-Propanediol (Propylene Glycol)	100 F	<OK		OK**	OK		<OK	<OK	<OK	<OK			OK	OK	OK	OK
Propionaldehyde	70 F			<OK					F 3 1 Da					F 3 3 H		
Propionaldehyde	100 F			OK 4	OK 4								F 5 1 Da	F 5 1 Da	F 3,4 1 Yr	F 3,6 2 Wk
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Propionic Acid	70 F			OK+ 8 Mo			F 3 2 Da	F 3 2 Da	F 3 2 Da	F 3 2 Da						
Propionic Acid	100 F			OK+	OK+										F 3,4 1 Yr	
n-Propyl Acetate	70 F			<OK			<OK 1	<OK 1	<OK 1	<OK 1					OK	OK
n-Propyl Alcohol	100 F	<OK 1		<OK	OK	<OK		<OK 1	<OK 1	<OK 1					OK	OK
Propyl CELLOSOLVE® {SEE: Ethylene Glycol Monopropyl Ether}																
Propylene Carbonate Crude	100 F			OK	OK	OK			F 2 2 Mo			OK 4	OK	F 2 1 Wk	OK	OK
Propylene Dichloride	100 F												<OK 4			<OK
Propylene Glycol Monomethyl Ether (PM)	100 F	F 3 1 Da		OK	OK			F 3,5 2 Mo	F 2 1 Wk	F 2,3 1 Da		F 2 1 Wk	OK 4	F 2,3 1 Da	OK	OK
Propylene Glycol Monomethyl Ether (PM)	150 F	F 3 1 Da		OK 4	OK4			F 2,3 1 Da	F 2 1 Wk	F 3 1 Da		F 2,3 1 Da	F 3,4 4 Mo	F 5 1 Da	F 5 10 Mo	F 5 2 Wk
Propylene Glycol Monomethyl Ether Acetate(PMA)	100 F	F 2 72 H		OK OK	OK	OK		F 2 72 H	OK 1			OK	OK	F 3 1 Yr	OK	OK
Propylene Oxide	70 F			OK**	OK		F 3 2 H	F 3 1 Mo	F 3 2 H	F 3 1 Mo						
Propylene Oxide	100 F				OK								F 2,3 1 Da		F 5 3 Mo	
Prune Juice	100 F	OK		OK		OK			OK	OK						
Pulp Slurry (Kraft Hi-Density Brown Stock)	120 F	F 2 2 Mo		OK				OK 4	OK 1,4	F 3 2 Mo	OK 4	OK 4	F 3 1 Wk	OK	OK	OK
PVC Powder	100 F	OK							OK**							
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ID 2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
PVC 2% (solution) in Sulfuric Acid 5%	100 F								OK						OK	OK
PVC Feed Tank Slurry (B. F. Goodrich)	100 F								OK						OK	OK 4
PYRANOL®1481	150 F						OK 4 11 Mo	OK 4 11 Mo	OK 11 Mo	OK 11 Mo						
Raisin Feedstock Conc. (Sunmaid)	100 F				OK 4								OK 4	OK 4	OK	OK
Raisin Feedstock Conc. (Sunmaid)	150 F				OK+4								F 3 10 Mo	F 3 10 Mo	OK 4	OK 4
Raisin Feedstock Conc. (Sunmaid)	180 F				OK+4								F 3 2 Mo	F 3 2 Mo	OK 4	OK 4
Rock Salt	100 F	OK					OK		OK**	OK				OK		
Rosin	100 F									OK**						
Rum, 80 Proof	100 F			OK	OK					F 3,4 1 Wk			OK 4	F 3 6 Mo	OK	OK
SC - Solvent #100	70 F			<OK		<OK		<OK		OK 7 Mo						
SC - Solvent #100	100 F				OK								OK	F 3 8 Mo	OK	OK
Sea Water (SEE: Water (Sea))																
SERVAC® 5%	100 F	<OK	<OK	<OK			<OK	<OK 4	<OK	<OK 4						
SERVAC® 5%	150 F	<OK	<OK	<OK			<OK	<OK 4	<OK	<OK 4						
Soap (Conc.) Fatty Acid pH 8.0	160 F		<OK	<OK			<OK 4		<OK	F 3 2 Mo						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Soap (Conc.) Fatty Acid pH 11.0	160 F		<OK	F 4,5 1 Mo			F 3 6 Mo		<OK	<OK						
Soap (Conc.) Oleic Acid pH 7.9	160 F		<OK	<OK			F 3 1 Mo		<OK	F 1,3 2 Mo						
Soap (Conc.) Oleic Acid pH 10.9	160 F		<OK	<OK 4			<OK		<OK	<OK						
Sodium Bisulfate 30%	100 F			<OK+		<OK+			<OK+		<OK+					
Sodium Bisulfite 40%	150 F													F 3 4 Mo	F 3 6 Mo	F 3 9 Mo
Sodium Bisulfite 50%	70 F						OK	OK	OK	OK						
Sodium Bromide 40%	100 F			OK		OK			OK	OK		OK 4	OK 4	OK 4		OK
Sodium Bromide 44%	150 F	OK 4	OK 4			OK+			OK 4	F 3 8 Mo		F 3 8 Mo	OK 4	OK 4		OK 4
Sodium Bromide 40%; Sodium Hydroxide 1%	100 F			F 3 6 Mo		OK			F 3 11 Mo	F 3 11 Mo						
Sodium Bromide 44%; Sodium Hydroxide 1%	100 F		OK			OK			OK	OK		F 3 6 Mo	OK	OK		OK
Sodium Bromide 44%; Sodium Hydroxide 1%	150 F		OK 4			OK 4			OK 4	OK 4		F1,3,4 6 Mo	OK 4	OK 4		OK
Sodium Bromide Waste	100 F		F 3 1 Yr			OK		F 3 1 Yr	F 3 1 Yr			F 3 1 Yr				OK
Sodium Carbonate Slurry	100 F													OK**		
Sodium Carbonate Slurry	150 F													OK**		
Sodium Carbonate 5%	100 F	OK	OK	OK 4		OK			OK	OK 4	OK 4	OK	OK	OK	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155MHB	7156	9060	9080	9500	9570
Sodium Carbonate 5%	150 F	OK 4	OK	OK 4		OK			OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK
Sodium Carbonate 30%	100 F	OK	OK	OK 4		OK			OK	OK 4	OK 4	OK	OK	OK	OK	OK
Sodium Carbonate 30%	150 F	OK 4	OK	OK 4		OK 7			OK 4	1 3,4 1 Yr	OK 4	OK	OK 4	OK 4	OK	OK
Sodium Carbonate 50%	70 F						<OK	<OK	<OK	<OK						
Sodium Chlorate (Dry)	100 F								OK**							
Sodium Chlorate 50%	70 F						<OK	<OK	<OK	<OK						
Sodium Chlorate 50%	100 F											OK		OK	OK	OK
Sodium Chlorate 50%	150 F											OK	OK 4	OK	OK	OK
Sodium Chlorate 50%	180 F						OK 1 Mo	OK 1 Mo	OK 1 Mo	OK 1 Mo						
Sodium Chlorate 25%; Sodium Chloride 15%	100 F											<OK				
Sodium Chlorate 25%; Sodium Chloride 15%	150 F											<OK				
Sodium Chlorate 50%; Sodium Chloride 50% (Slurry)	100 F	<OK					<OK		<OK							
Sodium Chlorate 50%; Sodium Chloride 50% (Slurry)	180 F	F 3 4 Mo					<OK		<OK							
Sodium Chloride (Dry)	100 F	OK							OK**					OK	OK	
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155MHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Chloride 10% (Brine Solution)	100 F	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Sodium Chloride 20% (Brine Solution)	100 F	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
Sodium Chloride 20% (Brine Solution)	180 F	OK		OK	OK	OK	OK		OK		OK	OK			OK	OK
Sodium Chloride 40%	212 F			OK		OK					OK	OK	F 4,10 1 Yr	F 4,10 1 Yr	OK	
Sodium Chloride 12% Sodium Hydrosulfite 3%	150 F			OK 4		F 5 1 Yr			OK 4		F 3 2 Mo	F 3 2 Mo				OK 4
Sodium Chloride 14%; Sodium Hydroxide 10% (Cell Liquor)	150 F								F 3 2 Wk	F 3 4 Mo						
Sodium Chloride 20% Methylene Chloride 2%	100 F			OK		OK										
Sodium Chlorite 50%	100 F			F 5 2 Wk					F 5 2 Wk							
Sodium Chromate 50%	70 F		<OK	OK			<OK	<OK	<OK	<OK						
Sodium Chromate 50%	150 F														OK	
Sodium Citrate 40%	100 F	<OK		<OK		<OK		<OK	<OK	<OK	<OK	<OK				OK
Sodium Cyanide 20%	100 F	F 3 6 Mo		F 3 6 Mo			F 3 6 Mo	F 3 6 Mo	<OK	<OK						OK
Sodium Fluorosilicate	100 F	OK							OK							
Sodium Formate 22%	100 F			OK		OK		OK	OK	OK	OK					
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Formate 22%	180 F			OK		OK		OK	OK 4	F 3 4 Mo	F 3 6 Mo					
Sodium Formate 50%	100 F			OK		OK		OK	OK	OK	OK		OK	OK		
Sodium Formate 50%	150 F												OK 4	OK		
Sodium Formate 50%	180 F			F 3 1 Yr		OK 4		OK 4	OK	F 5 1 Yr	F 3 6 Mo					
Sodium Hydrosulfide	180 F			F 5,6 Mo			F 3,4 2 Wk		F 3 1 Mo	<OK 4						
Sodium Hydrosulfide 40%	150 F								OK 4	OK 4		F 2,4 1 Mo	OK 4	OK 4	OK 4	OK 4
Sodium Hydrosulfide 50%	140 F			<OK 4			<OK 4	<OK 4	<OK	<OK 4						
Sodium Hydrosulfide 60%	230 F															OK
Sodium Hydrosulfide 72%	100 F			<OK 4	OK			<OK 4	<OK	<OK 4			OK 4	OK		
Sodium Hydrosulfide 72%	150 F			<OK 4				<OK 4	<OK	<OK 4			OK 4	OK		
Sodium Hydrosulfite 5%	100 F			OK		F 3 1 Yr	F 3 2 Mo		OK			OK				OK
Sodium Hydrosulfite 5%	150 F			OK	OK	F 3 1 Yr	F 3 2 Mo		OK			F 3 6 Mo	F 3 1 Wk	F 3 1 Wk		OK
Sodium Hydrosulfite 10%	100 F			OK		OK			OK		F 3 1 Yr	OK				OK
Sodium Hydrosulfite 10%	150 F			OK	OK	OK			F 3 2 Mo		F 3 2 Mo	F 3 2 Mo	F 3 1 Wk	F 3 1 Wk		OK
Sodium Hydrosulfite 25%	100 F			OK		F 3 1 Yr			F 3 4 Mo		F 3 2 Mo	OK				OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Hydrosulfite 25%	150 F			OK	OK	F 3 1 Yr			F 3 2 Mo		F 3 2 Mo	F 3 2 Mo	F 3 1 Wk	F 3 1 Wk		OK
Sodium Hydrosulfite 50%	100 F			OK	OK	OK			OK		OK					OK
Sodium Hydrosulfite 50%	150 F			OK	OK	OK			OK		OK		OK 4	OK 4		OK
Sodium Hydroxide 1%	100 F			F 5 4 Mo	F 5 4 Mo											
Sodium Hydroxide 1%	150 F								F 3 2 Wk	OK 8 Mo					OK	OK
Sodium Hydroxide 5%	100 F	F 3,4 1 Wk	OK		F 8 3 Wk		F 3 4 Mo		F 3 1 Wk	OK 8 Mo		<OK	F 3 1 Yr	OK	OK	OK
Sodium Hydroxide 5%	150 F	F 3 1 Da	OK			F 3 3 Mo	F 3,4 1 Wk		F 3 5 Da	F 3 16 Mo			F 3 1 Yr	F 3 1 Yr	OK	OK
Sodium Hydroxide 8%	100 F					F 4,7 1 Yr								OK	OK	OK
Sodium Hydroxide 8%	150 F											F 3 2 Mo			OK	OK
Sodium Hydroxide 8%	200 F		F 3 3 Mo			F 3 8 Mo				F 3 2 Mo						OK
Sodium Hydroxide 10%	100 F	F 3 6 Mo	OK			OK	<OK 1		F 1,3 4 Mo	<OK			OK	OK 4	OK	OK
Sodium Hydroxide 10%	150 F	F 3,4 2 Wk	F 3 1 Yr			F 1,3 8 Mo			F 3 2 Wk	F 3 4 Mo			F 3,4 1 Yr	F 3 6 Mo	OK	OK
Sodium Hydroxide 10%	200 F		F 3 6 Mo	F 5 3 Da		F 3,4 6 Mo	F 3 2 Mo	F 3 5 Da	F 3 3 Da	F 3 1 Mo				F 3 7 Mo	F 3,4 1 Yr	OK
Sodium Hydroxide 20%	100 F												OK 4			
Sodium Hydroxide 25%	100 F		<OK						F 3 6 Mo	OK			OK 4	OK	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Sodium Hydroxide 25%	150 F	F 3 1 Mo	OK	F 5 5 Da		F 1,3 8 Mo			F 3,4 2 Mo	OK			OK 4	F 3,4 1 Yr	OK	OK
Sodium Hydroxide 33%	100 F	F 3 8 Mo												OK 9		
Sodium Hydroxide 33%	150 F	F 3 1 Mo												OK 4		
Sodium Hydroxide 40%	100 F	OK	<OK			<OK	<OK		<OK	OK				OK 4	OK	OK
Sodium Hydroxide 40%	150 F	F 3 4 Mo	<OK			<OK 4	<OK 1		F 1,3 2 Mo					OK 4	OK	OK
Sodium Hydroxide 50%	100 F	OK 4	OK			OK 4	<OK 4		<OK 4	OK**		OK 15 Mo	OK	OK	OK	OK**
Sodium Hydroxide 50%	150 F	F 3 6 Mo	OK			OK 7			OK 4	OK		OK 15 Mo	OK 4	OK 4	OK	OK
Sodium Hydroxide 50%	180 F						F 2 8 Mo		F 2 8 Mo	F 1,8 10 Mo		F 1,8 1 Yr	OK 4	OK 4	OK	OK
Sodium Hydroxide 50%	200 F														OK 4	OK
Sodium Hydroxide 73%	200 F														OK 4	OK**4
Sodium Hydroxide 73%	265 F														OK 4,7	OK 4,7
Sodium Hypochlorite 5%	100 F						F 3 7 Da	F 5 1 Mo	F 3 3 Wk	F 5 4 Mo			F3,4,7 8 Mo	OK+4		OK+
Sodium Hypochlorite 50 ppm	100 F	F 1,3 2 Wk					OK+	F 3 1 Mo	OK+	F 3 2 Wk	OK+	OK+	F 3 1 Mo	OK+		
Sodium Hypochlorite 50 ppm	150 F	F 3 2 Wk					F 3 8 Mo	F 3 2 Wk	F 3 4 Mo	F 3 1 Wk	OK+	OK+	F 3 1 Wk	F 3 1 Mo		
Sodium Hypochlorite 50 ppm	180 F	F 3 1 Wk					F 3 2 Wk	F 3 2 Wk	F 3 6 Mo	F 3 1 Wk	F 3,4 4 Mo	F 3,10 6 Mo	F 3 1 Wk	F 3 1 Mo		
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Hypochlorite 100 ppm	100 F	F 3 2 Wk					OK+	OK+	OK+	F 3 2 Wk	OK+	OK+	F 3 6 Mo	OK+		
Sodium Hypochlorite 100 ppm	150 F	F 3 2 Wk					OK+	F 3 1 Mo	F 3 4 Mo	F 3 1 Wk	F 3 1 Yr	OK+	F 3 1 Wk	F 3 1 Mo		
Sodium Hypochlorite 100 ppm	180 F	F 3 1 Wk					F 3 1 Wk	F 3 1 Wk	F 1,9 8 Mo	F 3 1 Wk	F 3,4 4 Mo	F 3,4 6 Mo	F 3 6 Mo	F 3 1 Mo		
Sodium Hypochlorite 144 ppm	100 F	F 2 2 Wk	OK+	OK+4	OK+4	JK+	F 3 2 Mo	F 3 4 Mo	F 3 2 Mo	F 3 2 Wk	OK+		F 3 2 Mo	OK+	OK+	OK+
Sodium Hypochlorite 200 ppm	100 F	F 3 2 Wk					OK+	F 3 1 Mo	F 3 2 Wk	F 3 2 Wk	OK+	OK+	F 3 1 Mo	OK+		
Sodium Hypochlorite 200 ppm	150 F	F 3 1 Wk					F 3 1 Mo	F 3 2 Wk	F 3 4 Mo	F 3,4 1 Wk	F 3 6 Mo	F 3 6 Mo	F 3 1 Wk	F 3 1 Mo		
Sodium Hypochlorite 200 ppm	180 F	F 3 1 Wk					F 3 2 Wk	F 3 2 Wk	F 3 4 Mo	F 3 1 Wk	F 3,4 2 Wk	F 3,4 6 Mo	F 3 1 Wk	F 3,4 1 Mo		
Sodium Hypochlorite 288 ppm	100 F	F 3 1 Mo	OK+	OK+4	OK+4	OK+	F 3 2 Mo	F 3 6 Mo	F 3 1 Mo	F 3 2 Mo	OK+		F 3 6 Mo	OK+	OK+	OK+
Sodium Hypochlorite 300 ppm	100 F	F 3 1 Mo					F 3 4 Mo	F 3 1 Mo	F 3 1 Mo	F 3 2 Wk	OK+	OK+	F 3 4 Mo	OK+4		
Sodium Hypochlorite 300 ppm	150 F	F 3 2 Wk					F 3 2 Wk	F 3 2 Wk	F 3 2 Wk	F 3 2 Wk	F 3 1 Yr	OK+	F 3 1 Wk	F 3 1 Mo		
Sodium Hypochlorite 300 ppm	180 F	F 3 1 Wk	OK+	OK+	OK+	F 3 6 Mo	F 3 1 Wk	F 3 1 Wk	F 3 1 Wk	F 3,4 1 Wk	F 3 1 Wk	F 3 1 Mo	F 3 1 Wk	F 3,4 1 Mo	OK+	OK+
Sodium Hypophosphite 5%	70 F						OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 8 Mo						
Sodium Lauryl Sulfate 30%	100 F	OK 8 Mo		OK 8 Mo		OK 8 Mo		OK 8 Mo	OK 8 Mo	OK 8 Mo		OK 8 Mo				
Sodium N-Methyldithio-carbamate 42%	100 F	OK		OK	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK
Sodium Nitrate 40%	100 F		OK	OK 4	OK	OK		OK	OK	OK	OK	OK	OK	OK		OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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10-2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Nitrate 40%	150 F		OK	OK 4	OK	OK 4		F 3 8 Mo	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4		OK 4
Sodium Perborate	100 F								OK**							
Sodium Phosphate, Di-Basic 5% (Disodium Phosphate)	100 F										<OK	<OK				
Sodium Phosphate 50%	70 F						OK+ 8 Mo	F 3 3 Mo	OK+ 8 Mo	OK+ 8 Mo						
Sodium Propionate 20%	70 F			OK			<OK	<OK	<OK	<OK						
Sodium Silicate	100 F	OK 7 Mo	OK 7 Mo			OK 7 Mo	OK 7 Mo		OK 7 Mo	OK 7 Mo						
Sodium Silicate	150 F	F 3 7 Mo	OK 7 Mo			OK 7 Mo	F 3 7 Mo		OK 7 Mo	OK 4 7 Mo						
Sodium Silicate 50%	100 F	OK 7 Mo	OK 7 Mo			OK 7 Mo	OK 7 Mo		OK 7 Mo	OK 7 Mo						
Sodium Silicate 50%	150 F	OK 8 Mo	OK 8 Mo			OK 8 Mo	OK 8 Mo		OK 8 Mo	OK 8 Mo						
Sodium Sulfate Dry	100 F	OK**							OK**					OK		
Sodium Sulfate 6%; Ammonium Sulfate 6%	150 F	<OK	<OK	<OK			<OK	<OK 4	<OK	<OK 4						
Sodium Sulfate 10%	150 F		<OK	OK 4 8 Mo		OK 8 Mo		OK 4 8 Mo	OK 8 Mo	OK 4 8 Mo						
Sodium Sulfate 30%	150 F		<OK	OK 4 8 Mo		OK 8 Mo		OK 8 Mo	F 3 1 Mo	OK 4 8 Mo			F 3 1 Wk	F 3 6 Wk		
Sodium Sulfide 10%	100 F		OK			OK			F 3 6 Mo	OK	F 3 1 Yr	OK	OK 4	OK	OK	OK
Sodium Sulfide 10%	150 F		OK			OK			F 3 6 Mo	F 3 1 Yr	F 3 1 Yr	F 3 2 Mo	OK 4	F 3 6 Mo	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Sulfide 50%	100 F		OK			OK			OK	OK 4	F 3 2 Mo	F 3 1 Yr		OK	OK	OK
Sodium Sulfide 50%	150 F		F 3 6 Mo			OK 4			F 3 4 Mo	OK	F 3 1 Mo	F 3 2 Mo	OK 4	OK 4	OK	OK
Sodium Sulfite 10%	180 F			<OK 4			<OK	<OK 4	<OK 4	<OK 4						
Sodium Sulfite 50%	150 F												OK	OK	OK	OK
Sodium Thiocyanate 10%	70 F			OK+4 9 Mo				OK+ 9 Mo	OK+ 9 Mo	OK+ 9 Mo						
Sodium Thiocyanate	180 F			OK+4 9 Mo				OK+4 9 Mo	F 3 4 Mo	OK+ 9 Mo						
Sodium Thiocyanate 50%	70 F			OK+ 9 Mo					OK+ 9 Mo	OK+ 9 Mo						
Sodium Thiocyanate 50%	100 F												OK+	OK+	OK+	OK+
Sodium Thiocyanate 50%	180 F			OK+4 9 Mo				OK+ 9 Mo	F 3 4 Mo	OK+4 9 Mo						
Sodium Thiosulfate 10% pH 6.5	100 F								<OK+1							
Sodium Thiosulfate 30%	100 F	<OK+	<OK+	<OK+4		OK	<OK+	<OK+	<OK+	<OK+			OK+	OK+	OK+	OK+
Sodium Xylenesulfonate	100 F			F 2,4 6 Mo			F 3 4 Mo	<OK 4	<OK	<OK 4						
Sorbitol	100 F	<OK		<OK	OK				<OK	<OK						
Soy Sauce (Kikkoman)	110 F			OK	OK 4				OK 4	OK 4		OK 4	OK 4	OK 4		OK
Soy Sauce (Kikkoman)	150 F			OK 4	OK 4				OK 4	F 3 10 Mo		OK 4	OK 4	OK 4		OK 4
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Soy Sauce (Kikkoman)	180 F			OK 4	OK 4				OK 4	F 3 3 Mo		F 3 6 Mo	F 3 6 Mo	F 3 6 Mo		OK 4
Soybean Foots	250 F	F 3 2 Wk		F 5 1 Wk		OK				F 3 2 Mo						
Soybean Oil	70 F			<OK	OK		<OK		<OK	<OK 4						
SR-10® 5% (Wyandotte Chemical)	100 F	<OK 4		<OK			<OK	<OK 4	<OK	<OK 4						
SR-10® 5% (Wyandotte Chemical)	150 F	<OK 4		<OK			<OK	<OK 4	<OK	<OK 4						
Stearic Acid	180 F												F 3 6 Mo	F 3 6 Mo	OK	OK
Stearic Acid	200 F			OK	OK											
Stearic Acid 50% in Ethyl Alcohol	70 F			<OK	OK		<OK	<OK	<OK	F 3 2 Mo						
Stearic Acid 90%	160 F	F 5 1 Yr	OK	OK	OK	OK	F 5 2 Mo	F 3 1 Yr	F 5 1 Mo	F 5 1 Da						
Stearic Acid 90% (n-Octadecanoic Acid)	180 F												F 2 6 Mo	F 3,6 6 Mo	OK	OK
STEROX AJ-85®	170 F			<OK			F 2,3 1 Wk	F 2,3 1 Mo	F 2,3 1 Wk	F 2,3 1 Mo						
Strawberry Preserve	70 F			<OK		<OK				<OK						
Styrene	100 F			OK	OK	OK	F 3 1 Wk	OK 1	F 3 1 Wk	F 1,3 2 Wk	F 2 1 Wk		OK	F 3 2 Da	OK	OK
Styrene	150 F				OK								F 5 2 Mo			F 3 2 Mo
Sugar Solution (Saturated)	70 F	<OK		<OK		<OK			<OK	<OK						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sulfuric Acid 40%	150 F		<OK+			<OK+	F 3,4 2 Wk		F 3,4 1 Mo							
Sulfuric Acid 50%	100 F	<OK+		<OK+4		OK+	<OK+4	<OK+	<OK+4	<OK+4						
Sulfuric Acid 50%	150 F	F 3,4 4 Mo	F 5 1 Yr	<OK+4			F 3,4 4 Mo		F 3,4 1 Mo							
Sulfuric Acid 75%	100 F			<OK+4		<OK+4	F 3 1 Mo		F 3 2 Mo	F 3,4 6 Mo						
Sulfuric Acid 75%	150 F			<OK+4		<OK+	F 5 1 Da		F 3 1 Da							
Sulfuric Acid 92-98%	70 F			OK**4			F 5 2 H	F 5 2 H	F 5 2 H	F 5 2 H					F 5 1 Da	
Sulfuric Acid 92-98%	100 F			OK**4	OK**4											
Sulfuric Acid 96%	150 F			OK 4												
Swift Glue	70 F			<OK			<OK 1	F 3,4 2 Wk	F 3 3 Wk	F 3,4 3 Wk						
Tall Oil	70 F			<OK		<OK	<OK		<OK	<OK						
Tall Oil	150 F								OK 4							
Tall Oil	180 F			OK 4	OK 4								F 1,8 10 Mo		OK	OK
Tall Oil	200 F	F 3 4 Mo		OK	OK	OK		F 3 1 Mo	F 3 4 Mo	F 3 2 Wk	F 3 1 Mo	F 3 2 Wk	F 3 1 Yr	F 3 1 Yr	OK	OK
Tall Oil	210 F			OK 4	OK 4											
Tall Oil (Crude) Reichhold	Amb.	OK 4	OK	OK	OK	OK		F 3,4 1 Yr	OK 4	F 3,4 10 Mo	OK 4	OK 4	OK 4	OK 4	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sulfamic Acid 5%	100 F	OK+				OK+		F 3 48 H	OK+	OK+4	F 3 48 H					
Sulfamic Acid 5%	150 F														OK	OK
Sulfamic Acid 20%	70 F			<OK+			F 3,4 2 Wk	F 3 1 Wk	F 3 1 Wk	F 3 1 Mo						
Sulfamic Acid 50%	70 F			<OK+			F 3,4 2 Wk	F 3 1 Wk	<OK+	F 3 4 Mo						
Sulfamic Acid 50%	100 F								F 3 6 Mo				F 3 2 Da	F 3,4 4 Mo		
Sulfolane 60%	100 F			OK		OK							OK	OK 4		OK
Sulfur (Dry)	100 F								OK**							
Sulfur (Molten)	320 F			OK**	OK											
Sulfuric Acid 0.1%	140 F			<OK+4		<OK+4			F 3,4 5 Mo	F 3 2 Mo						
Sulfuric Acid 2%	150 F			<OK+4		<OK+4		F 1,3 1 Mo	F 3 1 Wk	F 3 1 Mo						
Sulfuric Acid 5%	100 F					OK							F 3 2 Wk		OK+4	
Sulfuric Acid 10%	100 F	F 3,4 6 Mo	<OK+	<OK+4	OK+4	<OK+4	F 3 2 Wk		F 3 1 Mo				F 3 1 Wk	F 3,4 4 Mo	OK+4	OK+4
Sulfuric Acid 10%	150 F	F 3,4 1 Mo	<OK+	<OK+4		OK+	F 3,4 1 Wk		F 3,4 1 Wk						F 3,4 4 Mo	F 3,4 2 Mo
Sulfuric Acid 20%	70 F			<OK+4			<OK+	F 3 1 Wk	<OK+	F 3 4 Mo						OK+
Sulfuric Acid 40%	100 F		<OK+	<OK+4		<OK+	F 3,4 4 Mo		F 3,4 4 Mo							
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Tall Oil Fatty Acid	100 F			OK**	OK	OK		F 3 1 Yr	OK	F 3.5 2 Mo		F 2 4 Mo	OK 4		OK	
Tallow (Crude)	150 F			<OK	OK		F 5 6 Mo	<OK	F 3 4 Mo	F 5 2 Wk						
TAMUL F® (Rohm & Haas)	100 F			OK 7 Mo					<OK 1	OK 7 Mo						
Tanning Extract	100 F			OK**												
TELVAR®	70 F						<OK	F 3 2 Mo	<OK	<OK						
Terephthalic Acid (Dry)	100 F	OK														
Tetrachloroethylene (Perchloroethylene)	70 F			OK**		<OK	<OK	<OK	<OK	<OK						
Tetrachloroethylene (Perchloroethylene)	100 F		OK	OK	OK	OK	OK		OK	OK 4	OK	OK	OK 4	F 3 10 Mo	OK	OK
Tetrachloroethylene (Perchloroethylene)	200 F			<OK	OK			OK 4					OK 4	F 3 1 Wk	OK	OK 4
Tetraethylenepentamine	70 F			<OK			F 2.6 2 Mo	F 3 1 Wk	F 2.6 2 Mo	F 2.6 2 Mo						
Tetraethylenepentamine	100 F	F 2 1 Da		OK	OK	OK		F 2 1 Da	F 2 1 Da	F 2.3 1 Wk	F 2.3 1 Wk	F 2 1 Da	F 2 8 Mo	F 2 1 Da	OK	OK 4 1 Yr
Tetraethylenepentamine	150 F	F 5 1 Da		OK	OK	OK		F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Wk	F 2.3 1 Da	OK	F 5 1 Mo
Tetraethyllead	100 F			OK**	OK			FC/OK**								
Tetrahydrofuran (THF)	100 F			OK**	OK		F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da			F 4.5 1 Wk		F 3 1 Wk	F 5 1 Wk
Tetrahydrofuran (THF)	120 F												F 3.5 1 Wk			
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Tetrahydrofuran (THF)	150 F												F 5 1 Da		F 5 1 Da	F 5 1 Da
Therminol #55® (Heat Transfer Agents) Monsanto	120 F			OK	OK				OK				OK	OK	OK	OK
Therminol #59® (Heat Transfer Agents) Monsanto	120 F			OK	OK				OK 4				OK	OK	OK	OK
Therminol T-60® (Heat (Transfer Agents) Monsanto	120 F			OK	OK				F 3 10 Mo				OK 4	OK 3	OK	OK
Therminol #66® (Heat Transfer Agents) Monsanto	120 F			OK	OK				OK 4				OK 4	OK	OK	OK
Therminol VP-1® (Heat Transfer Agents) Monsanto	120 F			OK	OK				F 3 8 Mo				OK 4	F 3 6 Mo	OK	OK
Titanium Dioxide (Dry)	100 F	OK							OK**					OK		
Titanium Dioxide ~~(Slurry)~~	100 F			OK**	OK	OK**			OK**					OK	OK	OK
Toluene	70 F			OK		OK	OK	OK		OK				OK		OK
Toluene	100 F				OK				OK 1				OK	F 3 1 Wk	OK	OK
2,4-Toluene Diisocyanate	100 F								OK**				OK		OK	
2,4-Toluene Diisocyanate	150 F			OK** 4 Mo	OK	<OK	OK 4 Mo		OK 4 Mo	OK 4 Mo						
Toluenesulfonic Acid 70%; Methanol 30%	100 F							F 3 4 Mo								
p-Toluenesulfonic Acid 25%	100 F	F 1,3 4 Mo	OK	OK		OK		F 3,4 48 H	F 3 2 Mo	F 3 1 Mo	F 3 4 Mo	F 3,4 2 Wk	OK 4	OK 4	OK	OK
p-Toluenesulfonic Acid 25%	150 F	F 3,5 48 H	F 5 4 Mo	F 5 4 Mo		OK+		F 3,4 48 H	F 3 2 Mo	F 3 48 H	F 3 48 H	F 3,5 48 H	F 3,5 48 H	F 3 48 H		F 3,4 1 Yr
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p-Toluenesulfonic Acid 50%	100 F	F 3,4 4 Mo	OK	OK		OK		F 3,4 2 Mo	OK 4	F 4,5 1 Mo	F 3,4 1 Yr	F 4,5 2 Wk	OK 4	OK 4	OK	OK
p-Toluenesulfonic Acid 50%	150 F	F 5 48 H	F 4,5 4 Mo	OK 4		OK		F 3,4 48 H	F 3 2 Mo	F 5 48 H	F 3,4 2 Wk	F 5 48 H	F 3 48 H	F 3,4 48 H	F 3,9 10 Mo	F 3,4 1 Yr
p-Toluenesulfonic Acid 75%	100 F	F 2,4 4 Mo	OK	OK		OK		OK 1,4	OK 4	F 2 1 Mo	OK 4	F 3,4 1 Wk	OK 4	OK 4	OK	OK
p-Toluenesulfonic Acid 75%	150 F	F 3,4 1 Wk	F 4,5 1 Yr	OK 4		OK 4		F 3,4 48 H	F 3,4 2 Wk	F 2,5 48 H	F1,3,4 2 Wk	F 4,5 48 H	OK 4,7	F 3 48 H		F 4,5 6 Mo
Tomato Juice	100 F	OK	OK 4 Mo						OK 4	OK 4					OK	OK
Tomato Juice	150 F	OK 4							OK 4	F 3 1 Yr					OK	OK
Tomato Paste	100 F	OK 4							OK 4	OK 4		OK 4	OK 4	OK 4	OK	OK
Tomato Paste	150 F	OK 4							OK 4	F 3 1 Yr		F 3,4 1 Mo	F 3,4 2 Mo	F 3,4 4 Mo		
Transmission Fluid	130 F			OK	OK										OK	OK
Tributyl Phosphate	100 F			OK	OK			F 3,4 4 Da	F 1,3 4 Mo				OK		OK	OK
1,1,1-Trichloroethane (CHLOROTHENE®)	100 F		OK	OK**	OK	OK		OK 1,4	F 2 1 Da	F 3 2 Wk	F 3 2 Wk	F 3 2 Mo	OK 4	OK	OK	OK
1,1,1-Trichloroethane (CHLOROTHENE®) Vulcan Chem.	212 F	F 3 1 Mo		OK	OK			F 3 1 Mo	F 1,3 1 Mo	F 3 1 Wk	F 3 1 Wk	F 3 1 Wk	OK 4	F 3 24 H	OK	OK
Trichloroethylene	100 F		F 3 6 Mo	<OK	OK	F 3 2 Mo	F 2,3 1 Da	<OK	F 2,3 1 Da				F 2,3 4 Mo	F 5 72 H		OK 4
Trichloroethylene	180 F			<OK	OK			OK**4								
Trichloroethylene	190 F			OK 4	OK			F 3,4 1 Yr					F 3,4 1 Yr		F 3,4 8 Mo	F 3,4 1 Yr
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Tridecyl Alcohol	70 F			<OK			<OK	<OK	<OK	<OK						
Tri(dimethylaminomethyl) Phenol	100 F												OK	OK	OK	OK
Triethanolamine	100 F	OK	OK	OK	OK		OK	F 3 2 Wk	OK	OK			OK	OK	OK	OK
Triethanolamine	150 F		OK	OK	OK		OK	F 3 1 Wk	OK	OK						
TRI-ETHONE® (PPG)	165 F							<OK1,4								
TRI-ETHONE® (PPG)	165 F							FC <OK1,4								
Triethyl Benzene	70 F			OK 8 Mo			OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 8 Mo						
Triethyl Benzene	150 F			<OK	OK		OK 8 Mo	OK 8 Mo	OK 8 Mo							
Triethylene Glycol	100 F	<OK	<OK	<OK	OK			F 3,4 2 Wk	F 2 2 Mo	F1,3,4 8 Mo	F 3 2 Wk	OK	OK	F 2 2 Mo	OK	OK
Triethylene Glycol	150 F		F 3 2 Mo	OK	OK			F 2,3 72 H	F 3 2 Mo		F 3 72 H	F 3 2 Mo	F 3,4 10 Mo	F 3 4 Mo	OK 4	OK 4
Triethylene Glycol 80%	100 F							F1,3,4 2 Wk								
Triethylenetetramine	100 F			OK	OK								F 5 2 Wk		OK 4,7	F 5 1 Wk
Trimethyl Phosphate	100 F	F 3 1 Da	F 3 1 Wk	OK	OK	OK		F 3 1 Da	F 3,5 1 Wk	F 2,3 6 Mo	F 2,3 1 Da	F 3 1 Da	OK	F 5 1 Da		OK
Triphenyl Phosphite	100 F			<OK	OK	<OK		<OK	<OK							
Tripotassium Phosphate (SEE: Potassium Phosphate, tribasic)																
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Tripropylene Glycol Monomethyl Ether (TPM)	100 F	F 1,3 10 Mo		OK	OK	OK		F 2 72 H	OK 1			OK 1	OK	OK 1	OK	OK
TRITON X100® (Rohm & Haas)	180 F			<OK			F 3 1 Wk	F 3 4 Mo	F 3 2 Wk	F 1,3 4 Mo						
Turbine Oil (Synthetic) {SEE: Oil, Turbine (Synthetic)}																
TURBO 15® {SEE: Lubricant}																
Turpentine	70 F			<OK			<OK	<OK	<OK	<OK					OK	OK
UCON ®Quenchants (Union Carbide)	150 F			OK 4				F 3 1 Mo			F 3 1 Mo	F 3 6 Mo	F 3 1 Wk	OK 4	OK	OK 4
UCON ®Quenchants 25% (Union Carbide)	150 F	F 3 2 Wk		OK 4				F 3 2 Wk	F 3 2 Wk	F 3 2 Wk	F 3 1 Mo	F 3 1 Mo	F 3 1 Wk	F 3 2 Mo	OK 4	OK 4
Urea (Dry)	100 F												OK		OK	
Urea 50%	100 F	OK		OK		OK		OK 4	OK	OK						
Urea Ammonium Nitrate (Nitrogen Fertilizer Solution)	100 F		OK	OK	OK	OK		OK 4	OK	OK	OK 4	OK	OK	OK	OK	OK
Urea Ammonium Nitrate (Nitrogen Fertilizer Solution)	150 F		OK	OK 4	OK 4	OK 4		OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK	OK 4
Urea Ammonium Nitrate (Nitrogen Fertilizer Solution)	200 F		OK 4	OK 4	OK 4	OK 4		OK 4	F 3 1 Yr	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4
Urea Ammonium Nitrate (Nitrogen Fertilizer Solution)	250 F		OK 4	OK 4	OK 4	OK 4		OK 4	F 3 6 Mo	F 3 6 Mo	F 3 6 Mo	F 3 6 Mo	F 5,6 6 Mo	OK 4	OK 4	OK 4
Urea Formaldehyde Resin	100 F			OK**	OK											
Uric Acid Solution	70 F			OK 8 Mo			OK 8 Mo	F 3 6 Mo	OK 8 Mo	F 3 8 Mo						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Valeric Acid	100 F														OK	OK
Valeric Acid	150 F														OK 4	F1,3,4 8 Mo
Valeric Acid 5%	100 F	F 3,6 1 Da							F 3,6 1 Da	F 5 1 Da			F 3,5 1 Da	F 3,6 1 Da		OK 4
Vegetable Fat	150 F			OK	OK								OK	OK	OK	OK
Vegetable Fat	180 F			OK	OK								OK 4	OK 4	OK	OK
Vegetable Juice (V-8®)	70 F			<OK		<OK				OK 2 Mo						
Vegetable Oil	100 F			OK**	OK										OK	
Vegetable Shortening CRISCO®	70 F									<OK						
VERSENE 100® (SEE: Ethylenediaminetetraacetic acid)																
Vinegar (White)	70 F			<OK+			F 3 2 Mo		F 3 2 Mo							
Vinegar (White)	100 F												F 3 1 Da			
Vinyl Acetate Monomer (Union Carbide)	100 F		OK	OK**	OK	F 3 4 Mo	F 2 2 Mo	OK 1,4	F 3 1 Yr	F 2 2 Mo			F 5 6 Mo	F 3 48 H	OK	OK
Vinyl Acetate Monomer (Union Carbide)	120 F							F 2,3 1 Mo	F 3 1 Wk				F 5 1 Wk	F 3 1 Da	OK	OK
Vinyl Acetate Monomer (Union Carbide)	150 F		F 2 6 Mo	OK**	OK	F 3 4 Mo	F 2 2 Mo	F 2 2 Mo	F 3 2 Mo	F 2 2 Mo					F 3 1 Mo	F 5 2 Mo
Vitamin "D" Solution	70 F									<OK						
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Vodka, 190 Proof	100 F			OK	OK					F 1,3 6 Mo			OK 4	F 3 1 Wk	OK	OK
Waste Sulfide Liquid	180 F						F 3 1 Da	F 3 1 Da	F 3 1 Da							
Water (Demineralized)	100 F	F 3 6 Mo		<OK	OK	<OK		F 3 4 Mo	F 3 6 Mo	F 3 6 Mo	OK**	OK**			OK	OK
Water (Demineralized)	150 F						OK									
Water (Demineralized)	212 F			OK	OK							OK			OK	F 3 40 H
Water, Demineralized (Ion (Cation) Exchange) Approx. pH 4	120 F			OK		OK		F 3 3 Mo		F 3 1 Yr	F 3 1 Wk					
Water, Demineralized (Ion (Cation) Exchange(Approx. pH 4	180 F			OK		OK		F 3 1 Yr		F 3 2 Mo	F 3 1 Wk					
Water (Distilled)	100 F	<OK		<OK	OK	<OK	<OK		<OK		OK**	OK**			OK	OK
Water (Distilled)	200 F	F 3 4 Da		OK**	OK	OK	F 3 4 Da		F 3 4 Da		OK**	OK**			OK	
Water (Sea)	100 F	<OK		<OK	OK	<OK	<OK	<OK	<OK	<OK	<OK	<OK	OK	OK	OK	OK
Water (Sea)	150 F	<OK		<OK	OK	<OK	OK	<OK	<OK	<OK	<OK	<OK	OK	OK	OK	OK
Water (Tap)	100 F	OK**	<OK	<OK	OK	<OK	<OK	<OK	OK**	OK**	<OK	<OK	OK	OK	OK	OK
Water (Tap)	150 F		<OK	OK	OK	OK			OK	F 3 6 Mo	<OK	OK**	F 3 1 Wk	OK 10 Mo	OK	OK
Water (Tap)	200 F	F 3 9 Da	<OK	OK**	OK	<OK	F 3 1 Da	F 3 1 Wk	F 3 9 Da	F 3 1 Wk	OK**	OK**			OK	
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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Water (Tap)	212 F				OK										OK	F 3 4 Mo
2,4-D ESTER WEED-NO-MORE®	70 F			OK**			<OK	<OK	<OK	<OK			OK 4	OK 4		
Whiskey, 80 Proof	100 F			OK					F 3 10 Mo	F1,3,4 1 Wk			F 3,4 1 Yr	F1,3,4 1 Mo	OK**	OK
Whiskey, 90 Proof	100 F			OK						F 2,4 1 Da			F 3,4 1 Mo	F 3,4 6 Mo	OK	OK
Wine, 10% Alcohol by volume	70 F			<OK		<OK			<OK	OK**			OK	OK	OK	OK
Wine 14% Alcohol by volume	100 F			OK	OK				OK	F 3 10 Mo			OK 4	OK	OK	OK
Wine (Fortified) 20% Alcohol by volume	100 F			OK	OK				OK 1	F 3 2 Mo			OK 4	OK	OK	OK
Worchestershire Sauce	150 F			OK	OK					F 3,4 1 Wk					F 3 8 Mo	OK
Xylene	100 F	<OK		<OK	OK	<OK	<OK	<OK	<OK	<OK	OK		OK	F 3 1 Yr	OK	OK
Xylene	150 F				OK			OK 4	OK 1,4	OK 1,4			OK 4		OK	OK
para-Xylene	150 F			<OK	OK	<OK		<OK1,4								
Zinc Chloride 40%	70 F			OK+ 9 Mo			OK+ 9 Mo	OK+ 9 Mo	OK+ 9 Mo	OK+ 9 Mo						
Zinc Chloride 40%	150 F														OK	
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

Mo = Month
Wk = Week
Da = Day
H = Hours
F = Failed

FC = Force Cured.
< = 6 Month Test.
** = Minimum 1 year field service history.
+ = Corrosion rate extreme to steel substrate; NOT recommended for immersion service.

1 = Slight Softening: Normally NOT recommended for continuous immersion service. May be recommended for spillage.
2 = Severe Softening: NOT recommended for continuous immersion service. May be recommended for spillage.
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

NOTE: All solutions are in water unless otherwise indicated.

PLASITE®

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BULLETIN TD-3
CORROSION RESISTANCE
TEST DATA

AUGUST 1989
(Replaces July 1987)

TD-3 CORROSION RESISTANCE TEST DATA

FOR THICK FILM COATINGS

The proper selection of coatings for specific exposures requires the best combination of science, art, experience and certain engineering fundamentals. Protective coatings for immersion and severe service are selected much in the same manner as other materials of construction involved in a chemical environment.

EFFECTIVE LIFE OF COATINGS depends on many factors, a few of which are listed below as a check-list to consider in the process of selecting the proper coating:

A. Chemical resistance of coating film.
B. Surface preparation and accessibility.
C. Film thickness -- continuity and quality depending on skilled application.
D. Design of tankage and equipment.
E. Physical abuse — abrasion -- impingement - liquid velocities impact.
F. Electro-chemical, cathodic protection.
G. Thermal shock — cyclical heating and cooling.
H. Temperature limits and operating characteristics.
I. Impurities and combinations of reagents.
J. Substrate over which coating is applied.

The test data published in this bulletin was derived by conducting immersion tests in closed containers. The 1" x 5" x 1/8" mild steel panels were coated with a specific coating at the nominal mil thickness recommended for immersion service. The panels were immersed in one-half of their length in the liquid.

Test panels were inspected and results recorded as follows:
24 hrs.; 1 week; 2 weeks; 1 month; 2 months; 4 months; 6 months; 8 months; 10 months; and 1 year.

INSTRUCTIONS FOR USE OF TD-3

By using coded symbols, the following data in chart form allows the user to determine the effect of the environment on the specific coating. The chart is based on immersion exposure (space does not allow reporting the effect of vapor and interface stage). Although a failure may be indicated, and if not too rapid, a judgment may be made if the coating is useful in protection against fumes, splash and spills. Each page shows the symbols and description of exposure and effect. The following notes will aid in interpretation of results.

1 = SLIGHT SOFTENING

This is not considered a true failure as in most cases it is only a surface softening, the coating is not readily removable from the surface and, when removed from the environment, it generally comes back to its original hardness. The chart indicates that it should not be used for total and continuous immersion service. It is possible that the coatings showing this degree of softening might be used at the discretion of the user.

2 = SEVERE SOFTENING

The guidelines are that it may be easily removed from the surface and would not be recommended for continuous service even though the coating might appear to harden after being removed from the environment.

3	BLISTERED	5	DISSOLVED	6	CRACKED
8	SEVERE ETCHING	9	SWELLING	10	PERMEATION

Would be interpreted as not being suitable for immersion service and would be considered a failure when immersion service is contemplated.

4 = DISCOLORATION

Not considered a failure.

7 = SLIGHT ETCHING

This is a noted effect to the coating film and would normally not be considered a failure. This effect is limited to slight surface etching only, with no measurable loss of film thickness. Coatings showing the degree of etching might be used at the discretion of the user.

The information presented is to be used as a guide to preliminary selection and an indication of the chemical resistance range of the coatings. Evaluation under actual conditions and field service is the next step in the process of proper selection. Consult our Home Office or PLASITE representative in your area for information on further tests and field history.

PLASITE 4000 SERIES

These coatings are formulated with vinyl ester resin. For immersion service, the normal film thickness is 35 mils minimum, 45 mils maximum, and is the thickness that is used to develop the test data. For film thickness above 45 mils, consult with our technical service laboratory. For film thickness below 35 mils for non-immersion service, refer to specific coating bulletins. For lining concrete tanks, refer to specific coating bulletin and to PLASITE Bulletin PA-4000.

All data, statements and recommendations made herein are based upon information we believe to be reliable, but without any express or implied guarantee or warranty of accuracy and are made with reservation that the user himself will evaluate the use, well as to compatibility, suitability for his purpose, before adoption. We make no representations regarding the use of our products, product or construction, or recommendations for their use in violation of any patent rights or in violation of any applicable laws or regulations.

Wisconsin Protective Coating Corporation • Manufacturers of Corrosion Resistant Coatings

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Acetic Acid 5%	100°F	OK 4 1 Yr				OK 4 1 Yr	
Acetic Acid 5%	150°F	F 3, 4 1 Yr	F 3 2 Mo	F 3 2 Mo	F 3 1 Mo	F 3, 4 4 Mo	F 3, 4 4 Mo
Acetic Acid 10%	100°F	OK 4 1 Yr		F 3 4 4 Mo		F 3 10 Mo	
Acetic Acid 10%	150°F					F 3, 4 6 Mo	
Acetic Acid 20%	100°F	F 4, 9, 10 6 Mo	F 3 10 Mo			F 3, 4 6 Mo	F 3 10 Mo
Acetic Acid (Glacial) 100%	100°F	F 2, 4 24 H		F 4, 6, 9 2 Wk	F 4, 6, 9 2 Wk	F 4, 8, 9 4 Mo	
Acetone	100°F	F 3 24 H				F 3 1 Mo	
Acetophenone	100°F	F 2 24 H				OK 1, 4, 7 1 Yr	
Acrylamide	Ambient						OK**
Acrylic Acid (Glacial)	100°F	F 2 1 Wk	F 3 1 Wk	F 2 1 Wk	F 2 1 Wk	OK 4, 7 1 Yr	OK 1 Yr
Acrylic Acid (Glacial)	150°F	F 1, 3, 5 2 Wk	F 1, 5 2 Wk	F 5, 7 1 Mo	F 5, 7 1 Mo	F 3, 7 4 Mo	OK 4 8 Mo
Acrylic Acid	100°F	F 2 1 Wk	F 3 1 Mo	F 2 1 Wk	F 3 1 Mo	OK 1, 7 1 Yr	OK 7 1 Yr
Acrylic Acid 5%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Acrylic Acid 5%	150°F	F 3 4 Mo	F 3 2 Mo	F 3 2 Mo	F 3, 4 2 Mo	OK 4 1 Yr	F 3, 4 4 Mo
Acrylic Acid 20%	100°F	OK 4 1 Yr	OK 4 1 Yr	F 3, 4 1 Mo	F 4, 5 1 Mo	OK 4 1 Yr	OK 4 1 Yr
Acrylic Acid 50%	100°F	F 3, 4, 7 1 Wk	F 4, 5, 7 1 Wk	F 2, 3, 7 1 Wk	F 3, 5, 6 1 Wk	F 2, 3, 5 1 Wk	F 2, 3 24 H
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating

6 = Cracked
7 = Slight Etchi
8 = Severe Etchi
9 = Swelling
10 = rmeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Allyl Chloride (3-Chloropropene)	100°F	F 2 1 Mo				F 4, 10 1 Yr	
Aluminum Ammonium Sulfate 50%	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4, 7 1 Yr	
Aluminum Chloride 29%	150°F	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Aluminum Fluoride 5%	150°F	OK 4 1 Yr				OK 4 1 Yr	
Aluminum Nitrate 50%	150°F	OK 4 1 Yr	OK 4, 7 1 Yr		OK 4 1 Yr	OK 4,7 1 Yr	OK 4,7 1 Yr
Aluminum Sulfate 10%	100°F	OK 4 1 Yr	OK 1 Yr	OK 1 Yr	OK 4 1 Yr	OK 1 Yr	OK 1 Yr
Aluminum Sulfate 10%	150°F	OK 4 1 Yr	F 3 6 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Aluminum Sulfate 50%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 1 Yr	OK 1 Yr	OK 1 Yr	OK 1 Yr
Aluminum Sulfate 50%	150°F	OK 4 1 Yr	F 3 1 Yr	OK 1 Yr	OK 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Ammonium Hydroxide 5%	100°F	F 3, 4 6 Mo			F 3, 4, 7 1 Mo		
Ammonium Hydroxide 10%	100°F	OK 4, 7 1 Yr	F 3, 4 9 Mo	OK 4, 7 1 Yr	F 3, 4, 7 2 Mo	F 3 1 Mo	F 3, 4 1 Mo
Ammonium Hydroxide 29%	100°F	F 3, 4 2 Mo				F 3, 4 1 Mo	F 3, 4 1 Mo
Ammonium Perchlorate 10%	150°F	OK 4 1 Yr	OK 4 1 Yr			OK 1 Yr	OK 4 1 Yr
Ammonium Sulfate 8%	150°F	OK 4 1 Yr		OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	
Ammonium Sulfide 100%	100°F	OK 4 1 Yr				OK 4, 7 1 Yr	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

TD-3 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Barium Nitrate 50%	150°F	OK 4 1 Yr				OK 4 1 Yr	
Barium Sulfide 20%	150°F	OK 4 1 Yr		F 4, 6 9 Mo		F 3 1 Yr	
Benzaldehyde	100°F	F 5 1 Wk				OK 1, 4 1 Yr	
1,4-Butanediol	150°F	OK 4 1 Yr				OK 4,7 1 Yr	
n-Butylacrylate	100°F	F 3, 4 1 Mo				OK 4, 7 1 Yr	
n-Butylamine	100°F	F 5 24 H				F 5 24 H	
Butyl Alcohol	Ambient					OK**	
Butyl Glycidyl Ether	100°F	F 2 1 Da				OK 4 1 Yr	
Butyraldehyde	100°F	OK 7 1 Yr				OK 7 1 Yr	
Butyric Acid 5%	100°F	OK 1 1 Yr		F 1, 3 6 Mo		OK 4 1 Yr	
Butyric Acid 50%	100°F	F 2, 3 1 Wk		F 2, 4, 7 1 Wk		F 3, 4, 7 1 Mo	
Butyric Acid 98%	100°F	F 2 24 H	F 2 24 H	F 6 6 Mo	F 6 6 Mo	OK 7 1 Yr	OK 1 Yr
Butyric Acid 98%	150°F	F 2 24 H	F 6 2 Wk	F 6 2 Wk		OK 7 1 Yr	OK 7 1 Yr
Calcium Hydroxide 50%	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Caproic Acid 98%	100°F	F 2 24 H				OK 7 1 Yr	
Caproic Acid 98%	150°F	F 3, 6 4 Mo	F 1, 6 4 Mo	F 1, 6 4 Mo	F 6 6 Mo	OK 7 1 Yr	OK 1 Yr
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etchi
8 = Severe Etchi
9 = Swelling
10 = Immersion

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Carbon Disulfide	Ambient	F 2 8 Mo				F 6, 7 1 Yr	
Carbon Tetrachloride	Ambient	OK 7 1 Yr				OK 7 1 Yr	
Chlorobenzene	Ambient	F 2 1 Da				OK 7 1 Yr	
3-Chloropropene (SEE: Allyl Chloride)							
Chromic Acid 10%	150°F					OK 4 1 Yr	OK 4 1 Yr
Chromic Acid 20%	100°F	F 2, 4 24 H		F 4, 8 4 Mo		OK 4, 7 1 Yr	OK 4, 7 1 Yr
Chromic Acid 20%	150°F					OK 7 1 Yr	OK 1,4,7 1 Yr
Citric Acid 50%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Cobalt Acetate 40%	150°F	OK 1 Yr		F 6 9 Mo		F 3 1 Yr	
Cresylic Acid 100%	100°F	F 3, 8 24 H		F 3, 8 24 H		F 3, 8 24 H	
Cresylic Acid 100%	150°F	F 8 24 H		F 8 24 H		F 3, 5 1 Wk	
Cyclohexene	100°F	F 2 1 Da				OK 4, 7 8 Mo	
Cyclohexylamine	100°F	F 5 1 Da				F 4, 5, 7 2 Mo	
1,2 Dibromo-1,1 Dichloroethane	100°F	F 2 1 Da				OK 4 1 Yr	
1,2 Dibromoethane (SEE: Ethylene Dibromide)							
1,2 Dichloroethane	100°F	F 2 1 Da				F 3, 4, 7 10 Mo	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 Discoloration
5 Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Diethanolamine	100°F	OK 4, 7 1 Yr				OK 4, 7 1 Yr	
Diethanolamine	150°F	F 2,3,4,6 2 Wk	F 2,3,4,6 2 Wk	F 2, 4 24 H		F 4, 5 2 Wk	F 4, 5 2 Wk
Diethyl Ether (SEE: Ethyl Ether)							
Diethylenetriamine	100°F	F 4, 5 1 Wk				F 4, 5 1 Wk	F 5 24 H
Dimethylamine 25%	100°F	F 3, 4, 7 1 Mo				F 3 2 Wk	
Dimethylaminomethyl Phenol	100°F	OK 7 1 Yr				OK 7 1 Yr	
Dimethylaminomethyl Phenol (DMP-30)	100°F	OK 7 1 Yr				OK 7 1 Yr	
Dimethylethanolamine	100°F	F 2 24 H				OK 4 1 Yr	
Dimethylformamide	100°F	F 5 1 Da				F 5 1 Da	
2,4-Dimethylphenol (Xylenol)	150°F					F 5 2 Wk	F 5 2 Wk
Dimethylsulfoxide	100°F	F 2 1 Da				F 2 1 Da	
Ethanol	100°F	F 2 24 H		F 2 24 H		OK 4 1 Yr	
Ethyl Ether (Diethylether)	Ambient	OK 7 1 Yr				OK 4 1 Yr	
Ethylamine 70%	100°F	F 5 24 H	F 5 24 H			F 5 24 H	F 5 24 H
Ethylene Diamine	100°F	F 5 2 Wk				F 4, 5 2 Wk	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

-4457-

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating

6 = Cracked
7 = Slight Etchi
8 = Severe Etchi
9 = Swelling
10 = Delamination

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Ethylene Dibromide (1,2 Dibromoethane)	100°F	F 2 1 Da				F 4, 6, 7 1 Yr	
Ethylene Glycol	210°F					OK 1, 4, 7 1 Yr	OK 4, 7 1 Yr
Ethylene Glycol 50%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 1 Yr	OK 1 Yr
Ethylene Glycol 50%	150°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Fatty Ester (SEPTAN C-65) BASF	Ambient	OK 1 Yr		OK 1 Yr		OK 1 Yr	
Ferric Chloride 40%	150°F	OK 4 1 Yr	OK 4, 7 1 Yr			OK 4, 7 1 Yr	OK 4, 7 1 Yr
Ferric Chloride 50%	150°F	F 4, 6 1 Mo	OK 4 1 Yr	OK 4 1 Yr		OK 4 1 Yr	OK 4 1 Yr
Formaldehyde 37%	100°F	OK 4 1 Yr	OK 4 1 Yr			OK 7 1 Yr	OK 4 1 Yr
Formaldehyde 37%	150°F	F 3 8 Mo				F 3 8 Mo	
Formaldehyde 50%	100°F					OK 1 1 Yr	
Formaldehyde 50%	150°F					OK 1, 4 1 Yr	
Formic Acid 2%	100°F	OK 4 1 Yr				OK 4 1 Yr	
Formic Acid 5%	100°F	F 6 9 Mo	F 6 9 Mo	F 4, 6 9 Mo	F 4, 6 9 Mo	F 3, 4, 6 6 Mo	OK 4 1 Yr
Formic Acid 10%	100°F	F 4, 6 4 Mo				F 4, 6 4 Mo	
Formic Acid 25%	100°F	F 6, 9 4 Mo	F 6, 9 4 Mo			F 4, 5 2 Mo	F 4, 5 2 Mo
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Formic Acid 90%	100°F	F 4, 6 2 Wk				F 4, 6 2 Wk	
Furfural	100°F	F 2 24 H				F 2 2 Mo	
Furfuryl Alcohol	100°F					OK 1, 4 1 Yr	OK 1, 4 1 Yr
Gasoline 80% (unleaded) / Methanol 20%	100°F	F 2 24 H				OK 1 Yr	
Gasoline 90% / Ethanol 10%	100°F	F 2 1 Da		F 2 1 Da		OK 1 Yr	
Gasoline 90% / Methanol 10%	100°F	F 2 1 Da	F 2 1 Da			OK 7 1 Yr	OK 4 1 Yr
Gasoline 95% (unleaded) / Methanol 5%	100°F	F 2 72 H				OK 1 Yr	
Glycolic Acid 70%	150°F	OK 4 1 Yr				OK 4, 7 1 Yr	
Heat Transfer Agent (THERMINOL 55) Monsanto	120°F	OK 1 Yr				OK 1 Yr	
Heat Transfer Agent (THERMINOL 59) Monsanto	120°F	OK 1 Yr				OK 1 Yr	
Heat Transfer Agent (THERMINOL 66) Monsanto	120°F	OK 1 Yr				OK 1 Yr	
Heat Transfer Agent (THERMINOL T-60) Monsanto	120°F	OK 1 Yr				OK 1 Yr	
Heat Transfer Agent (THERMINOL VP-1) Monsanto	120°F	OK 1 1 Yr				OK 1 Yr	
Heptanoic Acid 95%	100°F	OK 1, 4 1 Yr				OK 4 1 Yr	
Heptanoic Acid 95%	150°F	F 3, 4, 7 6 Mo		F 6, 7 9 Mo		OK 7 1 Yr	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

-4457-

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating

6 = Cracked
7 = Slight Etchi
8 = Severe Etchi
9 = Swelling
10 - meation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Herbicide (BLAZER) BASF	Ambient	OK 4, 7 1 Yr		OK 4, 7 1 Yr		OK 4, 7 1 Yr	
Hydrobromic Acid 3%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Hydrobromic Acid 3%	150°F	OK 4, 7 1 Yr	F 3, 7 4 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	F 3, 4 8 Mo
Hydrobromic Acid 10%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4, 7 1 Yr
Hydrobromic Acid 10%	150°F	F 3, 4, 7 1 Yr	F 3, 4, 7 8 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4, 7 1 Yr
Hydrobromic Acid 20%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4, 7 1 Yr
Hydrobromic Acid 20%	150°F	OK 4, 7 1 Yr	OK 4, 7 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4, 7 1 Yr
Hydrobromic Acid Condensate	122°F	OK 4 1 Yr	OK 4 1 Yr			OK 4 1 Yr	OK 4 1 Yr
Hydrochloric Acid 5%	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Hydrochloric Acid 10%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Hydrochloric Acid 10%	150°F	OK 4 1 Yr		OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	
Hydrochloric Acid 20%	100°F	OK 4 1 Yr				OK 4 1 Yr	
Hydrochloric Acid 25%	100°F	F 6 8 Mo	F 6 8 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	F 6, 7 8 Mo
Hydrochloric Acid 30%	100°F	F 4,5 1 Mo	F 4,5 4 Mo			F 4, 5 1 Mo	F 4, 5 1 Mo
Hydrochloric Acid 30%	150°F					F 3, 4 1 Mo	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Hydrochloric Acid 37%	100°F	F 2 24 H				F 3, 4 3 Wk	
Hydrofluoric Acid 3%	100°F	OK 1, 4 1 Yr	F 6 8 Mo			OK 4 1 Yr	F 6 1 Yr
Hydrofluoric Acid 10%	100°F	F 3, 4, 6 1 Mo	F 4, 6 1 Mo			F 3, 4 1 Da	F 3 1 Wk
Hydrofluoric Acid 10%	150°F					F 1, 3, 6 2 Mo	F 3 24 H
Hydrofluoric Acid 20%	100°F					F 3 1 Wk	F 3 24 H
Hydrofluoric Acid 20%	150°F					F 1, 3 1 Wk	F 3 24 H
Hydrofluorosilicic Acid 10%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Hydrofluorosilicic Acid 20%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Hydrofluorosilicic Acid 25%	Ambient	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Hydrogen Peroxide 70%	100°F	F 3, 7 2 Wk				F 3, 7 2 Wk	
Hydroxylamine Sulfate 24% (BASF 584962)	150°F	F 10 1 Yr	F 3 4 Mo			OK 4 1 Yr	F 10 1 Yr
Hydroxylamine Sulfate 30% (BASF 547254)	150°F	F 10 1 Yr	F 3 6 Mo			OK 4 1 Yr	F 10 1 Yr
Hydroxylamine Sulfate 30% (BASF 584900)	150°F	F 10 1 Yr	F 3 3 Mo			OK 4 1 Yr	F 10 1 Yr
Isobutyl Acetate	100°F	F 2, 4 24 H				OK 1, 4 1 Yr	
Isopropyl Alcohol	100°F	F 2, 4 1 Wk				OK 4 1 Yr	
Isopropyl Alcohol	150°F	OK 1, 4 1 Yr				OK 1, 4 1 Yr	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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8 = Severe Etch
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Jet Fuel "A"	100°F	OK 4 1 Yr	OK 1 Yr	OK 1 Yr	OK 1 Yr	OK 1 Yr	OK 1 Yr
KYMENE Resin 367 (Hercules)	100°F	OK 4 1 Yr		OK 4 1 Yr		OK 1 Yr	
KYMENE Resin 525 (Hercules)	100°F	OK 4 1 Yr		OK 1 Yr		OK 4 1 Yr	
KYMENE Resin 557-H (Hercules)	100°F	OK 4 1 Yr		OK 4 1 Yr		OK 1 Yr	
KYMENE Resin 760-35 (Hercules)	100°F	OK 4 1 Yr		OK 1 Yr		OK 4 1 Yr	
KYMENE Resin 2399 (Hercules)	100°F	OK 4 1 Yr		OK 1 Yr		OK 1 Yr	
KYMEME Resin S-2064 (Hercules)	150°F	F 3 8 Mo				OK 4 1 Yr	
Lactic Acid 85%	Ambient	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Leachate (Landfill) NOTE: Chemical composition of leachates varies)	100°F	OK 4 1 Yr				OK 4 1 Yr	
Liquor, Black (Sulfite)	100°F	OK 4 1 Yr				OK 4 1 Yr	
Lithium Chloride 40%	150°F	OK 1 Yr		OK 1 Yr		OK 4 1 Yr	
Magnesium Hydroxide 10%	150°F	OK 4 1 Yr		OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Magnesium Hydroxide 10%	200°F	F 3 2 Mo	F 3 1 Mo	F 3, 6 1 Yr	F 3 2 Mo	F 6 8 Mo	F 3 2 Mo
Maleic Acid 50%	150°F	OK 4 1 Yr				OK 4 1 Yr	
Methacrylic Acid (Glacial)	100°F	F 2, 7 24 H	F 2 1 Wk	F 2 2 Wk	F 1,3 2 Mo	OK 4 1 Yr	OK 4 1 Yr
Methacrylic Acid (Glacial)	150°F					F 4, 5, 9 4 Mo	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Methacrylic Acid (Glacial) 5%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Methacrylic Acid 50%	150°F					F 3, 6 1 Wk	
Methanesulfonic Acid 70%	Ambient	OK 4 1 Yr				OK 4 1 Yr	
Methanesulfonic Acid 70%	100°F	OK 4 1 Yr				OK 4 1 Yr	
Methanol	100°F					F 3, 4 2 Mo	
Methene Bis 4-cyclohexylamine	100°F	OK 7 1 Yr				OK 7 1 Yr	
Methionine Hydroxy-analog (ALIMET)	150°F	F 1, 3 2 Mo	F 1, 3, 6 9 Mo			F 3, 6, 9 10 Mo	OK 4 1 Yr
Methyl Ethyl Ketone	100°F			F 5 24 H		OK 1, 4 1 Yr	
Methyl Isobutyl Ketone	100°F	F 2 24 H	F 2 24 H			OK 4 1 Yr	OK 4 1 Yr
Methylchloroformate	100°F	F 2 1 Da				F 3, 4, 7 2 Wk	
Mineral Oil	205°F	OK 1 Yr		OK 1 Yr		OK 1 Yr	
Molasses, Beet (Upjohn)	110°F	OK 4 1 Yr					
Monochloroacetic Acid 5%	100°F	OK 4 1 Yr				OK 4 1 Yr	
Monoethanolamine	100°F	F 3, 4, 6 1 Mo				F 3, 4 1 Wk	
Nitric Acid 5%	100°F	OK 4 1 Yr		OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Nitric Acid 10%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Nitric Acid 10%	150°F					F 3 4 Mo	
Nitric Acid 15%	100°F	OK 4 1 Yr	F 3, 4 1 Yr	OK 4 1 Yr	F 3, 4 1 Yr	F 3 8 Mo	OK 4 1 Yr
Nitric Acid 20%	100°F	F 1, 3, 4 6 Mo	F 2, 4 8 Mo	F 3, 4 1 Yr	F 3, 4 8 Mo	F 3, 4 8 Mo	F 3, 4 1 Yr
2-Nitropropane	100°F	F 2 1 Da					
Nonylphenol	100°F	F 2, 7 1 Yr				OK 7 1 Yr	
Nonylphenol	150°F	F 5 6 Mo		F 3 1 Yr	F 5 6 Mo	OK 1 Yr	
Octanoic Acid 100%	100°F	OK 1 Yr		OK 1 Yr		OK 1 Yr	
Octanoic Acid 100%	150°F	OK 1, 7 1 Yr		OK 7 1 Yr		OK 7 1 Yr	
n-Octyl Mercaptan	100°F	OK 1, 4 1 Yr		OK 1, 4 1 Yr		OK 1, 4 1 Yr	
n-Octyl Mercaptan	150°F	OK 1, 4 1 Yr		OK 1, 4 1 Yr		OK 1 1 Yr	
Oil, crude (Prudhoe Bay)	200°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Oil, crude	210°F	OK 4 1 Yr				OK 4 1 Yr	
Oxalic Acid 10%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Oxalic Acid 10%	150°F	OK 4 1 Yr	F 3 6 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
n-Pentanoic Acid	100°F	F 3, 4 6 Mo		OK 7 1 Yr	OK 1 Yr	OK 7 1 Yr	
n-Pentanoic Acid	150°F	F 4, 6 2 Mo	F 4, 6 2 Mo	F 4, 6 2 Mo	F 4, 6 2 Mo	OK 1 Yr	OK 1 Yr
Perchloroethylene	100°F	OK 4 1 Yr				OK 4 1 Yr	
Phenol 2%	100°F	F 2 24 H				OK 7 1 Yr	
Phenol 5%	100°F	F 2 24 H	F 2 24 H			OK 1, 4 1 Yr	OK 1, 4 1 Yr
Phenol 5%	150°F	F 2 24 H				OK 1, 4 1 Yr	
Phenol 10%	100°F	F 3 24 H				F 5 3 Wk	
Phenol 50%	100°F	F 5 24 H				F 5 24 H	
Phosphoric Acid 15%	150°F	F 3, 4 8 Mo	F 3, 4 8 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Phosphoric Acid 54%	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Phosphoric Acid 76%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Phosphoric Acid 76%	150°F	F 3, 4 4 Mo	OK 4 1 Yr	F 3, 4 4 Mo	OK 4 1 Yr	F 3, 4 1 Yr	OK 4 1 Yr
Phosphoric Acid 86%	100°F	OK 1, 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Phosphoric Acid 86%	150°F	F 3, 4 1 Yr	OK 4 1 Yr	F 3, 4 8 Mo	F 3, 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Phosphoric Acid, Super	150°F	OK 4, 7 1 Yr	OK 4, 7 1 Yr			OK 4, 7 1 Yr	OK 4, 7 1 Yr
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Phosphoric Acid, Super	200°F	F 2, 4 4 Mo	F 3, 4 2 Mo			F 3, 4, 7 9 Mo	F 2, 4, 7 8 Mo
Pickling Acids	Ambient						OK**
Potassium Chloride 50%	180°F	F 3, 4 10 Mo				F 3, 4 10 Mo	
Potassium Ferrocyanide 25%	150°F	OK 4 1 Yr				F 3, 6 1 Yr	
Potassium Hydroxide 5%	100°F	OK 4 1 Yr				OK 4 1 Yr	
Potassium Hydroxide 10%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 1, 4, 7 1 Yr	F 3, 7 8 Mo	OK 4, 7 1 Yr	OK 4 1 Yr
Potassium Hydroxide 10%	150°F	F 2, 4 6 Mo				F 4, 5, 9 6 Mo	
Potassium Hydroxide 25%	100°F	OK 4 1 Yr				F 3, 4 6 Mo	
Potassium Hydroxide 50%	100°F	OK 1, 4 1 Yr	OK 1, 4 1 Yr	F 2, 7 4 Mo	F 2, 7 4 Mo	F 2, 4, 7 4 Mo	F 2, 4, 9 4 Mo
Potassium Hydroxide 50%	150°F	F 3 8 Mo				F 3, 4, 7 3 Wk	
Potassium Hydroxide 50%	180°F	F 2, 9 1 Wk		F 2, 9 1 Wk		F 2, 9 1 Wk	
Potassium Hydroxide 44% / 35% Water Acrylic Acid 21%	100°F	OK 4 1 Yr				OK 1, 7 1 Yr	
Potassium Permanganate 5%	150°F	OK 4 1 Yr	OK 4 1 Yr	F 3 1 Wk	F 3, 8 1 Yr	OK 4, 7 1 Yr	OK 4, 7 1 Yr
Propionaldehyde	Ambient					OK 4 1 Yr	
Propionaldehyde	100°F	F 3, 4, 6 8 Mo				OK 4, 7 1 Yr	
Propionic Acid	100°F	F 2 24 H	F 2 24 H			F 6 1 Yr	F 6 1 Yr
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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TD-3 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Propionic Acid	150°F	F 2 24 H				F 3, 4 2 Mo	
Propionic Acid 5%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr		OK 4 1 Yr	OK 4 1 Yr
Propionic Acid 10%	100°F	OK 4 1 Yr				OK 4 1 Yr	
Propylene Dichloride	100°F	F 2 1 Da				OK 4 6 Mo	
Propylene Glycol Methyl Ether	100°F	F 2 24 H	F 2 24 H	F 2 24 H		OK 4 1 Yr	OK 1 Yr
Propylene Glycol Methyl Ether Acetate	100°F	F 2 24 H				OK 4 1 Yr	
PVC Feed Tank Slurry (B. F. Goodrich)	100°F	OK 1, 4 1 Yr				OK 4 1 Yr	
Raisin Feedstock Concentrate (Sunmaid)	100°F	OK 4 1 Yr					
Raisin Feedstock Concentrate (Sunmaid)	150°F	OK 4 1 Yr					
Raisin Feedstock Concentrate (Sunmaid)	180°F	F 3 6 Mo					
Silicon Fluid w/trace of hydrochloric acid (Dow Corning)	100°F	OK 1 Yr				OK 1 Yr	
Silicon Fluid w/trace of hydrochloric acid (Dow Corning)	150°F	OK 1 Yr				OK 1 Yr	
Silver Nitrate	Ambient					OK**	
Sodium Bisulfite 10%	150°F	OK 4 1 Yr	OK 4 1 Yr	OK 7 1 Yr		OK 7 1 Yr	OK 4, 7 1 Yr
Sodium Bisulfite 40%	150°F	OK 4, 7 1 Yr	OK 4, 7 1 Yr	OK 4, 7 1 Yr	OK 4 1 Yr	F 4, 6 1 Yr	OK 4, 7 1 Yr
Sodium Chlorate 50%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 1 Yr	OK 1 Yr
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Sodium Chlorate 50%	150°F	F 3, 4 1 Yr				OK 7 1 Yr	
Sodium Chloride 25%	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Sodium Chromate 50%	150°F	OK 1 Yr	F 3, 4 1 Yr		OK 4 1 Yr	OK 7 1 Yr	OK 7 1 Yr
Sodium Formate 20%	100°F	OK 4 1 Yr				OK 4, 7 1 Yr	
Sodium Hydrosulfite 10%	150°F	F 3, 10 1 Yr				OK 4, 7 1 Yr	
Sodium Hydrosulfite 25%	150°F	F 3, 10 1 Yr				OK 4 1 Yr	
Sodium Hydrosulfite 40%	150°F	F 2, 4 9 Mo	F 2 9 Mo			F 2, 4, 7 2 Mo	F 2, 4, 7 4 Mo
Sodium Hydroxide 5%	100°F	OK 4 1 Yr		OK 4 1 Yr		OK 4,7 1 Yr	
Sodium Hydroxide 5%	150°F	F 2, 3 1 Yr				F 3, 7 2 Mo	
Sodium Hydroxide 10%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Sodium Hydroxide 25%	100°F	OK 4 1 Yr				F 4, 9 6 Mo	
Sodium Hydroxide 50%	100°F	OK 4, 7 1 Yr	OK 4 1 Yr			F 2 8 Mo	F 2 8 Mo
Sodium Hydroxide 50%	150°F	F 2, 3 1 Yr				F 2, 7 3 Wk	
Sodium Hydroxide 73%	200°F	F 3 3 Wk				F 3 3 Wk	
Sodium Hypochlorite 5%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4 1 Yr
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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TD-3 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Sodium Hypochlorite 5%	150°F	OK 4, 7 1 Yr				OK 4, 7 1 Yr	
Sodium Hypochlorite 12%	150°F					F 3 1 Yr	
Sodium Sulfite 25%	100°F	OK 7 1 Yr	OK 4, 7 1 Yr	OK 7 1 Yr	OK 4, 7 1 Yr	OK 7 1 Yr	OK 7 1 Yr
Sodium Sulfite 50%	150°F	OK 1 Yr	OK 4, 7 1 Yr			OK 7 1 Yr	OK 7 1 Yr
Soy Sauce (Kikkoman)	110°F	OK 4 1 Yr					
Soy Sauce (Kikkoman)	150°F	OK 4 1 Yr					
Soy Sauce (Kikkoman)	180°F	F 3 6 Mo					
Stannous Chloride 10%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Stannous Chloride 10%	150°F	OK 4 1 Yr	F 3 4 Mo	OK 4 1 Yr	F 3 6 Mo	OK 4 1 Yr	OK 4 1 Yr
Stannous Chloride 55%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Stannous Chloride 55%	150°F	F 10 1 Yr	F 3 8 Mo	OK 4 1 Yr	F 10 1 Yr	OK 4 1 Yr	F 10 1 Yr
Stearic Acid 90%	180°F	F 3 1 Yr	F 3, 4, 6 9 Mo	OK 1 Yr		OK 1 Yr	OK 4 1 Yr
Stearic Acid 100%	180°F	OK 7 1 Yr	OK 1 Yr	OK 1 Yr		OK 1 Yr	OK 1 Yr
Sulfamic Acid 5%	100°F	OK 4 1 Yr				OK 4 1 Yr	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Sulfamic Acid 20%	100°F	OK 4 1 Yr	OK 4 1 Yr			OK 4 1 Yr	OK 4 1 Yr
Sulfamic Acid 50%	100°F	OK 4 1 Yr				OK 4, 7 1 Yr	
Sulfite (SEE: Liquor, Black)							
Sulfuric Acid 5%	150°F	OK 4 1 Yr				OK 4 1 Yr	
Sulfuric Acid 10%	150°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	F 9 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Sulfuric Acid 30%	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Sulfuric Acid 50%	100°F	F 3, 6 1 Yr	OK 4 1 Yr	F 3, 4 1 Yr	OK 4 1 Yr	F 3, 4, 6 1 Yr	OK 4 1 Yr
Sulfuric Acid 50%	150°F	F 4, 6 6 Mo	OK 4 1 Yr	F 1, 3, 4 8 Mo	OK 4 1 Yr	F 3, 4, 6 8 Mo	OK 4 1 Yr
Sulfuric Acid 60%	150°F		OK 4 1 Yr			F 4, 6 4 Mo	OK 4, 7 1 Yr
Sulfuric Acid 70%	100°F	F 3, 4, 6 8 Mo	OK 4 1 Yr	F 3, 4 8 Mo	OK 4 1 Yr	F 3, 4 1 Yr	OK 4 1 Yr
Sulfuric Acid 70%	150°F	F 3, 6 1 Yr				F 2, 4, 7 1 Yr	OK 4, 7 1 Yr
Sulfuric Acid 75%	100°F	F 2, 4 8 Mo	OK 4, 7 1 Yr	F 2, 4 1 Yr	OK 4 1 Yr	OK 1, 4 1 Yr	OK 1, 4 1 Yr
Sulfuric Acid 75%	150°F	F 2 1 Yr	OK 1, 4 1 Yr	F 6 1 Yr	F 2, 3, 4 8 Mo	F 3 1 Yr	OK 1, 4 1 Yr
Sulfuric Acid 90%	150°F	F 9 24 H				F 9 24 H	
Sulfurous Acid 2%	100°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Sulfurous Acid 6%	100°F	OK 4 1 Yr		OK 4 1 Yr		F 3, 4, 7 3 Mo	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Tall Oil	150°F	OK 4 1 Yr	OK 4 1 Yr			OK 4 1 Yr	OK 4 1 Yr
Tall Oil, Crude (Reichhold 4107)	Ambient	OK 1 Yr		OK 1 Yr		OK 1 Yr	
Tetrahydrofuran	100°F	F 5 24 H	F 5 24 H			F 4, 6 5 Mo	F 2 8 Mo
Toluene	100°F	F 2 24 H	F 2 24 H	OK 1 Yr		OK 4 1 Yr	OK 1 Yr
para-Toluenesulfonic Acid 10%	150°F	OK 4 1 Yr	F 3, 4 6 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	F 3, 4 10 Mo
para-Toluenesulfonic Acid 25%	100°F	OK 4 1 Yr				OK 4 1 Yr	
para-Toluenesulfonic Acid 25%	150°F	F 3, 4 1 Yr	F 3, 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	F 3, 4 1 Yr	F 4, 6 1 Yr
Tomato Paste	100°F	OK 4 1 Yr	OK 4 1 Yr				
Tributyl Phosphate	100°F	F 2, 7 1 Yr				OK 1, 7 1 Yr	
1,1,1-Trichloroethane	100°F	OK 1, 4 1 Yr		OK 1 Yr		OK 4 1 Yr	
Triethanolamine	100°F	OK 4, 7 1 Yr				OK 4, 7 1 Yr	
Triethylenetetramine	100°F	F 4, 5, 7 1 Wk				OK 4, 7 1 Yr	
Urea Ammonium Nitrate	100°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Urea Ammonium Nitrate	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Urea Ammonium Nitrate	200°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Urea Ammonium Nitrate	250°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Valeric Acid 5%	100°F	F 2, 4 2 Wk		F 3, 4 1 Wk		OK 1, 7 1 Yr	
Vinegar	100°F	OK 4 1 Yr	OK 4 1 Yr			OK 4 1 Yr	
Vinyl Acetate	100°F	F 2 24 H	F 2 24 H			F 5 1 Yr	F 5 1 Yr
Water, demineralized	150°F					OK 4 1 Yr	
Water, tap	150°F	OK 4 1 Yr	F 3 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Xylene	100°F	OK 7 1 Yr				OK 1 Yr	
Xylenol (2-4 Dimethylphenol)	150°F					F 5 2 Wk	F 5 2 Wk
Zinc Bromide 77%	Ambient	OK**					
Zinc Chloride, 40%	150°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

Silikal®

SILIKAL NORTH AMERICA, INC.

F4457

Chemical Resistance

of Silikal reactive resins at room temperature 73 °F (23 °C.)

Chemicals	Evaluation
Alkalis:	
Aluminium hydroxide	+
Amine	○
Ammonium hydroxide 10 %	+
Ammonium hydroxide 25 %	○
Ammonium hydroxide alcoholic	○
Potassium hydroxide 10 %	+
Potassium hydroxide 30 %	+
Potassium hydroxide 50 %	+
slaked Lime	+
Sodium hydroxide 10 %	+
Sodium hydroxide 30 %	+
Acids:	
Formic acid 10 %	○
Formic acid 40 %	–
Boric acid 3 %	+
Chromic acid 10 %	+
Chromic acid 20 %	+
Chromic acid 40 %	○
Acetic acid 10 %	+
Acetic acid 25 %	+
• Acetic acid 30 %	○
• Acetic acid 80 %	–
Fatty acid	○
Oxalic acid 10 %	+
Lactic acid 5 %	+
Lactic acid 10 %	+
Phosphoric acid 10 %	+
Phosphoric acid 20 %	+
Phosphoric acid 40 %	+
Phosphoric acid conc.	○

Chemicals	Evaluation
Acids:	
Nitric acid 10 %	+
Nitric acid 30 %	○
• Nitric acid conc.	–
Hydrochloric acid 10 %	+
Hydrochloric acid 30 %	+
Hydrochloric acid conc.	+
Sulphuric acid 10 %	+
Sulphuric acid 30 %	+
• Sulphuric acid 50 %	○
• Sulphuric acid 80 %	–
Citric acid 10 %	+
Citric acid 30 %	+
Certain acids may lead to discoloration without attacking the material	
Solvents:	
• Organic hydrocarbons	–
• Ethyl alcohol	–
Ethyl alcohol 10 %	○
Ethyl acetate	–
Gasoline regular	+
Gasoline super	○
• Benzene	–
Butyl alcohol	–
Butyl acetate	–
Chloroform	–
Cyclohexane	+
Dibutylphthalate	○
Diesel oil	+
Dioctylphthalate	○
Glycerol	○

Chemicals	Evaluation
Solvents:	
Heptane	+
Hexane	+
Isopropyl alcohol	–
Kerosene	+
White spirit	+
Methanol	–
Methylene chloride	–
Monochlorobenzene	○
n-Propylalcohol	–
n-Propylacetate	–
Ethylene perchlorate	○
Petroleum	+
Phenol	○
Styrene	○
• Carbon tetrachloride	–
• Trichlorethylene	–
• Toluene	–
• Xylene	–

Evaluation:

+ **excellent resistance** after months of contact

○ **fair resistance** after 4 hours of contact

– **poor resistance** after less than 4 hours of contact

Chemicals	Evaluation
Water and water solutions:	
Sewage	+
chlorine water	+
Formaldehyde 37 %	+
Antifreeze (contains glycol)	+
Tap water	+
Sea water	+
Sodium chloride 5 %	+
Sodium chloride conc.	+
Sodium hypochlorite 15 %	+
Sodium carbonate	+
Soap solution	+
Silicone solution	+
Water deionized	+
Water 90° C	○
hydrogen peroxide 3 %	+
hydrogen cerodixe 10 %	+
hydrogen peroxide 30 %	+
hydrogen peroxide 80 %	○
Natural and manufactured beverages:	
Beer	+
Vegetable juice	+
Milk	+
Grape juice	+
Wine	+
Whisky	○

Chemicals	Evaluation
Oils and Fats:	
Blood	+
hydraulic fluids e.g. Skydrol B 500	○
Linsead oil	+
Mineral oil	+
Olive oil	+
Castor oil	+
Crude oil	+
Lard	+
Animal fats	+
Cleaning agents:	
Gasoline	+
Household bleach	+
Spot remover	–
Soaps	+
Petroleum	+
Ammonia solution	+
Soapy water	+
Soda water	+
Turpentine	+
Mineral spirits	○

Evaluation:

+ **excellent resistance** after months of contact

○ **fair resistance** after 4 hours of contact

– **poor resistance** after less than 4 hours of contact

Chemical Resistance of Methyl Methacrylate Based Materials

This is a guide only. Chemical attack is in most cases caused by a combination of chemicals. This table shows resistance of cured acrylic resin (PMMA) to individual chemicals only.

Other resin systems, such as the RU-products, may have a substantially better chemical resistance rating.

Since various combinations of chemicals may cause different rates of attack, it is absolutely necessary to document job specifics by using the *Silikal* Questionnaire.

Neither seller nor manufacturer has any knowledge or control concerning the purchaser's use of our products. The buyer is responsible for the application and processing of our products and is also liable for observing any third party rights. Our technical advice on the use of our materials is given without obligation. Technical data concerning our products are representative values and to be used as general guidelines only.

Our technical advice and recommendations serve the aim of facilitating and furthering the work of our customers. No warranty follows from this information, because in every case the particular circumstances and proprietary rights must be considered.

INTERNATIONAL COATINGS INC.

Resilient Epoxy Flooring and Grouting Systems

PRODUCT DATA SHEET

ICO-SUPER GUARD COATING

Product Description

ICO-Super Guard Coating™ is a 100% solids, low odor epoxy coating that is our highest chemical resistant coating for use with concentrated acids, caustics and solvents. Its above-average resilience enables it to better withstand cracking from thermal shock, whether for inside or outside applications. **ICO-Super Guard Coating™** is available in our standard red, green, black or brown colors with a high gloss finish. A solvented satin finish, as well as a faster cure ("FC") version, is also available.

Applications

ICO-Super Guard Coating™ is particularly recommended as a floor and wall coating for secondary containment areas, sumps, trenches and other severely corrosive environments where maximum chemical protection is desired. It must be applied over a fresh coat of our **ICO-Primer™** epoxy primer. **ICO-Super Guard Coating™** can be used over both new and old concrete, wood and metal surfaces, both inside and outside and at temperatures down to 50°F. For higher wear applications, use our **ICO-Super Guard™ self-levelling** or **ICO-Super Guard™ trowelled** grades.

Chemical Resistance Guide

Code: HR: Recommended for constant exposure R: Recommended for moderate usage
OS: Recommended for areas where occasional spillage occurs NR: Not recommended
NMF: Not meaningful - Chemical boils below 200°F, or not run.

Chemical	Rating (21 Days @ 77°F)	Rating (8 Hours @ 200°F)	Chemical	Rating (21 Days @ 77°F)	Rating (8 Hours @ 200°F)	Chemical	Rating (21 Days @ 77°F)	Rating (8 Hours @ 200°F)
Acetic Acid - Glacial	HR	HR	Hydrogen Sulfite	HR	NMF	Picric Acid	HR	HR
Acetone	R	NMF	Iso Propyl Alcohol	HR	NMF	Sodium Hydroxide - 50%	HR	HR
Ammonium Hydroxide - 26%	HR	NMF	Lactic Acid - 50%	HR	R	Sulfuric Acid - 50%	HR	R
Butanol	HR	NMF	88%	HR	R	- 80%	HR	NR
Chlorine Water - 30%	HR	HR	Methanol	HR	NMF	- 98%	OS	NR
Chloroform	OS	NMF	Methyl Acetate	HR	NMF	Tetrachloroethylene	HR	NMF
Citric Acid - 50%	HR	R	Methylene Chloride	R	NMF	Trichloroethylene	HR	NMF
Ethanol	HR	NMF	MEK	R	NMF	1.1.1. Trichloroethylene	HR	NMF
Ethyl Acetate	HR	NMF	Nitric Acid - 10%	HR	NMF	Toluene	HR	NMF
Freon TS	HR	NMF	- 50%	R	NMF	Xylene	HR	NMF
HCL - 24%	HR	NR	- 69%	NR	NMF			
36%	HR	HR	Phosphoric Acid - 85%	HR	NMF			
Hydrogen Peroxide - 30%	HR	NR						

NOTE: *The above test data was obtained from total immersion tests. The table should be used as a guideline, as no warranty can be expressed or implied regarding the accuracy of the information given as it would apply to actual plant use.*

Physical Characteristics

Solids by Weight:	100%
Density	
Part A:	10 lbs./gal
Part B:	9.5 lbs./gal
Mixed:	9.85 lbs./gal
Viscosity	
Part A:	11,400 cps
Part B:	640 cps
Mixed:	6,900 cps
Mixing Ratio	
By Volume (A:B):	3.5:1
By Weight (A:B):	3.8:1
Pot Life (at 75°F):	30 mins.
Curing Times (at 75°F)	
Tack-free Time:	3 hours
Lite Traffic:	6-8 hours
Heavy Traffic:	48 hours
Full Chemical Cure:	7 days
Shelf Life:	12 months
Hardness (Shore D):	75
60° Gloss:	108
Direct Impact:	ok at 70 in lbs
Cross Hatch Adhesion:	no loss
Tensile Elongation (D638):	10%
Conical Mandrel:	no loss on ½" bend

NOTE: Above properties are for ICO-Super Guard Red Coating™. Properties will vary slightly according to color

INTERNATIONAL COATINGS INC.

Resilient Epoxy Flooring and Grouting Systems

PRODUCT DATA SHEET

ICO-SUPERGUARD

Production Description

ICO-SuperGuard™ is our highest performing epoxy flooring, formulated to withstand attack not only from the most aggressive acids and bases used in industry, but also from such solvents as methylene chloride, MEK, acetone, and methanol. It is a solvent-free, low odor product that, when used with our blended ICO-Fill™ aggregate, can be trowelled down, applied as a self-levelling floor, or as a thin film coating. It is a resin-rich system that does not need to be coated and that has extremely good adherence. ICO-SuperGuard™ comes in our standard red, brown and green colors.

Applications

ICO-SuperGuard™, with its wide range of chemical resistance, along with its ability to withstand spalling from thermal and mechanical shock, is the ideal choice for containment areas in tank farm operations, chemical waste and solvent recycling treatment centers and other such operations that must comply with EPA regulations for containment of hazardous materials. Other recommended applications include water waste treatment facilities, acid etching and metal plating lines and other such operations where maximum chemical protection of floors is a must.

Chemical Resistance Guide

Code. HR: Recommended for constant exposure R: Recommended for moderate usage
OS: Recommended for areas where occasional spillage occurs NR: Not recommended
NMF: Not meaningful - Chemical boils below 200°F, or not run.

Chemical	Rating (21 Days @ 77°F)	Rating (8 Hours @ 200°F)	Chemical	Rating (21 Days @ 77°F)	Rating (8 Hours @ 200°F)	Chemical	Rating (21 Days @ 77°F)	Rating (8 Hours @ 200°F)
Acetic Acid - Glacial	HR	HR	Hydrogen Sulfite	HR	NMF	Picric Acid	HR	HR
Acetone	R	NMF	Iso Propyl Alcohol	HR	NMF	Sodium Hydroxide - 50%	HR	HR
Ammonium Hydroxide - 26%	HR	NMF	Lactic Acid - 50%	HR	R	Sulfuric Acid - 50%	HR	R
Butanol	HR	NMF	- 88%	HR	R	- 80%	HR	NR
Chlorine Water - 30%	HR	HR	Methanol	HR	NMF	- 98%	OS	NR
Chloroform	OS	NMF	Methyl Acetate	HR	NMF	Tetrachloroethylene	HR	NMF
Citric Acid - 50%	HR	R	Methylene Chloride	R	NMF	Trichloroethylene	HR	NMF
Ethanol	HR	NMF	MEK	R	NMF	I.I.I. Trichloroethylene	HR	NMF
Ethyl Acetate	HR	NMF	Nitric Acid - 10%	HR	NMF	Toluene	HR	NMF
Freon TS	HR	NMF	- 50%	R	NMF	Xylene	HR	NMF
HCL - 24%	HR	HR	- 69%	NR	NMF			
- 36%	HR	HR	Phosphoric Acid - 85%	HR	NMF			
Hydrogen Peroxide - 30%	HR	NR						

NOTE: The above test data was obtained from a total immersion tests. The table should be used as a guideline, as no warranty can be expressed or implied regarding the accuracy of the information given as it would apply to actual plant use.

Physical Characteristics

Density (lbs/gal)
- Part A: 9.7
- Part B: 9.3
- Parts A & B Mixed: 9.6

Viscosity (Liquid Mix): Pourable

Mixing Ratios

Kit:
Empty Contents of Container A, Container B, and 100 pounds of ICO-Fill

Mixing Ratios (approximate)

Bulk Packs Only:

By Volume
- Part A:Part B: 3.:1

By Weight
- Part A:Part B: 3.:1
- ICO-Fill: Liquid Mix: 4:1

NOTE: See reverse side for exact weights.

Coverage (theoretical):
- Filled System: 6.4 SF per gallon per 1/4" thickness

Shelf Life at 77 deg. F: 12 months
Pot Life of Liquid A & B Mixed at 77 deg. F: 1.5 hours
Working Time of Filled Mix at 77 deg. F: 2 hours

Curing Time at 77 deg. F
- Life Traffic: 18-24 hours
- Heavy Traffic: 48-72 hours
- Maximum Chemical Resistance: 7 days

Physical Test Data (Based on Trowellable Mix)

Tensile Strength (ASTM C307)	878 psi
Percent Elongation (unfilled) (D638)	10.0%
Flexural Strength (C580)	1465 PSI
Compressive Yield (C579)	4584 PSI

CHEMICAL RESISTANCE

-4457-

This chart is to be used in conjunction with the Tnemec Chemical Resistance Guide which explains abbreviations and provides information on chemical resistance. Contact your Tnemec representative for further information and technical data.

AUGUST 198

Tnemec Co.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 104	Series 120
Acetic Acid (10%)	OC	OC	FC	FC	FC	IS
Acetic Anhydride	NT	FC	FC	OC	FC	NT
Acetone	NR	OC	OC	OC	OC	NT
Activated Carbon	NT	NT	IS	FC	IS	IS
Adipic Acid (Dry)	FC	NT	FC	OC	FC	NT
Aluminum Chloride (25%)	NT	NT	FC	OC	FC	FC
Aluminum Nitrate (50%)	NT	NT	FC	FC	FC	IS
Aluminum Sulfate (49%)	NT	FC	FC	FC	FC	IS
Ammonium Chloride (50%)	NT	FC	FC	FC	FC	IS
Ammonium Hydroxide (10%)	OC	IS	IS	IS	IS	FC
Ammonium Hydroxide (28%)	OC	IS	IS	FC	FC	FC
Ammonium Nitrate (38%)	NT	IS	IS	FC	IS	NT
Ammonium Phosphate (50%)	NT	IS	IS	IS	IS	NA
Ammonium Sulfate (65%)	FC	IS	IS	IS	IS	IS
Amyl Acetate	NR	NR	FC	OC	FC	NT
Aviation Gas 100/130	NT	NT	IS	NT	NT	NA
Barium Chloride (50%)	NT	FC	FC	FC	FC	IS
Benzene	NR	OC	IS	FC	FC	NT
Boric Acid (5%)	FC	IS	IS	IS	IS	IS
n-Butyl Alcohol	NR	OC	IS	OC	FC	FC
n-Butyl Acetate	NR	NR	FC	OC	FC	NT

Chemical resistance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests accurately represent all environments.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 104	Series 120
Butyl Cellosolve ®	NR	NR	FC	OC	FC	FC
Calcium Chloride (50%)	FC	FC	IS	FC	IS	IS
Calcium Hypochlorite (5%)	FC	IS	IS	IS	IS	IS
Chromic Acid (10%)	FC	FC	FC	FC	FC	IS
Citric Acid (50%)	FC	FC	IS	IS	IS	IS
Coal Oil	NR	IS	IS	IS	IS	IS
Copper Sulfate (50%)	FC	FC	IS	NT	IS	IS
Corn Mash Solution	NR	FC	IS (120 F.)	FC	FC	NA
Cyclohexane	NR	IS	IS	IS	IS	NA
n-Decyl Alcohol	NR	OC	IS	OC	FC	NT
Diesel Oil HD #2	NR	IS	IS	IS	IS	IS
Diethanolamine	FC	FC	IS	FC	IS	NR
Ethyl Alcohol	NR	FC	IS	FC	IS	FC
Ethylene Glycol	FC	FC	IS	IS	IS	NA
Furfuryl Alcohol	NT	NR	OC	OC	OC	FC
Gasoline - Leaded	NR	NT	IS	NT	IS	NA
Gasoline - Unleaded	NR	NT	IS	NT	IS	NA
Gasoline - Gasohol	NR	NR	IS	OC	IS	NT
Grease	FC	FC	IS	FC	IS	NA
Glycerin	FC	IS	IS	IS	IS	NA
Heptane	FC	IS	IS	IS	IS	NA
Hexane	FC	IS	IS	IS	IS	NA
Hydraulic Fluid	NR	IS	IS	IS	IS	NA

Chemical resistance results were obtained in a controlled environment and Thermec Company makes no claim that these tests accurately represent all environments.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 104	Series 120
Hydrochloric Acid (10%)	FC	FC	FC	FC	FC	IS (150 F
Hydrochloric Acid (30%)	FC	FC	FC	FC	FC	IS
Hydrochloric Acid (37%)	FC	FC	FC	FC	FC	FC
Hydrofluoric Acid (10%)	NR	NR	OC	NR	OC	FC
Hydrogen Peroxide (30%)	FC	FC	IS	FC	FC	NA
Isobutyl Alcohol	NR	OC	IS	OC	FC	FC
Isooctyl Alcohol	NR	OC	IS	OC	FC	FC
Isopropyl Alcohol	NR	FC	IS	FC	IS	FC
Isopropyl Acetate	NR	NR	FC	OC	FC	FC
JP-4 Aviation Fuel	NT	NT	IS	NT	NT	NA
JP-5 Aviation Fuel	NT	NT	IS	NT	NT	NA
Jet A Fuel	NT	NT	IS	NT	NT	NA
Kerosene	OC	NA	IS	IS	IS	NA
Lactic Acid (10%)	FC	FC	IS	FC	FC	IS
Lactic Acid (85%)	FC	OC	FC	FC	FC	IS
Lime Slurry	FC	IS	IS	IS	IS	NT
Linseed Oil	FC	IS	IS	IS	IS	NT
Magnesium Chloride (50%)	NT	FC	IS	FC	IS	IS
Magnesium Hydroxide (50%)	OC	IS	IS	IS	IS	FC
Methyl Alcohol	NR	NR	FC	OC	FC	FC
Methyl Ethyl Ketone	NR	NR	OC	OC	OC	FC
Methyl Propyl Ketone	NR	OC	FC	OC	FC	NA
N-Methyl-2-Pyrolidone	NR	NR	OC	NR	OC	NA

Chemical resistance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests accurately represent all environments.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 104	Series 120
Mineral Spirits	FC	IS	IS	IS	IS	NA
Naptha	FC	FC	IS	IS	IS	NA
Nitric Acid (10%)	FC	OC	OC	OC	OC	IS
n-Octyl Alcohol	NR	OC	IS	OC	FC	FC
Oxalic Acid (10%)	FC	FC	FC	FC	FC	IS
Perchloroethylene	NR	FC	IS	FC	OC	NA
Phosphoric Acid (10%)	FC	FC	FC	FC	FC	IS (150 F
Phthalic Acid (90%)	FC	FC	FC	FC	FC	IS
Potassium Hydroxide (10%)	FC	FC	IS	IS	IS	FC
n-Propyl Alcohol	NR	OC	IS	OC	FC	FC
Propylene Glycol	OC	FC	IS	FC	IS	NA
Sodium Bisulfate (30%)	FC	FC	FC	FC	FC	IS
Sodium Carbonate (30%)	FC	IS	IS	IS	IS	NA
Sodium Carbonate Slurry	FC	IS	IS	IS	IS	NT
Sodium Chloride (10%)	FC	IS	IS	IS	IS	NA
Sodium Chloride (20%)	FC	IS	IS	IS	IS	NA
Sodium Chromate (50%)	NT	NT	FC	NT	FC	IS
Sodium Formate	NT	NT	NT	NT	NT	IS
Sodium Hydrosulfide (72%)	NT	NT	FC	NT	NT	IS
Sodium Hydrosulfite (10%)	NT	NT	NT	NT	NT	IS
Sodium Hydroxide (10%)	FC	IS	IS (150 F.)	IS	IS	FC
Sodium Hydroxide (50%)	OC	IS	IS (150 F.)	IS	IS	FC
Sodium Hypochlorite (5%) (Bleach)	FC	FC	FC	FC	FC	IS

Chemical resistance results were obtained in a controlled environment and Tremec Company makes no claim that these tests accurately represent all environments.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 1041	Series 120
Sodium Silicate	NT	NT	NT	NT	NT	IS
Sodium Sulfate (6%)	FC	IS	IS	IS	IS	NA
Sodium Thiosulfate (30%)	NT	NT	FC	NT	FC	IS
Sodium Tripolyphosphate	FC	IS	IS	IS	IS	NA
Sour Crude	OC	IS	IS (150 F.)	IS	IS	IS
Sweet Crude	OC	IS	IS (150 F.)	IS	IS	IS
Soybean Oil	FC	IS	IS	IS	IS	NA
Sulfuric Acid (10%)	FC	FC	FC	FC	FC	IS
Sulfuric Acid (30%)	FC	FC	FC	FC	FC	IS
Sulfuric Acid (50%)	OC	OC	OC	OC	OC	IS
Styrene	NR	NR	FC	NR	OC	IS
Tannic Acid	FC	IS	IS	IS	IS	IS
Toluene	NR	FC	IS	FC	IS	NA
Transmission Fluid	NR	IS	IS	IS	IS	IS
1.1.1-trichloroethane	NR	FC	IS	OC	FC	FC
Trisodium Phosphate (20%)	FC	FC	IS	FC	IS	IS
Turpentine	OC	IS	IS	IS	IS	NA
Vinegar	FC	OC	FC	FC	FC	IS
Water, Distilled	FC	IS	IS (200 F.)	IS	IS	NA
Water, Fresh	IS	IS	IS (200 F.)	IS	IS	NR
Water, Sea	IS	IS	IS	IS	IS	NA
Water, Sewage	NR	IS	IS	IS	IS	IS
Xylene	NR	FC	IS	FC	IS	NA

Chemical resistance results were obtained in a controlled environment and Thermec Company makes no claim that these tests accurately represent all environments.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 104	Series 120
Zinc Chloride (40%)	NT	FC	IS	FC	FC	IS

Chemical resistance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests accurately represent all environments.

We live in a chemical world. Tens of thousands of chemicals are on the market and hundreds more are added every year. There is no universal coating that can tolerate all those chemicals. That's why choosing the correct coating or lining is so difficult. What's more, a company may have several micro-environments within its walls—each requiring a different type of coating.

Of course, the most important factor in coating selection is whether the coating can withstand attack by the chemical to which it is exposed. A pocket in the back of this guide includes a chart outlining resistance of specific Tnemec coatings to different chemicals.

Chemical resistance is not the only factor to consider in coating selection. Some others are: temperature resistance, flexibility, adhesion, toxicity, moisture vapor transmission, scrubbability, pot life, drying and curing time, method and ease of application, resistance to abrasion and impact. Flash point is also an important consideration as is solids-by-volume which gives an indication of coverage potential, volatile solvent content and value. Lastly, the life-cycle cost—not just initial cost—of the coating should be weighed.

Information to aid coating selection is available from:

- Tnemec Company, Inc. product data sheets
- National Association of Corrosion Engineers (NACE) publication Corrosion Prevention by Protective Coatings by Charles G. Munger

High-solids Epoxy.

Amine-cured epoxy coating offers excellent corrosion and chemical resistance to both acids and bases. Provides exceptional adhesion, and solvent and abrasion resistance. High-solids, two-component formula with over 80% solids-by-volume assures excellent coverage and value. Beige and gray high-gloss finish.

Vinyl-Copolymer Coating.

A proven, high performance, one-component coating that provides good corrosion resistance for long-term protection. Dries quickly, has good flexibility, repairs easily, and can be applied in low ambient temperatures (35 F. minimum). USDA approved for incidental contact. Available in select Tnemec CHROMACOLORS.

High-solids Amine-cured Epoxy.

High-solids (over 80%) formula with high-build characteristics (up to 10 mils) provides extraordinary protection, often with a single coat. Delivers strong chemical, corrosion, abrasion and stain resistance. Two-component formula is available in Tnemec CHROMACOLORS. Select colors meet USDA requirements for incidental contact.

Epoxy-Polyamide Coating.

Hi-build characteristic delivers excellent protection over properly primed steel and concrete surfaces. Two-component formula delivers exceptional corrosion, abrasion and moisture resistance. Select colors USDA approved for incidental contact. CHROMACOLORS available. Semi-gloss finish.

Vinyl-Ester Coating.

Premium high-solids coating (theoretical 92% solids-by-volume mixed) is especially formulated for lining tanks and vessels holding acid solutions. Two-component formula offers exceptional wet and dry temperature resistance. Available in beige (primer) and gray (finish coat).

High-build Coal Tar-Epoxy.

Provides exceptional adhesion and chemical resistance—especially to alkali and salt solutions. Good abrasion resistance. High-build, two-component formula permits dry film thickness up to 20 mils for one-coat coverage, one-coat savings. Black semi-gloss finish only.

62-1400 SEAM SEALER, 63-1500 FILLER/SURFACER.

Two-component, epoxy-polyamine products include solventless, non-shrinking seam sealer and filler/surfacer. Both develop high bond strength and outstanding resistance to water. Knife or trowel-grade products seal seams, rivet and bolt heads and faying surface edges. Also used to fill and patch voids and pits. For interior or exterior use.

120-5003 VINESTER F & S.

Vinyl-ester filler and surfacer offers outstanding bond strength for use in heavy service areas and wet or corrosive environments. Two-component, trowel-grade product patches, fills and surfaces concrete.

The Tnemec chart in the pocket at right will provide information for matching the performance of specific Tnemec coatings to expected chemical exposure. It is a compilation of Tnemec product testing to date and will be periodically revised as new data becomes available.

The chart is only a guide. Combinations of chemicals can have a completely different effect on coating performance than the chemicals separately. To be sure of a coating's performance, ask your Tnemec representative for a panel or coupon for testing.

IS

IS-IMMERSION SERVICE.
Suitable for continuous contact with chemical at 70-100 F. temperature. (Higher temperatures may be indicated for insulated tanks.) Coating will show no effect except slight softening or color change after six months continuous immersion.

FC

FC-FREQUENT CONTACT.
Suitable for frequent splash or prolonged exposure to concentrated vapors. The coating will show no effects except slight softening or color change after eight hours continuous immersion in the liquid chemical or 72 hours exposure to the vapor.

OC

OC-OCCASIONAL CONTACT.
Suitable for occasional splash and spillage or occasional exposure to concentrated vapors. The coating shows no effects, except slight softening or color changes, following short exposure to splash or spillage which evaporates, is hosed off, or dried overnight or, 24 hours exposure to vapor.

NA

NA—NOT APPLICABLE.
This designation makes no statements regarding chemical resistance. The coating may in fact do the job, but other systems are judged more applicable.

NR

NR—NOT RECOMMENDED.
Suitable for mild concentrations of vapors only.

NT

NT—NOT TESTED.

This guide is for reference only and is not intended to provide complete information concerning product application, preparation or safety. Tnemec Company, Inc. does not accept responsibility for any methods discussed in this publication. The use of materials and methods is solely at the risk of the user.

Chemical resistance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests accurately represent all environments.

CHEMICAL RESISTANCE GUIDE

Standard

The purpose of this guide is to aid in determining the potential value of STONKOTE GS4 when exposed to the damaging effects of corrosive chemical environments.

RATING CODE

E—Excellent
G—Good
NR—Not Recommended
OS—Suitable for use where "occasional spillages" occur, when flushing with water immediately follows.

-4457-

ACIDS

	RATING
Acetic—5%	G
Acetic—20%	OS
Acetic—Glacial	NR
Benzoic—Sat. 3%	E
Boric—Sat. 30%	E
Butyric—10%	OS
Chromic—10%	G
Chromic—20%	OS
Citric—50%	E
Cresylic	OS
Diglycolic	G
Fatty	G
Formic—up to 10%	OS
Fluoboric	G
Heptanoic	OS
Hydrochloric—15%	G
Hydrochloric—37%	OS
Hydrofluoric—5%	G
Hydrofluoric—10%	OS
Hypochlorous—5%	E
Lactic—up to 20%	OS
Maleic—30%	G
Maleic—40%	OS
Malic—50%	G
Nitric—10%	G
Nitric—30%	OS
Oleic	G
Oxalic—Sat.	E
Perchloric—35%	G
Phosphoric—up to 50%	OS
Picric—Sat.	E
Phthalic	G
Succinic—Sat.	E
Sulfuric—20%	E
Sulfuric—50%	G
Sulfuric—70%	OS
Tannic—Sat.	G
Tartaric—Sat.	E

ALKALIES AND SALTS

STONKOTE GS4 is rated Good to Excellent when exposed to most alkalies and salts.

SOLVENTS AND OTHER CHEMICALS

	RATING
Acetone	NR
Alcohol (Methyl)	OS
Alcohol (Ethyl, Propyl, Isopropyl, Butyl)	E
Benzene	OS
Carbon Tetrachloride	OS
Corn Oil	E
Cyclohexane	G
Diacetone Alcohol	OS
Ethylene Glycol	G
Ether	OS
Formaldehyde	G
Gasoline	E
Glycerine	E
Hydrogen Peroxide—10%	OS
JP5 Jet Fuel	G
Juices—Fruit	E
Juices—Vegetable	E
Lard	G
Linseed Oil	G
Methyl Ethyl Ketone	NR
Methylene Chloride	NR
Milk	E
Mineral Spirits	G
Naphtha	OS
Oils—Cutting	G
Oils—Mineral	E
Oils—Vegetable	G
Perchloroethylene	OS
Skydrol	G
Sucrose—Sat. (Sugar)	E
Toluene	OS
Trichloroethylene	NR
Urea	G
Vinegar (Household)	G
Water	E
Xylene	OS

Note: *This data is based on laboratory tests performed under carefully controlled conditions. (All solutions are at ambient temperatures.) No warranty can be expressed nor implied regarding the accuracy of this information as it will apply to actual plant operation or jobsite use. Plant operations and jobsite uses vary widely, and the individual results obtained are affected by the specific conditions encountered, which are beyond our control.*

CHEMICAL RESISTANCE GUIDE

StonHard

The purpose of this guide is to aid in determining the potential value of STONKOTE HT4 when exposed to the damaging effects of corrosive chemical environments.

RATING CODE

E—Excellent
G—Good
NR—Not Recommended
OS—Suitable for use where "occasional spillages" occur, when flushing with water immediately follows.

ACIDS

	RATING
Acetic—15%	E
Acetic—50%	OS
Acetic—Glacial	NR
Benzoic—Sat. 3%	E
Boric—Sat. 30%	E
Butyric—10%	OS
Chromic—10%	E
Chromic—40%	OS
Citric—50%	E
Cresylic	OS
Diglycolic	G
Fatty	E
Formic—up to 10%	G
Fluoboric	G
Heptanoic	OS
Hydrochloric—Conc.	E
Hydrofluoric—15%	E
Hypochlorous—5%	E
Lactic—up to 20%	E
Maleic—30%	E
Maleic—40%	G
Malic—50%	E
Nitric—10%	G
Nitric—30%	OS
Oleic	G
Oxalic—Sat.	E
Perchloric—35%	G
Phosphoric—up to 50%	G
Picric—Sat.	E
Phthalic	G
Succinic—Sat.	E
Sulfuric—20%	E
Sulfuric—50%	G
Sulfuric—70%	OS
Tannic—Sat.	E
Tartaric—Sat.	E

ALKALIES AND SALTS

STONKOTE HT4 is rated Good to Excellent when exposed to most alkalies and salts.

SOLVENTS AND OTHER CHEMICALS

	RATING
Acetone	OS
Alcohol (Methyl)	G
Alcohol (Ethyl, Propyl, Isopropyl, Butyl)	G
Benzene	E
Carbon Tetrachloride	E
Corn Oil	E
Cyclohexane	E
Diacetone Alcohol	E
Ethylene Glycol	E
Ether	OS
Formaldehyde	E
Gasoline	E
Glycerine	E
Hydrogen Peroxide—10%	E
JP5 Jet Fuel	E
Juices—Fruit	E
Juices—Vegetable	E
Lard	G
Linseed Oil	E
Methyl Ethyl Ketone	G
Methylene Chloride	NR
Milk	E
Mineral Spirits	E
Naphtha	E
Oils—Cutting	E
Oils—Mineral	E
Oils—Vegetable	G
Perchloroethylene	E
Skydrol	G
Sucrose—Sat. (Sugar)	E
Toluene	E
Trichloroethylene	G
Urea	E
Vinegar (Household)	E
Water	E
Xylene	E

Note: *This data is based on laboratory tests performed under carefully controlled conditions. (All solutions are at ambient temperatures.) No warranty can be expressed nor implied regarding the accuracy of this information as it will*

SPRAY-CURE CONCRETE CONSTRUCT CHEMICALS

SPRAY-CURE & SEAL (ACRYLIC TYPE)

-4457-

DESCRIPTION:	Clear liquid membrane-forming compound for use as an effective curing compound for new concrete and as an effective sealing compound for new or existing concrete. Has the advantage of providing a seal with the minimum effect on the color of the concrete. Yellowing with age is minimal.
COMPOSITION:	A blend of acrylate copolymer with aliphatic and aromatic solvents.
FLASH POINT:	105 degrees F.
NON-VOLATILE %:	20% minimum.
WT. PER GALLON:	6.87 ppg.
USE:	As a curing compound Spray-Cure & Seal effectively seals water inside the fresh concrete, allowing more complete curing and hardening. As a sealer this product forms a tough, long-lasting, flexible film on the surface of the concrete to keep out salt and freezing water, dirt, grease and oil. This makes for easier clean-up. Concrete treated with Spray-Cure & Seal resists spalling and dusting. Will not interfere with subsequently applied resilient flooring materials. Check with manufacturer for compatibility with other subsequent surface treatments. May be used outdoors or indoors. Provides a medium gloss clear finish. Yellowing with age is minimal.
APPLICATION:	Spraying preferred. May also be applied with brush or roller.
COVERAGE:	Depends upon condition of concrete surface. For use as a curing compound and/or sealer on new concrete, use at 200 sq. ft. per gallon. For use as a sealer on new or old concrete the rate will vary between 200 and 500 sq. ft. per gallon.
DRYING RATE:	This depends upon temperature, humidity and coverage rate. Generally this product will be dry to touch in one hour at 70 degrees F. Open to light traffic in 8 hours. Allow 12 hours before opening to heavy traffic.
CLEAN-UP:	Use Kleen-Sol equipment cleaning solvent.
PRECAUTIONS:	CAUTION: Contains petroleum distillate. Harmful or fatal if swallowed. Combustible. Skin and eye irritant. Keep away from heat, sparks and open flame. Avoid contact with skin, eyes and clothing. If contacted: flush eyes with water for 15 minutes. Contact physician. Wash from skin with soap and water. If swallowed do not induce vomiting. Call a physician immediately.
SPECIFICATIONS:	Meets or exceeds ASTM-C309 Type 1; TTC-800A Type 1, Class 1.
PACKAGING:	One gallon can (6 per case), 5 gallon pail and 55 gallon drum.

THE MURPHY-PHOENIX COMPANY
P.O. BOX 22930 • BEACHWOOD, OHIO 44122 • (216) 831-0404

SECTION D - PROCESS INFORMATION

ATTACHMENT D-1

RCRA STORAGE UNIT	FLOOR COATING
1. Building 56 (CP Storage Warehouse)	Vulkem
2. Building 81 (Plant 9)	Surtreat
3. Pilot Plant Warehouse (Building 68)	Herculite sheeting
4. Building 79 (Plant 6)	Surtreat
5. KC-2 Warehouse:	
Bays 1-4, & 8	Vulkem
Bays 5, 6, & 7	Stonhard
6. Plant 1 Pad:	
2-450' X 90' Tension Support Structures (TS-4) and (TS-5)	Auto-gard II

Section D - Process Information

ATTACHMENT D-2

BUILDING 56

Secondary Containment Dimensions:

- (13'-2")(45'-6") = (13.16)(45.5) = 598.78 ft^2
- $\frac{(4'-1")(4'-1")}{2} = \frac{(4.08)(4.08)}{2} = 8.32\ ft^2$
- (4'-1")(41'-5") = (4.08)(41.41) = 168.95 ft^2
- (14'-7")(45'-6") = (14.58)(45.5) = 663.39 ft^2
- $\frac{(4'-1")(4'-1")}{2} = \frac{(4.08)(4.08)}{2} = 8.32\ ft^2$
- (4'-1")(41'-5") = (4.08)(41.41) = 168.95 ft^2
- (44'-9½")(45'-6") = (44.75)(45.5) = 2,036.12 ft^2
- (13'-7½")(44'-0") = (13.58)(44.0) = 597.52 ft^2
  597.52 - (1.5) (13.83) =
  597.52 - 20.74 = 576.78 ft^2
- (45'-7")(45'-6") = (45.58)(45.5) = 2,073.89 ft^2
- (16'-11")(45'-6" - 6'-1") = (16.91)(39.41) = 666.42 ft^2
- (3'-1")(45'-6" - 6'-1") = (3.08)(39.5) = 121.66 ft^2
- (3'-3")(39'- 5" - 1'-3") = (3.25)(40.66) = 132.14 ft^2
- $\frac{(9'-10")(6'-3")}{2} = \frac{(9.83)(6.25)}{2} = 30.71\ ft^2$
- (9'-10")(40'-8" - 6'-3") = (9.83)(34.41) = 338.25 ft^2
- $\frac{(4'-1")(4'-1")}{2} - \frac{(0'-6")(4'-1")}{2} =$

  $\frac{(4.08)(4.08)}{2} - \frac{(.5)(4.08)}{2} = 8.32 - 1.02 = 7.30\ ft^2$
- (19'-10")(3'-7") = (19.83)(3.58) = 70.99 ft^2
- (15'-11 3/4")(3'-7") = (16.0)(3.58) = 57.28 ft^2

TOTAL AREA: 7,728.23 ft^2

BUILDING 56 (Continued)

Secondary Containment Calculations:

- Volume of Dike: 7,728.0 x .5 = 3,864 ft^3

- Maximum Container Gallons: 2,112 containers x 55 gallons = 116,160 gallons capacity

- 10% of Maximum Container Gallons: 11,616 gallons

- Conversion to Cubic Feet: $\frac{11,616}{7.48}$ = 1,552.94 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (132 pallets)(2.76 ft^3) = 364.32 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0

  Total pallet and column volume = 364.32 ft^3 + 0.0 = 364.32 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  3,864.0 - 364.32 = 3,500.0 ft^3

Conclusion: The CP Storage Warehouse (Building 56) has 3,500.0 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, the CP Storage Warehouse has sufficient capacity to contain 10 % of the volume of containers (1,553.0 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

KC-2 WAREHOUSE, BAY 1

Secondary Containment Dimensions:

- A (55'-3" - 4-11")(10'-11" + 4'-10" + 8") = (50.33)(15'-9" + 8") = (50.33)(16'-5") = (50.33)(16.41) = 825.91 ft^2
- B (10'-11")(4'-11") = (10.91)(4.91) = 53.56 ft^2
- C (4'-1")(8") = (4.08)(.66) = 2.69 ft^2
- D $\frac{(4'-1")(4'-2")}{2} = \frac{(4.08)(4.16)}{2} = 8.48\ ft^2$
- E (10")(4'-1") = (8.3)(4.08) = 3.38 ft^2
- F (60'-6" - 9'-4")(55'-3") = (51.16)(55.25)(55.25) = 2,826.59 ft^2
- G (20'-7" + 1'-0")(6'-4") = (21'-7")(6'-4") = (21.58)(6.33) = 136.60 ft^2
- H (20'-7")(3'-0") = (20.58)(3.0) = 61.74 ft^2
- I $\frac{(10'-3")(6'-4")}{2} = \frac{(10.25)(6.33)}{2} = \frac{64.88\ ft^2}{2} = 32.44\ ft^2$
- J (6'-4")(1'-0") = (6.33)(1.0) = 6.33 ft^2
- K (8'-9")(6'-4") = (8.75)(6.33) = 55.38 ft^2
- L (8")(6'-4") = (0.66)(6.33) = 4.17 ft^2
- M (6'-4" - 4'-1")(4'-2") = (2.08)(4.16) = 8.65 ft^2
- N (8'-9")(3.0) = (8.75)(3.0) = 26.25 ft^2
- O (8")(6'-4") = (.66)(6.33) = 4.17 ft^2
- $\frac{(4'-2")(4'-1")}{2} = \frac{(4.16)(4.08)}{2} = 8.48\ ft^2$
- (9'-1")(6'-4") = (9.08)(6.33) = 57.47 ft^2
- (9'-1")(2'-2") = (9.08)(2.16) = 19.61 ft^2
- TOTAL AREA: 2,826.59 + 825.91 + 53.56 - 8.48 + 136.60 + 61.74 + 32.44 + 6.33 + 55.38 + 4.17 + 8.65 + 4.17 + 8.48 + 57.47 + 19.61 + 26.25 = 4,157.35 ft^2

KC-2 WAREHOUSE, BAY 1 (Continued)

Secondary Containment Calculations:

Bay 1:

- Volume of Dike: 4,157.35 x .5' = 2,078.67 ft^3

- Maximum Container Gallons: 584 containers x 55 gallons = 32,120 gallons capacity

- 10% of Maximum Container Gallons: 3,212.0 gallons

- Conversion to Cubic Feet: $\frac{3,212.0}{7.48}$ = 429.49 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (73 pallets)(2.76 ft^3) = 201.48 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0

  Total pallet and column volume = 201.48 ft^3 + 0.0 = 201.48 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  2,078.67 - 201.48 = 1,877.19 ft^3

Conclusion: Bay 1 of the KC-2 Warehouse has 1,877.9 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay 1 has sufficient capacity to contain 10 % of the volume of containers (429.49 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

KC-2 WAREHOUSE, BAY 3

Secondary Containment Dimensions:

- South Ramp $\frac{(9'-11")(6'-4")}{2} = \frac{(9.91)(6.33)}{2} = 31.36\ ft^2$

- $(18'-8")(2'-6") = (18.66)(2.5) = 46.65\ ft^2$

- $(12'-10")(2'-6") = (12.82)(2.5) = 32.05\ ft^2$

- $(5.33)(5.66) = 30.16\ ft^2$

- $(22'-3")(4'-1") = (22.25)(4.08) = 90.78\ ft^2$

- $(22'-3")(4'-1") = (22.25)(4.08) = 90.78\ ft^2$

- North Ramp $\frac{(4'-2")(4'-1")}{2} = \frac{(4.16)(4.08)}{2} = 8.48\ ft^2$

- $(70.25 - 4.08 - 2.8)(22.25 + 22.25 + 4.16) =$
  $(63.37)(48.66) = 3,083.58\ ft^2$

- $(5.33 - 2.5)\ (5.66) = 16.01\ ft^2$

- $3,083.58 - 31.36 - 16.01 = 3,036.21\ ft^2$
  $3,036.21 + 90.78 + 90.78 + 8.48 + 46.65 + 32.05 = 3,304.95\ ft^2$ TOTAL AREA

KC-2 WAREHOUSE, BAY 3 (Continued)

Secondary Containment Calculations:

Bay 3:

- Volume of Dike: 3,304.95 x .5 = 1,652.48 ft^3

- Maximum Container Gallons: 608 containers x 55 gallons = 33,440.0 gallons capacity

- 10% of Maximum Container Gallons: 3,344.0 gallons

- Conversion to Cubic Feet: $\frac{3,344.0}{7.48}$ = 447.06 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (76 pallets)(2.76 ft^3) = 209.76 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0

  Total pallet and column volume = 209.76 ft^3 + 0.0 = 209.76 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  1,652.48 - 209.76 = 1,443.0 ft^3

Conclusion: Bay 3 of of the KC-2 Warehouse has 1,443.0 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay 3 has sufficient capacity to contain 10 % of the volume of containers (447.06 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

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KC-2 WAREHOUSE, BAY 4

Secondary Containment Dimensions:

- South Ramp $\frac{(6'\text{-}5'')(9'\text{-}9'')}{2} = \frac{(6.41)(9.75)}{2} = 31.24\ ft^2$

- $(13'\text{-}10.5'')(2'\text{-}7'') = (13.875)(2.58) = 35.79\ ft^2$

- $(13'\text{-}6'')(2.7'') = (13.5)(2.58) = 34.83\ ft^2$

- $(17'\text{-}7'')(4'\text{-}1'') = (17.58)(4.08) = 71.72\ ft^2$

- $(17'\text{-}7'')(4'\text{-}1'') = (17.58)(4.08) = 71.72\ ft^2$

- $\frac{(4'\text{-}2'')(4'\text{-}1'')}{2} = \frac{(4.16)(4.08)}{2} = 8.48\ ft^2$

- $(76.08 - 2.58 - 4.16)(17.41 + 4.16 + 17.41) =$
  $(69.34)(38.98) = 2{,}702.87\ ft^2$
  $2{,}702.87 - 32.85 = 2{,}671.17\ ft^2$

- $2{,}671.63 + 71.72 + 71.72 + 8.48 + 35.29 + 34.83 = 2{,}894.17\ ft^2$ TOTAL AREA

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KC-2 WAREHOUSE, BAY 4 (Continued)

Secondary Containment Calculations:

Bay 4:

- Volume of Dike: 2,894.17 x .5 = 1,447.08 ft^3

- Maximum Container Gallons: 464 containers x 55 gallons = 25,520.0 gallons capacity

- 10% of Maximum Container Gallons: 2,552.0 gallons

- Conversion to Cubic Feet: $\frac{2,552.0}{7.48}$ = 341.18 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (58 pallets)(2.76 ft^3) = 160.08 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0

  Total pallet and column volume = 160.08 ft^3 + 0.0 = 160.08 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  1,447.08 - 160.08 = 1,287.00 ft^3

Conclusion: Bay 4 of the KC-2 Warehouse has 1,287.0 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay 4 has sufficient capacity to contain 10 % of the volume of containers (341.18 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

KC-2 WAREHOUSE, BAY 5

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Secondary Containment Dimensions:

- (13'-6")(7'-3") = (13.5)(7.25) = 97.87 ft^2
- (12'-7")(7'-3") = (12.58)(7.25) = 91.20 ft^2
- South Ramp $\frac{(8'-2")(7'-3")}{2} = \frac{(8.16)(7.25)}{2} = 29.58\ ft^2$
- North Ramp $\frac{(4'-2")(4'-1")}{2} = \frac{(4.16)(4.08)}{2} = 8.48\ ft^2$
- (69'-11" - 7'-3" - 4'-1")(34'-2") = (58.58)(34.16) = 2,001.09 ft^2
- $\frac{(34'-2" - 4'-2")(4'-1")}{2} = \frac{(30.0)(4.08)}{2} = \frac{124.07\ ft^2}{2} = 61.2\ ft^2$
- TOTAL AREA OF SMALL DIKE: (40'-0")(7'- 0") = 280 ft^2
- TOTAL AREA OF LARGE DIKE: 1,673.09 + 61.20 + 61.20 + 8.48 + 91.20 + 97.87 + 29.58 = 2,022.62 ft^2

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KC-2 WAREHOUSE, BAY 5 (Continued)

Secondary Containment Calculations:

Bay 5 Large Dike:

- Volume of Large Dike: 2,022.62 x .5 = 1,011.31 ft^3

- Maximum Container Gallons: 360 containers x 55 gallons = 19,800.0 gallons capacity

- 10% of Maximum Container Gallons: 1,980.0 gallons

- Conversion to Cubic Feet: $\frac{1,980.0}{7.48}$ = 264.70 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (45 pallets)(2.76 ft^3) = 124.20 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0

  Total pallet and column volume = 124.20 ft^3 + 0.0 = 124.20 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  1,101.31 - 124.2 = 887.11 ft^3

Conclusion: The Large Dike in Bay 5 of the KC-2 Warehouse has 887.11 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, the Large Dike in Bay 5 has sufficient capacity to contain 10 % of the volume of containers (264.70 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

KC-2 WAREHOUSE, BAY 5 (Continued)

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Bay 5 Small Dike:

- Volume of Small Dike: 280.0 x .5 = 140.0 ft^3

- Maximum Container Gallons: 72 containers x 55 gallons = 3,960.0 gallons capacity

- 10% of Maximum Container Gallons: 396 gallons

- Conversion to Cubic Feet: $\frac{396.0}{7.48}$ = 52.8 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (9 pallets)(2.76 ft^3) = 24.84 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0

  Total pallet and column volume = 24.84 ft^3 + 0.0 = 24.84 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  140.0 - 24.84 = 115.16 ft^3

Conclusion: The Small Dike in Bay 5 of the KC-2 Warehouse has 115.16 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, the Small Dike in Bay 5 has sufficient capacity to contain 10 % of the volume of containers (52.8 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

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KC-2 WAREHOUSE, BAY 6

Secondary Containment Dimensions:

- (13'-10.5")(7'-4") = (13.875)(7.33) = 101.70 ft^2

- $\frac{(8'-2")(7'-4")}{2} = \frac{(8.16)(7.33)}{2} = 29.90\ ft^2$

- (13'-1")(7'-4") = (13.08)(7.33) = 95.87 ft^2

- (35'-1")(69'-7" - 4'-1" - 7'-4") = (35.08)(58.16) = 2,040.25 ft^2

- $\frac{(4'-2")(4'-1")}{2} = \frac{(4.16)(4.08)}{2} = 8.48\ ft^2$

- $(35'-1")(4'-1") - \frac{(4'-2")(4'-1")}{2} =$

  $(35.08)(4.08) - \frac{(4.16)(4.08)}{2} = 134.64$

  $\frac{134.64}{2} = 67.32\ ft^2$

- TOTAL AREA: 2,040.25 + 101.70 + 29.90 + 95.87 + 67.32 + 67.32 + 8.48 = 2,410.84 ft^2

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KC-2 WAREHOUSE, BAY 6 (Continued)

Secondary Containment Calculations:

Bay 6:

- Volume of Dike: 2,410.84 x .5 = 1,205.42 ft^3

- Maximum Container Gallons: 464 containers x 55 gallons = 25,520.0 gallons capacity

- 10% of Maximum Container Gallons: 2,552.0 gallons

- Conversion to Cubic Feet: $\frac{2,552.0}{7.48}$ = 341.18 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (58 pallets)(2.76 ft^3) = 160.08 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0

  Total pallet and column volume = 160.08 ft^3 + 0.0 = 160.08 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  1,205.42 - 160.08 = 1,045.34 ft^3

Conclusion: Bay 6 of the KC-2 Warehouse has 1,045.34 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay 6 has sufficient capacity to contain 10 % of the volume of containers (341.18 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

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KC-2 WAREHOUSE, BAY 7

Secondary Containment Dimensions:

- $(6'\text{-}8")(7'\text{-}3") = (6.66)(7.25) = 48.28\ ft^2$
- $\frac{(8'\text{-}1")(7'\text{-}3")}{2} = \frac{(8.08)(7.25)}{2} = 29.29\ ft^2$
- $(6'\text{-}7")(7'\text{-}3") = (6.58)(7.25) = 47.70\ ft^2$
- $(21'\text{-}4")(69'\text{-}4" - 4'\text{-}1" - 7'\text{-}3") = (21.33)(57.92) = 1,235.43\ ft^2$
- $(21'\text{-}4" - 4'\text{-}2")(4'\text{-}1") = (17.16)(4.08) = 70.01\ ft^2$
- $\frac{(4'\text{-}2")(4'\text{-}1")}{2} = \frac{(4.16)(4.08)}{2} = 8.48\ ft^2$
- $1,235.43 + 47.70 + 29.29 + 48.28 + 35.00 + 35.00 + 8.48 = 1,439.18\ ft^2$ TOTAL AREA

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KC-2 WAREHOUSE, BAY 7 (Continued)

Secondary Containment Calculations:

Bay 7:

- Volume of Dike: 1,439.18 x .5 = 719.59 ft^3

- Maximum Container Gallons: 208 containers x 55 gallons = 11,440 gallons capacity

- 10% of Maximum Container Gallons: 1,144.0 gallons

- Conversion to Cubic Feet: $\frac{1,144.0}{7.48} = 152.94\ ft^3$ liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (26 pallets)(2.76 ft^3) = 71.76 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0

  Total pallet and column volume = 71.76 ft^3 + 0.0 = 71.76 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  719.59 - 71.76 = 647.83 ft^3

Conclusion: Bay 7 of the KC-2 Warehouse has 647.83 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay 7 has sufficient capacity to contain 10 % of the volume of containers (152.9 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

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KC-2 WAREHOUSE, BAY 8

Secondary Containment Dimensions:

- $(9'-4")(2'-9") = (9.33)(2.75) = 25.65\ ft^2$
- $\frac{(8'-7")(6'-5")}{2} = \frac{(8.58)(6.41)}{2} = 25.64\ ft^2$
- $(9'-4")(2'-9") = (9.33)(2.75) = 25.65\ ft^2$
- $(37'-1" - 2'-9" - 4"-1")(12'-1" + 4'-2" + 11'-8") =$
  $(30.25)(27.91) =$
  $844.27\ ft^2 - 27.49 = 816.78\ ft^2$
- $(12'-1")(4'-1") = (12.08)(4.08) = 49.28\ ft^2$
- $\frac{(4'-2")(4'-1")}{2} = \frac{(4.16)(4.08)}{2} = 8.48\ ft^2$
- $(11'-8")(4'-1") = (11.66)(4.08) = 47.57\ ft^2$
- $816.78 + 25.65 + 25.65 + 49.28 + 8.48 + 47.57 - 25.64 = 947.77\ ft^2$ TOTAL AREA

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KC-2 WAREHOUSE, BAY 8 (Continued)

Secondary Containment Calculations:

Bay 8:

- Volume of Dike: 947.77 x .5 = 473.88 ft^3

- Maximum Container Gallons: 96 containers x 55 gallons = 5,280.0 gallons capacity

- 10% of Maximum Container Gallons: 528.0 gallons

- Conversion to Cubic Feet: $\frac{528.0}{7.48} = 70.59\ ft^3$ liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (12 pallets)(2.76 ft^3) = 33.12 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0

  Total pallet and column volume = 33.12 ft^3 + 0.0 = 33.12 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  473.88 - 33.12 = 440.77 ft^3

Conclusion: Bay 8 of the KC-2 Warehouse has 440.77 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay 8 has sufficient capacity to contain 10 % of the volume of containers (70.6 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

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BUILDING 81

Secondary Containment Dimensions:

Bay A:

- $$\frac{(27'\text{-}9")(84'\text{-}0") - (8'\text{-}6")(6'\text{-}11") + (6'\text{-}6")(18'\text{-}8") + (5'\text{-}9")(11'\text{-}6") + (6'\text{-}6")(8'\text{-}6")}{2} =$$

$$\frac{(27.75)(84.0) - (8.5)(6.91) + (6.5)(18.66) + (5.75)(11.5) + (6.5)(8.5)}{2} = 2{,}487.30 \text{ ft}^2 \text{ TOTAL AREA}$$

Secondary Containment Calculations:

Bay A:

- Volume of Dike: 2,487.30 x .5' = 1,243.65 ft^3

- Maximum Container Gallons: 684 containers x 55 gallons = 37,620 gallons capacity

- 10% of Maximum Container Gallons: 3,762.0 gallons

- Conversion to Cubic Feet: $\frac{3{,}762.0}{7.48} = 502.94 \text{ ft}^3$ liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (46 pallets)(2.76 ft^3) = 126.96 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0

  Total pallet and column volume = 126.96 ft^3 + 0.0 = 126.96 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  1,243 - 127.0 = 1,116.0 ft^3

Conclusion: Bay A of Building 81 has 1,116.0 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay A has sufficient capacity to contain 10 % of the volume of containers (502.94 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

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BUILDING 81, (continued)

Secondary Containment Dimensions:

Bay B:

- $(42'-0")(81'-3") - \frac{(8.0)(7.0)}{2} = (42.0)(81.25) - 28.0 = 3{,}384.5\ ft^2$ TOTAL AREA

Secondary Containment Calculations:

- Volume of Dike: $3{,}384.5 \times .5' = 1{,}692.25\ ft^3$
- Maximum Container Gallons: 824 containers x 55 gallons = 45,320 gallons capacity
- 10% of Maximum Container Gallons: 4,532.0 gallons
- Conversion to Cubic Feet: $\frac{4{,}532.0}{7.48} = 605.8\ ft^3$ liquid

  (Volume Conversion: 7.48 gallons/cubic feet)
- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (46 pallets)(2.76 ft^3) = 126.96 ft^3

  (number of columns)(column volume) = total column volume
  (3)(0.59) = 1.77 ft^3

  Total pallet and column volume = 126.96 ft^3 + 1.77 = 128.73 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  1,692.0 - 128.73 = 1,563.0 ft^3

Conclusion: Bay B of Building 81 has 1,563.0 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay B has sufficient capacity to contain 10 % of the volume of containers (605.8 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

BUILDING 81 (continued)

Bay C

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Secondary Containment Dimensions

- (30'-10½")(10.0) = (30.87)(10.0) = 308.75 ft^2 TOTAL AREA

Secondary Containment Calculations:

- Volume of Dike: 308.75 x .5' = 154.38 ft^3

- Maximum Container Gallons: 60 containers x 55 gallons = 3,300 gallons capacity

- 10% of Maximum Container Gallons: 330.0 gallons

- Conversion to Cubic Feet: $\frac{330.0}{7.48}$ = 44.12 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (5 pallets)(2.76 ft^3) = 13.8 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0 ft^3

  Total pallet and column volume = 13.80 ft^3 + 0.0 = 128.73 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  154.0 - 13.80 = 140.2 ft^3

Conclusion: Bay C of Building 81 has 140.0 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay C has sufficient capacity to contain 10 % of the volume of containers (44.0 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

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PLANT 6 WAREHOUSE

Secondary Containment Dimensions:

Bay A:

- (58'-10")(71'-8") - 24 + (6.0)(35'-0") =
  (58.66)(71.66) - 24 + (6.0)(35.0) =
  4,215.75 - 24 = 4,191.75 + 210 = 4,401.75 ft^2 TOTAL AREA

Secondary Containment Calculations:

- Volume of Dike: 4,401.75 x .5 = 2,200.87 ft^3

- Maximum Container Gallons: 1,492 containers x 55 gallons = 82,060.0 gallons capacity

- 10% of Maximum Container Gallons: 8,206.0 gallons

- Conversion to Cubic Feet: $\frac{8,206.0}{7.48}$ = 1,097.06 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (98 pallets)(2.76 ft^3) = 270.48 ft^3

  (number of columns)(column volume) = total column volume
  (4)(0.59) = 2.36 ft^3

  Total pallet and column volume = 270.48 ft^3 + 2.36 = 272.84 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  2,200.87 - 272.84 = 1,928.03 ft^3

Conclusion: Bay A of the Plant 6 Warehouse has 1,928.0 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay A has sufficient capacity to contain 10 % of the volume of containers (1,097.0 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32_ of Attachment D-2.

PLANT 6 WAREHOUSE (continued)

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Secondary Containment Dimensions:

Bay B:

- (54'-1")(86'-2") - 24 = (54.08)(86.16) - 24 = 4,635.53 ft^2 TOTAL AREA

Secondary Containment Calculations:

- Volume of Dike: 4,635.53 x .5 = 2,317.77 ft^3

- Maximum Container Gallons: 1,448 containers x 55 gallons = 79,640.0 gallons capacity

- 10% of Maximum Container Gallons: 7,964.0 gallons

- Conversion to Cubic Feet: $\frac{7,964.0}{7.48}$ = 1,064.7 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (92 pallets)(2.76 ft^3) = 253.92 ft^3

  (number of columns)(column volume) = total column volume
  (4)(0.59) = 2.36 ft^3

  Total pallet and column volume = 253.92 ft^3 + 2.36 = 256.28 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  2,317.77 - 256.28 = 2,061.49 ft^3

Conclusion: Bay B of the Plant 6 Warehouse has 2,061.0 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay B has sufficient capacity to contain 10 % of the volume of containers (1,064.0 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

PLANT 6 WAREHOUSE (continued)

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Secondary Containment Dimensions:
Bay C:

- $(54.25)(82.16) = 4{,}457.18\ ft^2$

  $(8.0)(11.25) = 90.0\ ft^2$

  $\frac{(6)(8)}{2} = 24\ ft^2$

  TOTAL AREA: $4{,}457.18 - 90.0 - 24.0 = 4{,}343.2\ ft^2$

Secondary Containment Calculations:

- Volume of Dike: $4{,}343.2 \times .5 = 2{,}171.6\ ft^3$
- Maximum Container Gallons: 1,256 containers x 55 gallons = 69,080.0 gallons capacity
- 10% of Maximum Container Gallons: 6,908.0 gallons
- Conversion to Cubic Feet: $\frac{6{,}908.0}{7.48} = 923.53\ ft^3$ liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (83 pallets)(2.76 ft^3) = 229.08 ft^3

  (number of columns)(column volume) = total column volume
  (4)(0.59) = 2.36 ft^3

  Total pallet and column volume = 229.08 ft^3 + 2.36 = 231.44 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  2,171.6 - 231.44 = 1,940.16 ft^3

Conclusion: Bay C of the Plant 6 Warehouse has 1,940.16 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, Bay C has sufficient capacity to contain 10 % of the volume of containers (923.53 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

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BUILDING 68 (PILOT PLANT WAREHOUSE)

Secondary Containment Dimensions:

- (69'-0")(7'-0") = (69.0)(7.0) = 483.0 ft^2 TOTAL AREA

Secondary Containment Calculations:

- Volume of Dike: 483.0 x .5 = 241.5 ft^3

- Maximum Container Gallons: 240 containers x 55 gallons = 13,200.0 gallons capacity

- 10% of Maximum Container Gallons: 1,320.0 gallons

- Conversion to Cubic Feet: $\frac{1,320.0}{7.48}$ = 176.47 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (16 pallets)(2.76 ft^3) = 44.16 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0 ft^3

  Total pallet and column volume = 44.16 ft^3 + 0.0 = 44.16 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  241.5 - 44.16 = 197.34 ft^3

Conclusion: The diked area of the Pilot Plant Warehouse has 197.0 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, the diked area has sufficient capacity to contain 10 % of the volume of containers (176.0 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

Plant 1 Pad Tension Support Structure 4 - South Bay (TS4-S)

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Secondary Containment Dimensions:

A. (7'-6" + 3'-4")(5'-2") = (10.83)(5.16) = 55.88 ft^2

55.88 - 11.09 = 44.79 ft^2

B. (5'-2")(49.75') = (5.16)(49.75) = 256.71 ft^2

C. (4'-4")(5'-2" - 2'-5") = (4.33)(2.75) = 11.90 ft^2

D. (6'-8" + 3'-3")(5'-2") = (9.91)(5.16) = 51.13 ft^2

51.13 - 10.89 = 40.24 ft^2

E. (49'-0")(13'-2") - (6'-4")(2'-3") =
(49.0)(13.16) - (6.33)(2.25) = 644.84 - 14.24 = 630.6 ft^2

F. (23'-10")(5'-6") = (23.83)(5.5) = 131.06 ft^2

G. $\frac{(15'-0")(5'-6")}{2} = \frac{(15.0)(5.50)}{2} = 41.25\ ft^2$

H. (25'-7" + 3'-3")(5'-1") - (3'-3")(3'-3") =
(28.83)(5.08) - (3.25)(3.25) = 146.45 - 10.56 = 135.88 ft^2

I. (32'-6")(5'-1") = (32.50)(5.08) = 165.1 ft^2

J. (4'-5")(5'-1" - 2'-6") = (4.41)(2.58) = 11.37 ft^2

K. (6'-10" + 3'-2")(5'-1") - (3'-2")(3'-2") =
(10.0)(5.08) - (3.16)(3.16) = 50.08 - 9.98 = 40.1 ft^2

L. $\frac{(207.33) + (205.67)}{2} = 206.5\ ft^2 = (206.5)(87.86) = 18{,}143.09\ ft^2$

- 18,143.09 - (6'-4")(2'-4") = 18,143.09 - 14.74 = 18,128.35 ft^2
18,143.09 - (6.33)(2.33) = 18,143.09 - 14.74 = 18,128.35 ft^2

- 18,143.09 + 131.06 + 41.25 + 644.84 + 40.10 + 11.37 + 165.1 +
30.48 + 135.89 = 19,343.18 ft^2 TOTAL AREA

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Plant 1 Pad Tension Support Structure 4 - South Bay (TS4-S) (Continued)

Secondary Containment Calculations:

- Volume of Dike: 19,343.18 x .5 = 9,671.59 ft^3

- Maximum Container Gallons: 5,952 containers x 55 gallons = 327,360.0 gallons capacity

- 10% of Maximum Container Gallons: 32,736.0 gallons

- Conversion to Cubic Feet: $\frac{32,736.0}{7.48} = 4,376.5\ ft^3$ liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (372 pallets)(2.76 ft^3) = 1,026.7 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0 ft^3

  Total pallet and column volume = 1,026.7 ft^3 + 0.0 = 1,026.7 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  9,671.6 - 1,026.7 = 8,644.9 ft^3

Conclusion: The diked area of the Plant 1 Pad Tension Support Structure (TS-4 South) has 8,644.9 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, the diked area has sufficient capacity to contain 10 % of the volume of containers (4,376.5 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

Plant 1 Pad Tension Support Structure 4 - North Bay (TS4-N)

Secondary Containment Dimensions:

M. (211.17)(87.56) - (4.5)(2.33) = 18,479.56 ft^2

- 44.79 + 256.71 + 32.66 + 11.90 + 40.24 + 630.6 + 41.25 + 131.06 + 18,479.56 = 19,668.77 ft^2

Secondary Containment Calculations:

- Volume of Dike: 19,668.77 x .5 = 9,834.39 ft^3

- Maximum Container Gallons: 5,936 containers x 55 gallons = 326,480.0 gallons capacity

- 10% of Maximum Container Gallons: 32,648.0 gallons

- Conversion to Cubic Feet: $\frac{32,648.0}{7.48}$ = 4,364.7 ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (371 pallets)(2.76 ft^3) = 1,023.96 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0 ft^3

  Total pallet and column volume = 1,023.96 ft^3 + 0.0 = 1,023.96 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  9,834.39 - 1.023.96 = 8,810.43 ft^3

Conclusion: The diked area of the Plant 1 Pad Tension Support Structure (TS-4) (North) has 8,810.43 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, the diked area has sufficient capacity to contain 10 % of the volume of containers (4,364.7 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

Plant 1 Pad Tension Support Structure 5 - North Bay (TS5-N)

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Secondary Containment Dimensions:

A. (3'-4" + 6'-9" + 4'-5" + 49'-10")(5'-8") - (3'-4")(3'-4") - (4'-5")(2'-5") =
(3.33 + 6.75 + 4.41 + 49.83)(5.66) - (3.33)(3.33) - (4.41)(2.41) =
(364.05) - (11.08) - 10.62 = 342.35 ft^2

B. (7'-11" + 3'-4")(5'-8") - (3'-4")(3'-4") =
(11.25)(5.66) - (3.33)(3.33) = 63.67 - 11.08 = 52.59 ft^2

C. (43'-9")(5.5) = (43.75)(5.5) = 240.62 ft^2

D. (5'-6")(29'-0") = (5.5')(29.0') = 159.5 ft^2

E. (25'-7" + 3'-3")(6.0') = (28.83)(6.0) = 172.98 ft^2
(172.98 - 10.56) = 162.42 ft^2

F. (32'-7" + 4'-6" + 6'-7" + 3'-4")(6.0) =
(32.58 + 4.5' + 6.58' + 3.33')(6.0) = 281.94

(3'-4")(3'-4") + (4'-6")(2'-5") = (11.08) + 10.84 = 21.92

281.94 - 21.92 = 260.02 ft^2

- (221'-1" + 3.25) - 6'-0" - 5'-6" = 221.08 + 3.25 - 6.0 - 5.5 = 212.88'
- (123'-3" + 4'-6" + 89'-0" + 3'-3") =
(123.25' + 4.5' + 89.0' + 3.25') = 220.0 ft^2
(220.0 - 5.5 - 3'-3") = 220.0 - 5.5 - 3.25) = 211.25 ft^2
- (3'-3" + 25'-7" + 12'-0" + 32'-7" + 4'-6" + 6'-7" + 3'-4") =
(3.25 + 25.58 + 12.10 + 32.58 + 4.5 + 6.58 + 3.33) = 87.82 ft^2

$$\frac{212.83 + 211.25}{2} = 212.04 \text{ ft ave. Length}$$

G. (212.04)(87.75) - (4.5)(2.5) = 18,606.51 - 13.5 = 18,595.26 ft^2

- (217'-6" + 3'-4" - 5'-8" - 5'-8") = 217.5 + 3.33 - 5.66 - 5.66 = 209.51
- 3'-4" + 98'-9" + 4'-7" + 95'-0" + 6'-5" + 9'-5" - 5'-8" - 5'-8" =
3.33 + 98.75 + 4.58 + 95.0 + 6.41 + 9.41 - 5.66 - 5.66 = 206.16
- $\frac{206.16 + 209.51}{2}$ = 207.83 ft
- 3'-4" + 6'-9" + 4'-5" + 49'-10" + 12'-3" + 7'-11" + 3'-4" =
3.33 + 6.75 + 4.41 + 49.83 + 12.25 + 7.91 + 3.33 = 87.81

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Plant 1 Pad Tension Support Structure 5 - North Bay (TS5-N) (Continued)

H. (207.83)(87.81) = 18,197.74 ft^2

- 18,197.74 - (4'-7")(2'-5") - (6'-5")(3'-3") = 18,229.6 ft
  11.03 20.83

- (29.0)(5'-8") = 164.14 ft^2

I. (15.0)(5.66)/2 = 42.45 ft^2

J. (5'-7")(43'-9") = 244.12 ft^2

K. $\frac{(14'-10\frac{1}{2}")(5.5)}{2}$ = 40.90 ft^2

L. $\frac{(12'-3")(5'-8")}{2}$ = 34.66 ft^2

M. $\frac{(12.0')(6.0')}{2}$ = 36.00 ft^2

North Section of TS5 Floor Area:
18,229.6 + 342.35 + 34.66 + 52.59 + 164.14 + 42.45 + 244.12 = 19,109.91 ft^2

South Section of TS5 Floor Area:
18,595.26 - 240.62 + 40.90 + 159.50 + 162.42 + 36.00 + 260.02 = 19,494.72 ft

Secondary Containment Calculations:

North Section of TS5 Volume:

- Volume of Dike: 19,109.91 x .5 = 9,554.95 ft^3

- Maximum Container Gallons: 6,016 containers x 55 gallons = 330,880.0 gallons capacity

- 10% of Maximum Container Gallons: 33,088.0 gallons

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Plant 1 Pad Tension Support Structure 5 - North Bay (TS5-N) (Continued)

- Conversion to Cubic Feet: $\frac{33,088.0}{7.48} = 4,423.53\ ft^3$ liquid

(Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

(number of pallets)(pallet volume) = total pallet volume
(371 pallets)(2.76 ft^3) = 1,023.96 ft^3

(number of columns)(column volume) = total column volume
(0)(0.59) = 0.0 ft^3

Total pallet and column volume = 1,023.96 ft^3 + 0.0 = 1,023.96 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

Volume of Dike - Total Pallet and Column Volume =

9,554.95 - 1,023.96 = 8,530.99 ft^3

Conclusion: The diked area of the Plant 1 Pad Tension Structure 5 North Bay has 8,530.99 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, the North Section of TS-5 has sufficient capacity to contain 10 % of the volume of containers (4,364.71 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

Plant 1 Pad Tension Support Structure 5 - North Bay (TS5-N) (Continued)

South Section of TS5 Volume:

- Volume of Dike: 19,484.72 x .5 = 9,747.36 ft^3

- Maximum Container Gallons: 5,936 containers x 55 gallons = 326,480.0 gallons capacity

- 10% of Maximum Container Gallons: 32,648.0 gallons

- Conversion to Cubic Feet: $\frac{32,648.0}{7.48} = 4,364.70$ ft^3 liquid

  (Volume Conversion: 7.48 gallons/cubic feet)

- Displacement Totals for Pallet and Structural Columns' Volume:

  (number of pallets)(pallet volume) = total pallet volume
  (371 pallets)(2.76 ft^3) = 1,023.96 ft^3

  (number of columns)(column volume) = total column volume
  (0)(0.59) = 0.0 ft^3

  Total pallet and column volume = 1,023.96 ft^3 + 0.0 = 1,023.96 ft^3

- Volume of Dike - Total Pallet and Structural Column(s) Displacement:

  Volume of Dike - Total Pallet and Column Volume =

  9,747.36 - 1,023.96 = 8,723.4 ft^3

Conclusion: The diked area of the Plant 1 Pad Tension Structure 5 South Bay has 8,723.4 ft^3 of diked volume available after accounting for displacement of container pallets and structural columns. Thus, the South Section of TS-5 has sufficient capacity to contain 10 % of the volume of containers (4,364.7 ft^3). The conversion factors and pallet and column volume calculations are provided in the reference material provided on page 32 of Attachment D-2.

PALLET DISPLACEMENT CALCULATIONS

Based upon design parameters:

3 each: 3-inch by 4-inch by 4 feet (runner boards)

$.25W \times .33H \times 4'L \times 3 = 0.99\ ft^3$

12 each: 1-inch by 5.5-inch x 4 feet (support boards)

$4'L \times 1"H \times 5.5"W \times 12 = 1.77\ ft^3$

$0.99\ ft^3 + 1.77\ ft^3 = 2.76\ ft^3$ displacement volume per pallet

STRUCTURAL COLUMNS DISPLACEMENT CALCULATION

Column = 13"H x 13"L x 6"H

$$\frac{(13)(13)(6)}{1{,}728\ in^3/ft^3} = .59\ ft^3$$

CONVERSION FACTORS

7.48 gallons/cubic feet

1,728 cubic inch per 1 cubic foot

Note: For the purpose of these calculations, representative pallets were selected for the displacement volume calculations.

ATTACHMENT D-2

SECONDARY CONTAINMENT CAPACITY CALCULATIONS

UNIT NAME	NO. OF PALLETS	PALLET VOLUME (cubic feet)	TOTAL PALLET VOLUME (cubic feet)	NO. OF COLUMNS	COLUMN VOLUME (cubic feet)	TOTAL COLUMN VOLUME (cubic feet)	TOTAL PALLET AND COLUMN VOLUME (cubic feet)	DIKE VOLUME (cubic feet)	DIKE VOLUME LESS PALLET AND COLUMN VOLUME (cubic feet)	LIQUID VOLUME (10%) (cubic feet)
KC2 Bay 1	73	2.76	201.48	0	0.59	0.00	201.48	2078.67	1877.19	429.49
Bay 3	76	2.76	209.76	0	0.59	0.00	209.76	1652.48	1443.0	447.06
Bay 4	58	2.76	160.08	0	0.59	0.00	160.08	1447.08	1287.0	341.18
Bay 5 - Large Dike	45	2.76	124.20	0	0.59	0.00	124.20	1011.31	887.11	264.70
Bay 5 - Small Dike	9	2.76	24.84	0	0.59	0.00	24.84	140.0	115.16	52.8
Bay 6	58	2.76	160.08	0	0.59	0.00	160.08	1205.42	1045.34	341.18
Bay 7	26	2.76	71.76	0	0.59	0.00	71.76	719.59	647.83	152.94
Bay 8	12	2.76	33.12	0	0.59	0.00	33.12	473.88	440.77	70.59
TS4(N)	371	2.76	1023.96	0	0.59	0.00	1023.96	9834.39	8810.43	4364.7
TS4(S)	372	2.76	1026.7	0	0.59	0.00	1026.7	9671.59	8644.8	4376.5
Bldg. 79- Bay A	98	2.76	270.48	4	0.59	2.36	272.84	2200.89	1928.03	1097.06
Bay B	92	2.76	253.92	4	0.59	2.36	256.28	2317.77	2061.49	1064.7
Bay C	83	2.76	229.08	4	0.59	2.36	231.44	2171.6	1940.16	923.53

ATTACHMENT D-2 (continued)

SECONDARY CONTAINMENT CAPACITY CALCULATIONS

UNIT NAME	NO. OF PALLETS	PALLETS VOLUME (cubic feet)	TOTAL PALLET VOLUME (cubic feet)	NO. OF COLUMNS	COLUMN VOLUME (cubic feet)	TOTAL COLUMN VOLUME (cubic feet)	TOTAL PALLET AND COLUMN VOLUME (cubic feet)	DIKE VOLUME (cubic feet)	DIKE VOLUME LESS PALLET AND COLUMN VOLUME (cubic feet)	LIQUID VOLUME (10%) (cubic feet)
Bldg. 81-Bay A	46	2.76	129.96	0	0.59	0.00	129.96	1243.65	1116.0	502.94
Bay B	46	2.76	126.96	3	0.59	1.77	128.73	1692.25	1563.0	605.8
Bay C	5	2.76	13.80	0	0.59	0.00	13.80	154.38	140.2	44.12
Bldg. 56	132	2.76	364.32	0	0.59	0.00	364.32	3864	3500	1552.94
Bldg. 68 - Diked Area	16	2.76	44.16	0	0.59	0.00	44.16	241.5	197.34	176.47
TS5(N)	371	2.76	1023.96	0	0.59	0.00	1023.96	9554.95	8530.99	4364.71
TS5(S)	371	2.76	1023.96	0	0.59	0.00	1023.96	9747.36	8723.4	4364.70

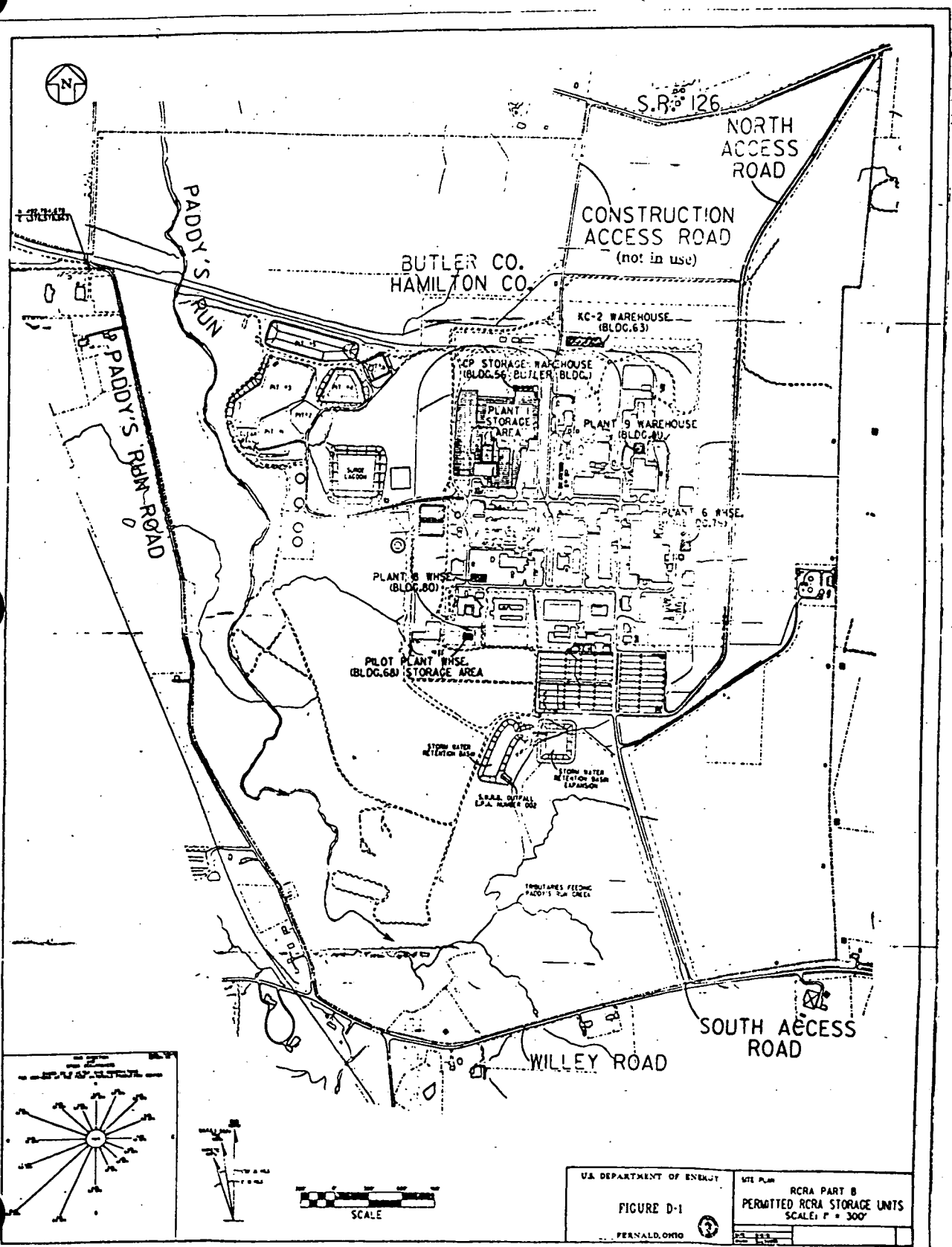

S.R. 126
NORTH ACCESS ROAD
CONSTRUCTION ACCESS ROAD
(not in use)
BUTLER CO.
HAMILTON CO.
PADDY'S RUN
PADDY'S RUN ROAD
KC-2 WAREHOUSE (BLDG.63)
CP STORAGE WAREHOUSE (BLDG.56 BUTLER BLDG.)
PLANT 1 STORAGE AREA
PLANT 9 WAREHOUSE (BLDG.40)
PLANT 6 WHSE. (BLDG.75)
PLANT 8 WHSE. (BLDG.80)
PILOT PLANT WHSE. (BLDG.68) STORAGE AREA
STORM WATER RETENTION BASIN
STORM WATER RETENTION BASIN EXPANSION
S.R.A.S. OUTFALL (EPA NUMBER 002)
TRIBUTARIES FEEDING PADDY'S RUN CREEK
SOUTH ACCESS ROAD
WILLEY ROAD
SCALE
U.S. DEPARTMENT OF ENERGY
FIGURE D-1
FERNALD, OHIO
SITE PLAN
RCRA PART B
PERMITTED RCRA STORAGE UNITS
SCALE: 1" = 300'

FIGURE D-2

FMPC

HAZARDOUS WASTE CONTAINER PRE-TRANSFER CHECK LIST

INSPECTOR NAME:		INSPECTOR BADGE NO.:	
ACCUMULATION AREA:	LOCATION:	DATE:	TIME:

ITEM NO.	INSPECTION ITEM	ACCEPTABLE YES	ACCEPTABLE NO	CORRECTIVE ACTION & DATE CORRECTED
1	Verify that container label arrangement is correct as per 20-C-605			
2	Verify that locking ring and lock bolt are secure on drum (+/- 6" from drum seam)			
3	Ensure the FMPC Lot Marking Code, Drum Number, and Reactivity Code are applied			
4	Record the weights minus the tare SAC weight on the XX Card (1200 lbs. max)			
5	Ensure that weights are correctly stenciled on drum			
6	Completed XX (65 Card) to NMC clerk and assist in Transfer Record			
7	Ensure that the 68/69 Card and the Transfer Record is in envelope			
8	Ensure that Generator and Supervisor or Alternate has signed XX (65) Card and that card is in envelope			
* 9	Record the drum full date on the Hazardous Waste Label as Start Date *(see Note 1)*			
10	Check the EPA Waste Number on Hazardous Waste Label			
11	Check the UN or NA Number on Hazardous Waste Label			
12	Check the drum exterior per SOP 20-C-605 criteria			
13	Check the drum exterior and SAC container for leaks, making sure they are clean			
** 14	Examine Hazardous Waste Label to ensure that it is complete *(see Note 2)*			
15	Ensure that the Hazardous Waste Disposal Record is complete and in envelope			
16	Ensure that the Material Evaluation Form (MEF) is in envelope			
17	Sign this check list and place it into the envelope			
18	Verify SAC and container are ready for transfer/storage			
19	Notify Waste Management and ITO/MVO that container is ready for storage/transfer			

* ***NOTE 1:*** *Date should be the same date appearing on Hazardous Waste Disposal Record sheet.*
** ***NOTE 2:*** *Should include Generator's name/address, EPA ID No., DOT Shipping Name, and should be written in waterproof ink.*

COMMENTS: _____

INSPECTOR'S SIGNATURE:	DATE:	SUPERVISOR'S SIGNATURE:	DATE:

FMPC-OPR-3-33 REV 1: 16 90.

FEMP
HAZARDOUS WASTE CONTAINER PRE-STORAGE CHECK LIST

-4457-

Storage Area: _____ Date: _____ Time: _____

FEMP Lot Number: _____

	INSPECTION ITEM	ACCEPTABLE YES	ACCEPTABLE NO	OBSERVATIONS & DATE CORRECTED
1	Ensure information on 65 card is accurate			
2	Ensure information on 68/69 card is accurate			
	DRUM MARKINGS ACCURATE AND PRESENT			
3	FEMP Lot Marking Number			
4	Reactivity Group Code (RGC)			
5	Gross Weight			
6	Net Weight			
7	Tare Weight			
8	Drum Number			
9	Marking Height (1½" to 2")			
	DRUM LABELS ATTACHED AND COMPLETE			
10	Hazardous Waste Label (Manifest Number is not required)			
11	DOT Label (as applicable) *A DOT label is required if specified in the "Comments" area of the "Hazardous Waste Container Pre-Transfer Checklist."*			
12	Labels and Markings located correctly on drum *"Painted over" labels shall be removed and discarded. Labels placed over a drum chime shall be relocated as shown in SSOP-0015.*			
	DRUM SKID CONDITION			
13	Free from loose dirt, rocks, or rubble.			
14	Drum free from holes.			
15	Acceptable dents and bulges in drums.			
16	Drum Lid secure—Bolt lockrings/bung plug tight. *A drum lid shall be convex (bowed outward).*			
17	Drum top and bottom rims free from dents. *A ¼ inch deep dent in the top or bottom rim (seal) is considered acceptable.*			
18	Free from rust/corrosion.			

MC&A	SIGNATURE:	BADGE NO.:
WASTE MANAGEMENT	SIGNATURE:	BADGE NO.:
INSPECTOR	SIGNATURE:	BADGE NO.:
INVENTORY NUMBER		

COMMENTS:

_____

_____

_____

_____

FS-S-3139 (REV. 6/12/92)

FIGURE D-4

FEMP
RCRA MATERIAL MOVEMENT AND OVERPACK

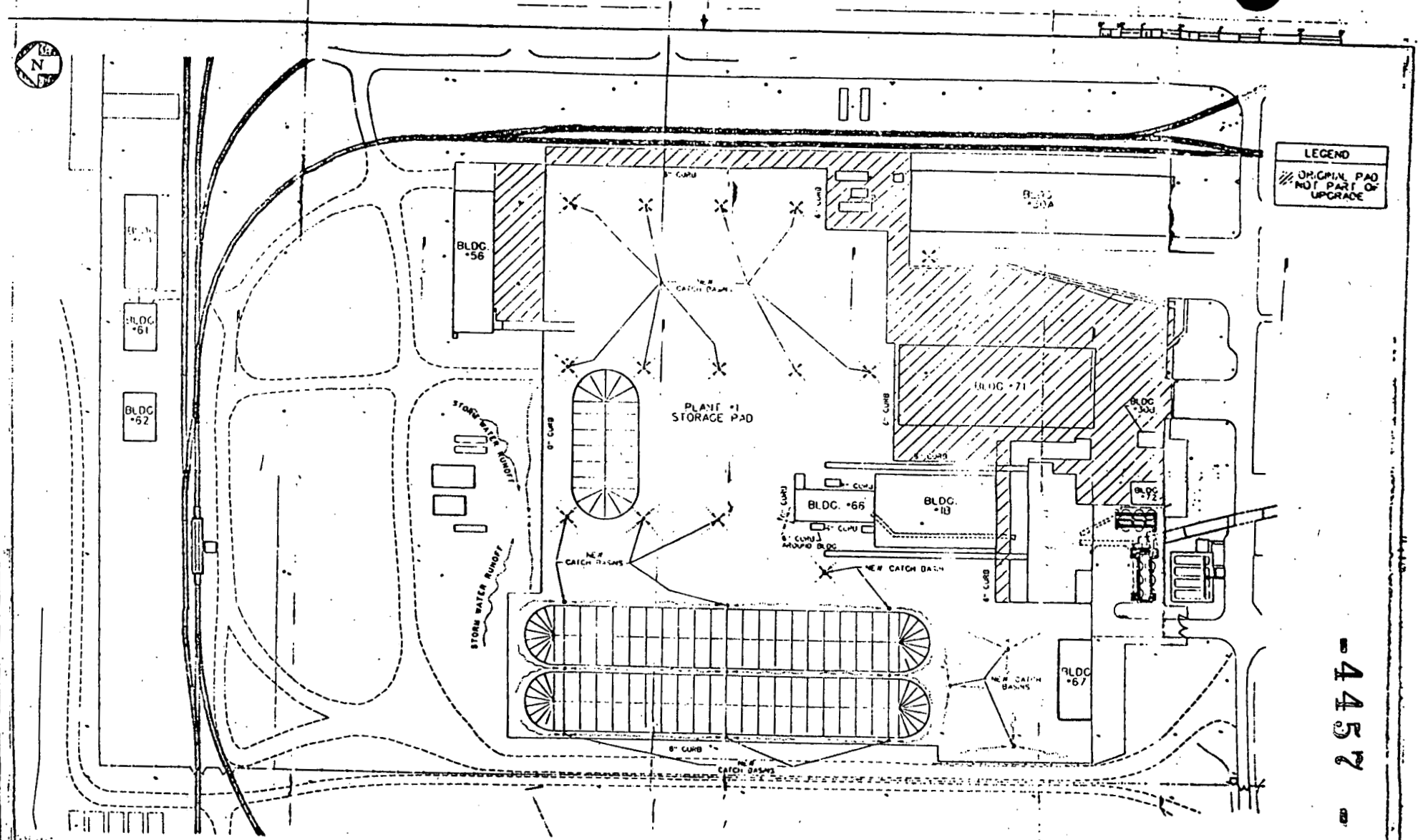
DATE	INVENTORY NUMBER	OLD LOCATION				NEW LOCATION				GROSS WEIGHT	TARE WEIGHT	NET WEIGHT	REMARKS
		A	R	S	L	A	R	S	L				

S-F-1090-1 (REV 2/9/93)

CONTRO[illegible] - MC&A

RCRA NEW DRUM ASSIGNMENT

DATE:	DATE:	DATE:	DATE:
INVENTORY NO.	INVENTORY NO.	INVENTORY NO.	INVENTORY NO.
P.O. NO.	P.O. NO.	P.O. NO.	P.O. NO.
SOURCE	SOURCE	SOURCE	SOURCE
MATERIAL CLASS	MATERIAL CLASS	MATERIAL CLASS	MATERIAL CLASS
MATERIAL TYPE	MATERIAL TYPE	MATERIAL TYPE	MATERIAL TYPE
LOT SEQUENCE	LOT SEQUENCE	LOT SEQUENCE	LOT SEQUENCE
DRUM NO.	DRUM NO.	DRUM NO.	DRUM NO.
GROSS WGT.	GROSS WGT.	GROSS WGT.	GROSS WGT.
TARE WGT.	TARE WGT.	TARE WGT.	TARE WGT.
NET WGT.	NET WGT.	NET WGT.	NET WGT.
MBA	MBA	MBA	MBA
COLOR CODE/RGC	COLOR CODE/RGC	COLOR CODE/RGC	COLOR CODE/RGC
ACCUM. DATE	ACCUM. DATE	ACCUM. DATE	ACCUM. DATE
EPA ID NO.	EPA ID NO.	EPA ID NO.	EPA ID NO.
UN/NA NO	UN/NA NO	UN/NA NO	UN/NA NO
MATL. DESC.	MATL. DESC.	MATL. DESC.	MATL. DESC.
LOCATION	LOCATION	LOCATION	LOCATION
ROW	ROW	ROW	ROW
STACK	STACK	STACK	STACK
LEVEL	LEVEL	LEVEL	LEVEL
DRUM SIZE	DRUM SIZE	DRUM SIZE	DRUM SIZE
HAND CODE S01	HAND CODE S01	HAND CODE S01	HAND CODE S01
CODE	CODE	CODE	CODE
AREA	AREA	AREA	AREA
PR. SHIP. NM	PR. SHIP. NM	PR. SHIP. NM	PR. SHIP. NM
LAND BAN	LAND BAN	LAND BAN	LAND BAN
DRUM CONTENTS	DRUM CONTENTS	DRUM CONTENTS	DRUM CONTENTS



U.S. DEPARTMENT OF ENERGY

FIGURE D-6

FERNALD, OHIO

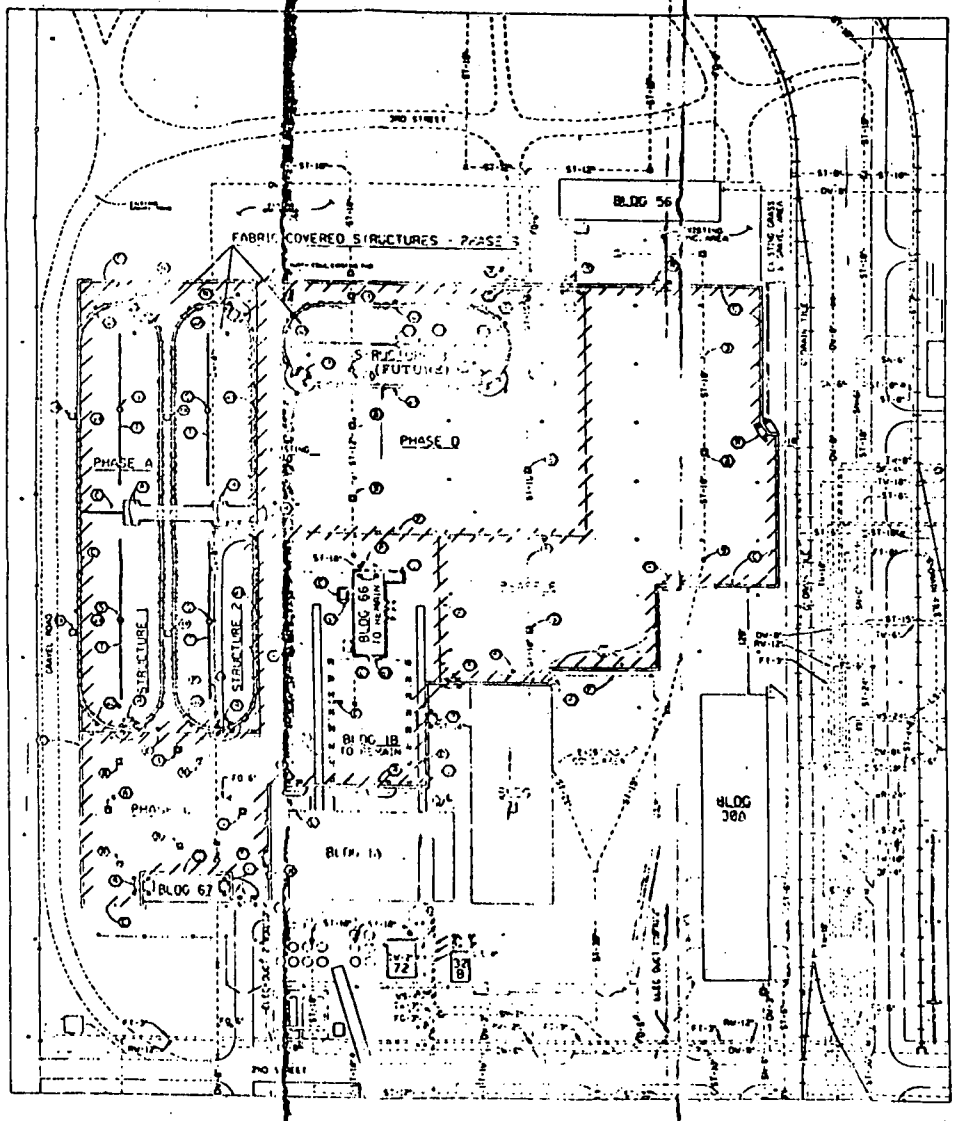
PLANT #1 STORAGE AREA

PLANT 1 STORAGE PAD LAYOUT AFTER UPGRADE

SCALE - 1" = 50'-0"

FILE NAME: [illegible]

4452



SITE PLAN

SCALE 1" = 50'

LEGEND

EXISTING

NEW

NOTES

SCOPE OF PHASE A CONSTRUCTION

1. REMOVAL OF FENCE
2. EXCAVATION AND INSTALLATION OF APPROX. [illegible] SQ. FT. OF NEW PAD WITH CURBS, RAMPS, MEMBRANE & WEARING SURFACE.
3. RELOCATION OF EXISTING ROAD
4. TRENCH DRAINS & SUMPS.
5. FOUNDATIONS FOR FRAME SUPPORTED FABRIC STRUCTURES, ERECTION OF 2 STRUCTURES.
6. INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

SCOPE OF PHASE B CONSTRUCTION

1. FABRICATION & DELIVERY OF FRAME SUPPORTED FABRIC STRUCTURES.

SCOPE OF PHASE C CONSTRUCTION

1. DEMOLITION OF CONVEYOR GALLERIES
2. CURBS AND RAMPS
3. CATCH BASINS
4. INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

SCOPE OF PHASE D CONSTRUCTION

1. REMOVAL OF FENCE
2. TRENCH DRAIN AND SUMP
3. FOUNDATIONS FOR FRAME SUPPORTED FABRIC STRUCTURE, ERECTION OF STRUCTURE.
4. CURBS AND RAMPS
5. CATCH BASINS
6. INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

SCOPE OF PHASE E CONSTRUCTION

1. REMOVAL OF FENCE
2. CURBS AND RAMPS
3. CATCH BASINS
4. INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

AS-BUILT NOTE

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

A. M. KINNEY, INC.

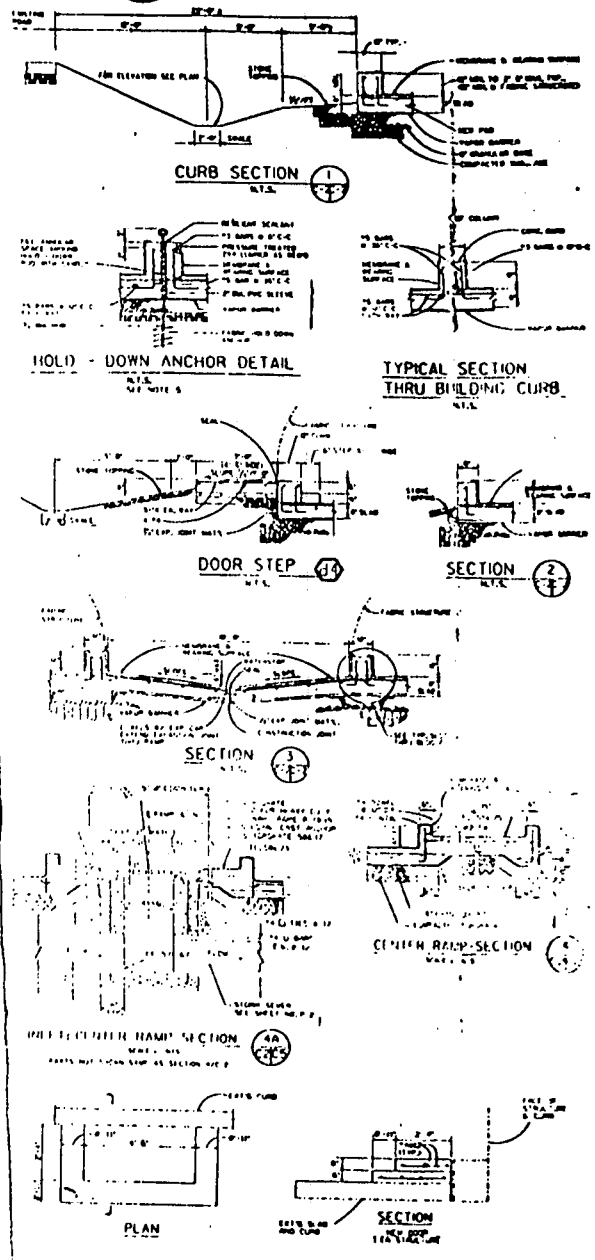
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

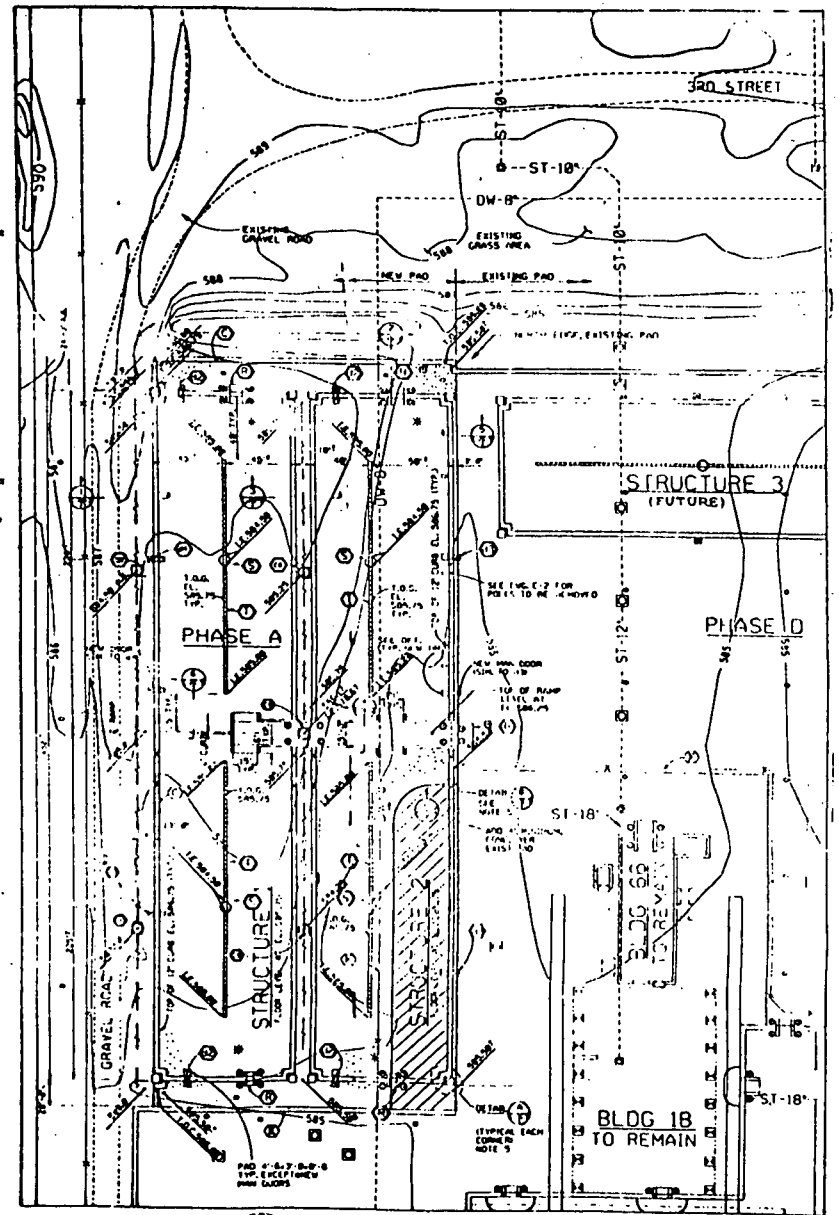
COVERED CONTROLLED STORAGE PAD - PLANT 1
CONSTRUCTION PHASING

FIGURE D-7

242

-4457-





SITE PLAN

FIGURE D-8

SECTION & DETAIL KEY

NOTES

1. SEE SHEET C-4 FOR SCOPE OF PHASE A CONSTRUCTION.
2. SEE SHEET P-4 FOR STORM SEWER AND CATCH BASIN DETAILS.
3. SEE SHEET C-5 FOR DETAILS OF FOUNDATIONS, THICKNESS AND SLOPES.
4. LIGHT POLES TO BE REMOVED BY ELECTRICAL CONTRACTOR. SEE SHT. E-2.
5. SEE MANUFACTURER'S DWGS FOR LOCATION OF ANCHOR BOLTS AND HOLD-DOWN ANCHORS.
6. LOCATE SLAB JOINTS AS SHOWN ON DELTA STEEL DRAWING NUMBER [illegible].

LEGEND

EXISTING

- REMOVE CURB
- REMOVE FENCE
- CONTOUR LINE
- ELECTRIC POLE

NEW

- CURB
- RAMP - SEE DETAIL SHEET C-5
- RAMP - SEE DETAIL SHEET C-5
- TRENCH DRAIN - SEE DETAIL SHEET C-5
- NEW STEP & PEDESTRIAN RAMP IN FABRIC STRUCTURES - SEE DETAIL SHEET C-5
- NEW STEP & PEDESTRIAN RAMP IN FABRIC STRUCTURES - SEE DETAIL SHEET C-5
- NEW STEP & PEDESTRIAN RAMP IN FABRIC STRUCTURES - SEE DETAIL SHEET C-5
- CATCH BASIN - SEE DETAIL SHEET P-1

NEW ELEVATION

- OVERHEAD DOOR CONTROL - WITHIN STRUCTURE
- STANDARD BOLLARDS
- BOLLARDS WITH DOOR CONTROL - OUTSIDE STRUCTURE

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

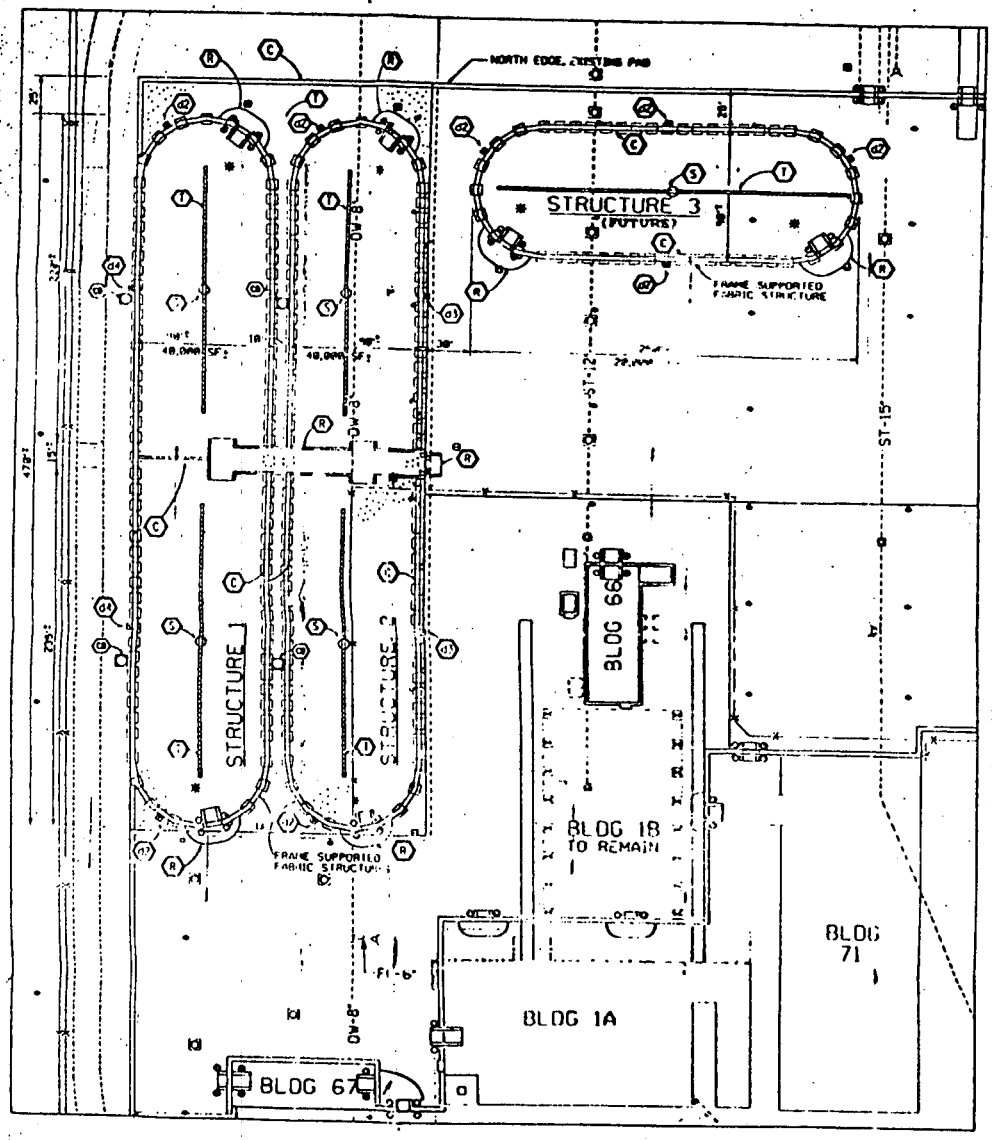
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASE A - PAD EXTENSION

DRAWN HEC	5-89	CHKD DW	5-89	APPD LHP	6-89
PLANT 1				AS NOTED	

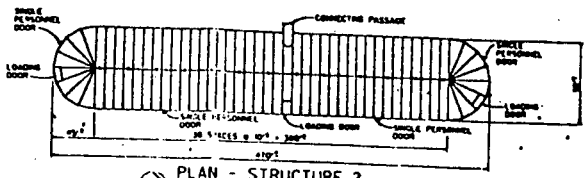
87-D-159 | 008/900 | 740-4445-C-0000-60 | C-2 | 3



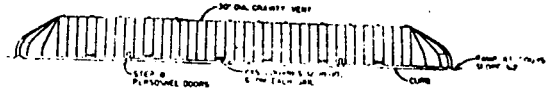
SITE PLAN

SCALE: 1" = 30'

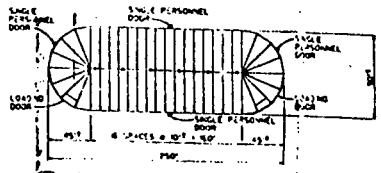
FIGURE D-9



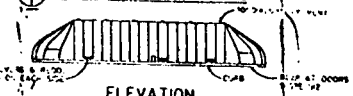
PLAN - STRUCTURE 2
STRUCTURE 1 SIMILAR



ELEVATION



PLAN - STRUCTURE 1



ELEVATION

SECTION

2 THUS

SECTION

1 THUS

FRAME SUPPORTED FABRIC STRUCTURE

LEGEND

EXISTING

- CATCH BASIN

NEW

- CATCH BASIN
- CURB
- RAMP
- SUMP
- TRENCH DRAIN
- PREFABRICATED TRENCH DRAIN SEE DWG.
- ADD STEP & PEDESTRIAN DOORS OF FABRIC STRUCTURES SEE DETAIL SHEET C-5
- ADD STEP & PEDESTRIAN DOORS OF FABRIC STRUCTURES SEE DETAIL SHEET C-5
- ADD STEP & PEDESTRIAN DOORS OF FABRIC STRUCTURES SEE DETAIL SHEET C-2
- OVERHEAD DOOR CONTROL
- BOLLARDS WITH DOOR CONTROL
- STANDARD BOLLARDS

SECTION & DETAIL KEY

NOTES

1. SEE DRAWING C-5 FOR DETAILS OF FOUNDATION, SUMPS AND TRENCH DRAINS.
2. PERSONNEL DOORS AND FRAMES TO BE HOLLOW METAL CUT SASHING, NOMINAL 3 FOOT BY 6 FOOT 8 INCH SIZE, AND TO INCLUDE HARDWARE, VISTOLE DOORS TO PROVIDE 10 FOOT, WIDE BY 7 FOOT HIGH CLEAR OPENINGS, AND TO BE EITHER HORIZONTAL SLIDING OR VERTICAL ROLL UP TYPE. ACCESS DOORS TO BE POWER OPERATED WITH PUSH-BUTTON CONTROLS POST MOUNTED OUTSIDE AND OVERHEAD DOOR CONTROLS INSIDE OF THE STRUCTURE.

AS-BUILT NOTE

[illegible]

2	AS BUILT - PHASE A&B	[illegible]	[illegible]
1	GENERAL REVISIONS	[illegible]	[illegible]
0	[illegible]	[illegible]	[illegible]

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

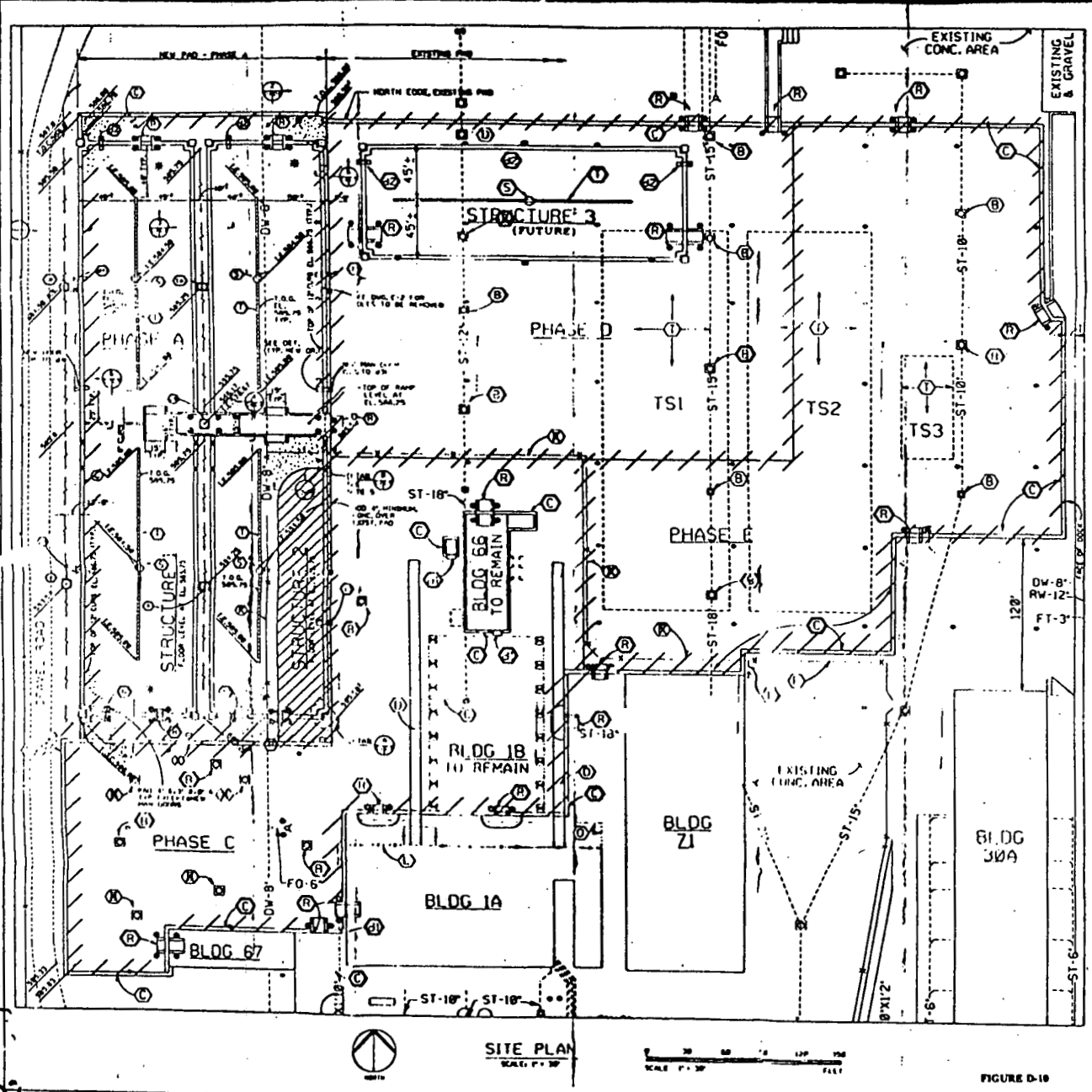
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASE D - FABRIC STRUCTURES

DESIGNED BY: HEC	6-89	DRAWN BY: EDW	6-89	CHECKED BY: LMP	DATE: 6-89
CONTRACT NO. PLANT 1				SCALE: AS NOTED	

07-0-159 | 0087502 | /48-4115-C-00108 | C-3 | 2


EXISTING CONC. AREA
EXISTING & GRAVEL
STRUCTURE 3 (FUTURE)
PHASE D
TS1
TS2
TS3
PHASE E
PHASE C
STRUCTURE
BLDG 66 TO REMAIN
BLDG 18 TO REMAIN
BLDG 21
BLDG 30A
BLDG 1A
BLDG 67
ST-18"
ST-15"
DW-8"
RW-12"
FT-3"
120'
SITE PLAN
SCALE: 1" = 30'
SCALE 1" = 30'
FIGURE D-10
LEGEND
EXISTING
NEW
UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
A. M. KINNEY, INC.
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASE C, D, & E
87-D-159
740-4445-C-00007

-4457-

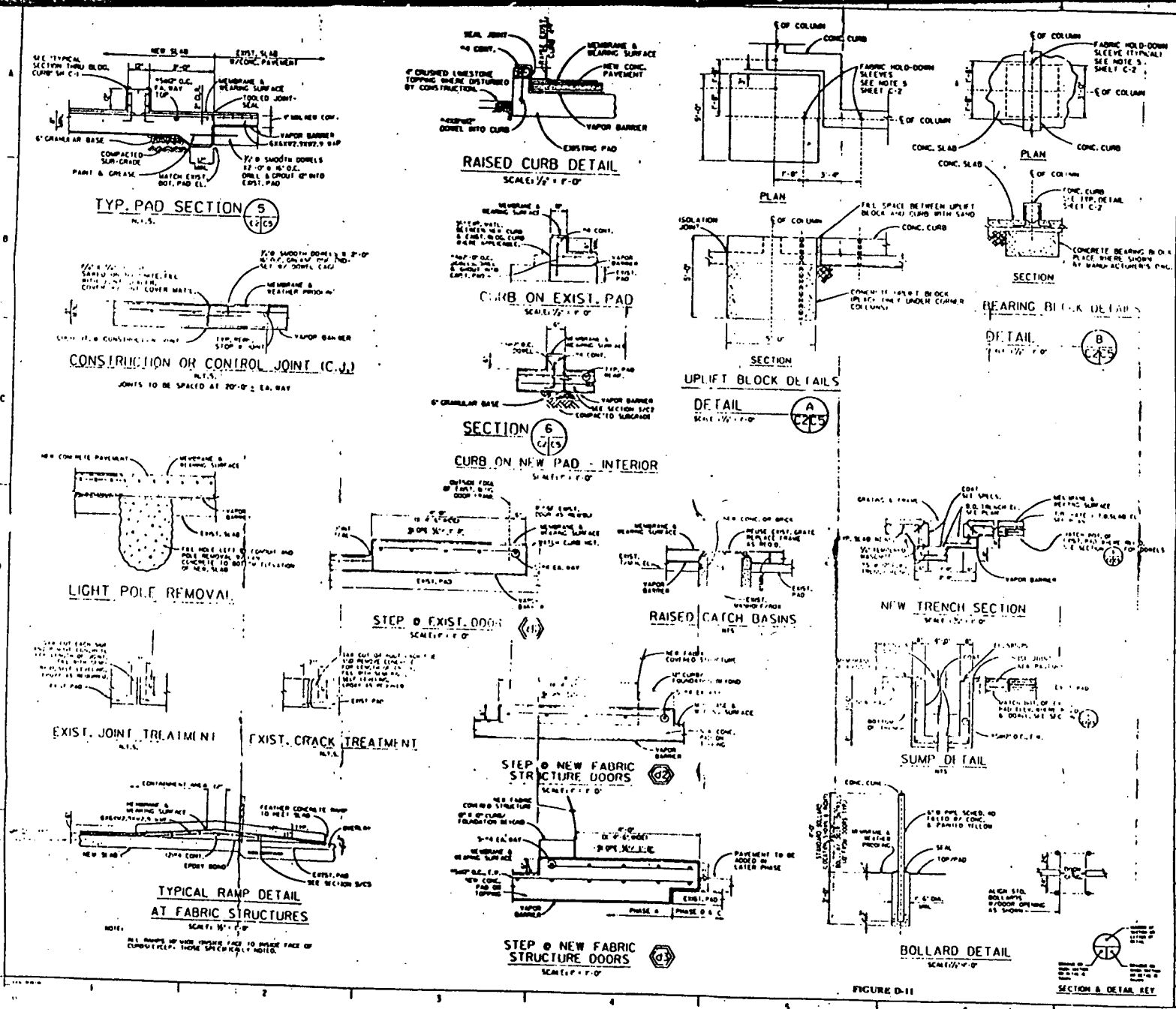
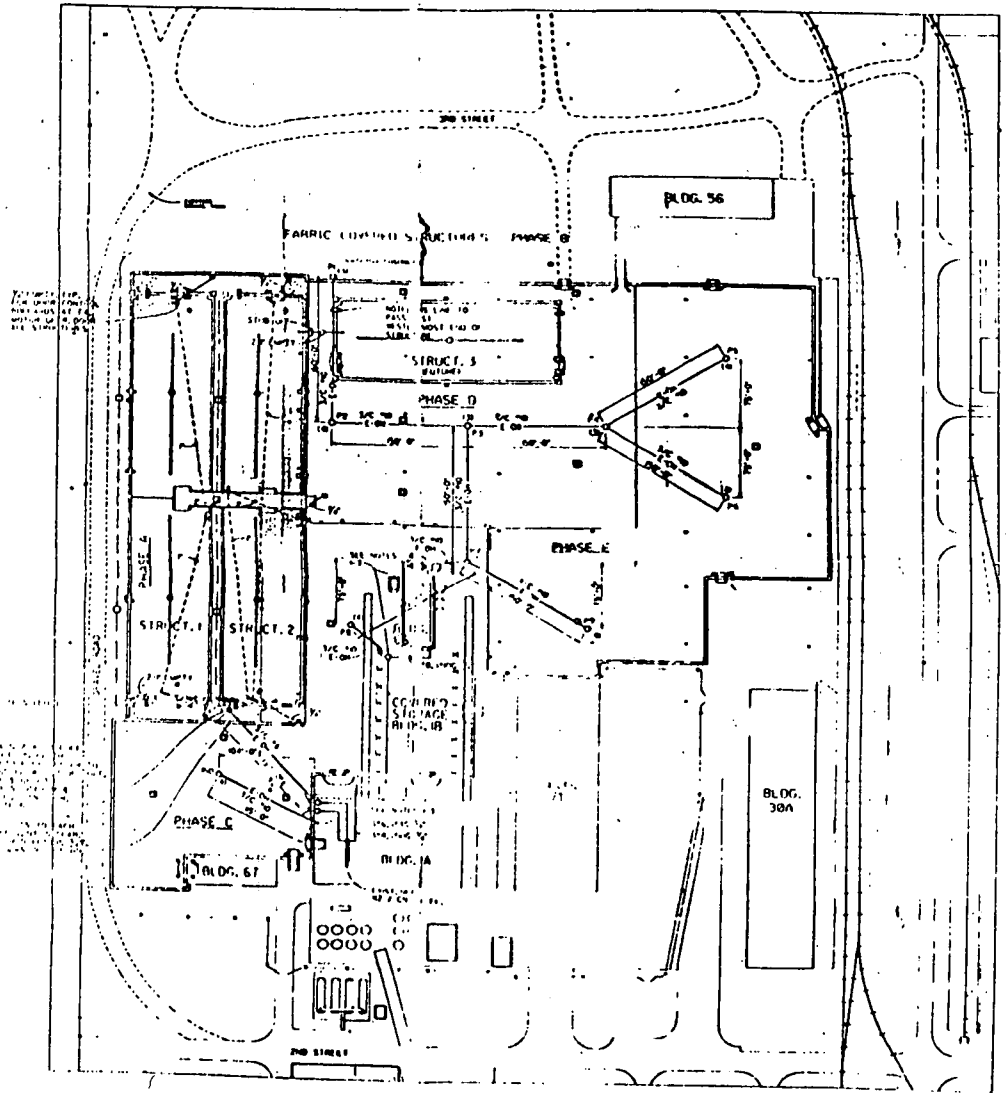
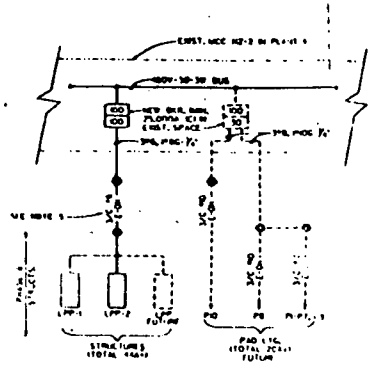

TYP. PAD SECTION
RAISED CURB DETAIL
PLAN
PLAN
SECTION
BEARING BLOCK DETAILS
DETAIL
CONSTRUCTION OR CONTROL JOINT (C.J.)
CURB ON EXIST. PAD
UPLIFT BLOCK DETAILS
DETAIL
SECTION
CURB ON NEW PAD - INTERIOR
LIGHT POLE REMOVAL
STEP @ EXIST. DOOR
RAISED CATCH BASINS
NEW TRENCH SECTION
EXIST. JOINT TREATMENT
EXIST. CRACK TREATMENT
STEP @ NEW FABRIC STRUCTURE DOORS
SUMP DETAIL
TYPICAL RAMP DETAIL AT FABRIC STRUCTURES
STEP @ NEW FABRIC STRUCTURE DOORS
BOLLARD DETAIL
SECTION & DETAIL KEY
NOTES
UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
A. M. KINNEY, INC.
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
COVERED CONTROLLED STORAGE PAD - PLANT 3
SITE DETAILS

FIGURE D-11



SITE PLAN



SINGLE LINE DIAGRAM

POLE-MTD. LUMINAIRE CONNS.			
POLE NO.	TOTAL LUMINAIRES/PHASE		
	A-B	B-C	C-A
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

AS-BUILT NOTE

FIGURE D-12

NOTES

1. ANCHOR OVERHEAD SPAN MESSENGERS TO BLDG. STEEL AS FOLLOWS:
   a. APPROX. 40'-0" FROM 30'-0" BLDG. HEIGHT, ABOVE GRADE ON BLDG. 56.
   b. 30'-0" ABOVE GRADE ON BLDGS. 67 & 30A.
   PROVIDE 3" GALV. STEEL PIPE SHIMS IF NECESSARY.
2. BOND OVERHEAD SPAN MESSENGERS TO CONDUIT SYSTEM AT POINTS OF CONNECTION BETWEEN OVERHEAD CABLE & CONDUIT SYSTEM. MESSENGERS ARE EQUIP. GROUND CONDUCTORS.
3. PROVIDE 1-HOLE WEATHERHEAD & CONDUIT FOR ENTRY OF 3/C OVERHEAD CABLE INTO BLDG. DO NOT STRIP JACKET FROM 3/C CABLE UNTIL CABLE IS ENTERED INTO JCT. BOX OR BLDG.
4. BALANCE POLE-MTD. LUMINAIRES AS EQUALLY AS POSSIBLE ON ALL 3 PHASES OF SUPPLY IN ACCORDANCE W/CONN. SCHEDULE, THIS SHEET.
5. COORDINATE LOCATION & STUBUP OF EMPTY CONDUIT NUMBER 5 WITH STRUCTURE SHOP DWGS. FOR OPTIONAL TERMINATIONS OF CONDUITS UNTIL LAID. INSTALL CONDUITS FOR DOOR CONTROL BOLLARDS. STUB UP ALL SLOCK CONDUITS 6" ABOVE SLAB & PROTECT FROM DAMAGE UNTIL ENTERED FOR USE.
6. THE MESSENGER IN THE OVERHEAD SERVICE FROM BLDG. 56 TO TERMINAL POLE NO. 1 AT STRUCT. 2 IS AN EXPANSION CONDUCTOR, NOT A NEUTRAL, AND MUST NOT BE USED AS A NEUTRAL.
7. SEE SHEET E-2 FOR DETAILS, LUMINAIRE TYPE, DATA & OVERHEAD STRANDING DATA.

LEGEND

LINE	PLAN
	CONDUIT RUN EXPOSED
	CONDUIT RUN IN UP HALF CONC. SLAB
3/C NO	OVERHEAD PRESSURIZED AERIAL CABLE ON MESSENGER, ONE SIZE INDICATED
1D 6 P3	NEW STEEL 1-1/2" POLE 14' HAMMERED ON CONC. BASE PER CTRL DWGS. FOR BASE NUMBER IN PARENTHESES INDICATES QUANT. OF LUMINAIRES ON POLE.
	NEW WOOD TERMINAL POLE, 9'/CUP
J	JUNCTION BOX
	WEATHERHEAD & JCT. BOX
100 10	WALLED CABLE BOX, FRAME TYPE
3/C 6	3/C 6 PVC, PVC-80 TO WOOD BOXES
	INTERRUPTING CAPACITY
	[illegible]
	[illegible]

REVISIONS			
0	AS-BUILT AB		
1	ORIGINAL REVISIONS		
2	[illegible]		
3	[illegible]		

UNITED STATES
DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT 1
ELECTRICAL POWER AND LIGHTING

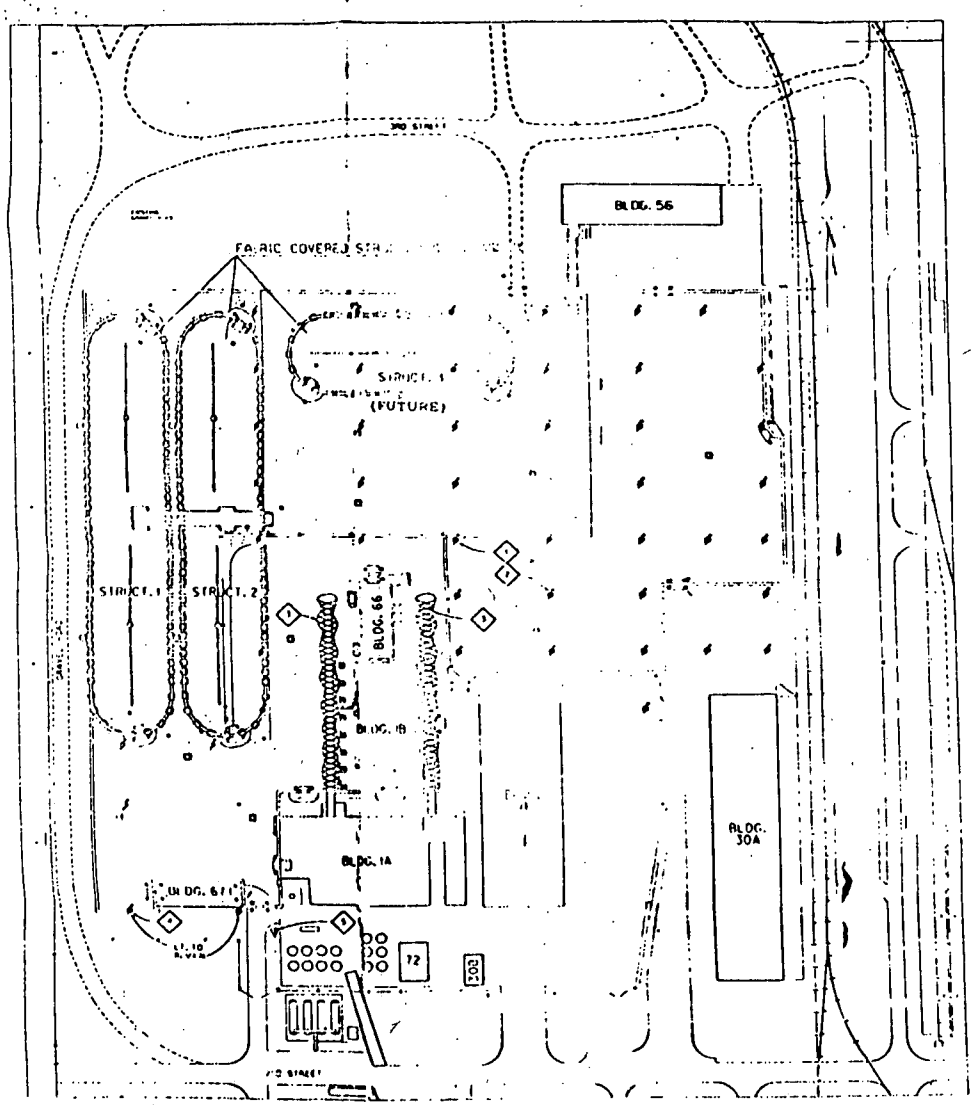
PSD	6/85	[illegible]	[illegible]	RG	[illegible]
PLANT 1					

87-D-159 | 008/502 | 748-4445-E-00069 | E-1 | 2

SECTION B DETAIL SET

-4457-

247



SITE PLAN

FIGURE D-13

ELECTRICAL DEMOLITION NOTES

1. REMOVE WOOD POLE & LT.
2. CUT OFF EXIST. CONDUIT 18IN. (+) BELOW TOP OF EXIST. PAD
3. REMOVE ELEC. WORK ON CONVEYOR GALLERIES (BEING REMOVED UNDER THIS SUBPROJECT)
4. DISCONN. BRANCH CKT. AT THIS LOC. FOR PHASE C AREA LTG. DEMOLITION
5. DISCONN. & INSULATE PRI. & SEC. WIRING AT EXIST. CONSTANT CURRENT TRANSF.

LEGEND

AS BUILT NOTE

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

A. M. KINNEY, INC.

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT
ELECTRICAL DEMOLITION

87-D-159 | 008750 | 748-4445-E-000TO | E-2

SECTION & DETAIL REF.

248

-4457-

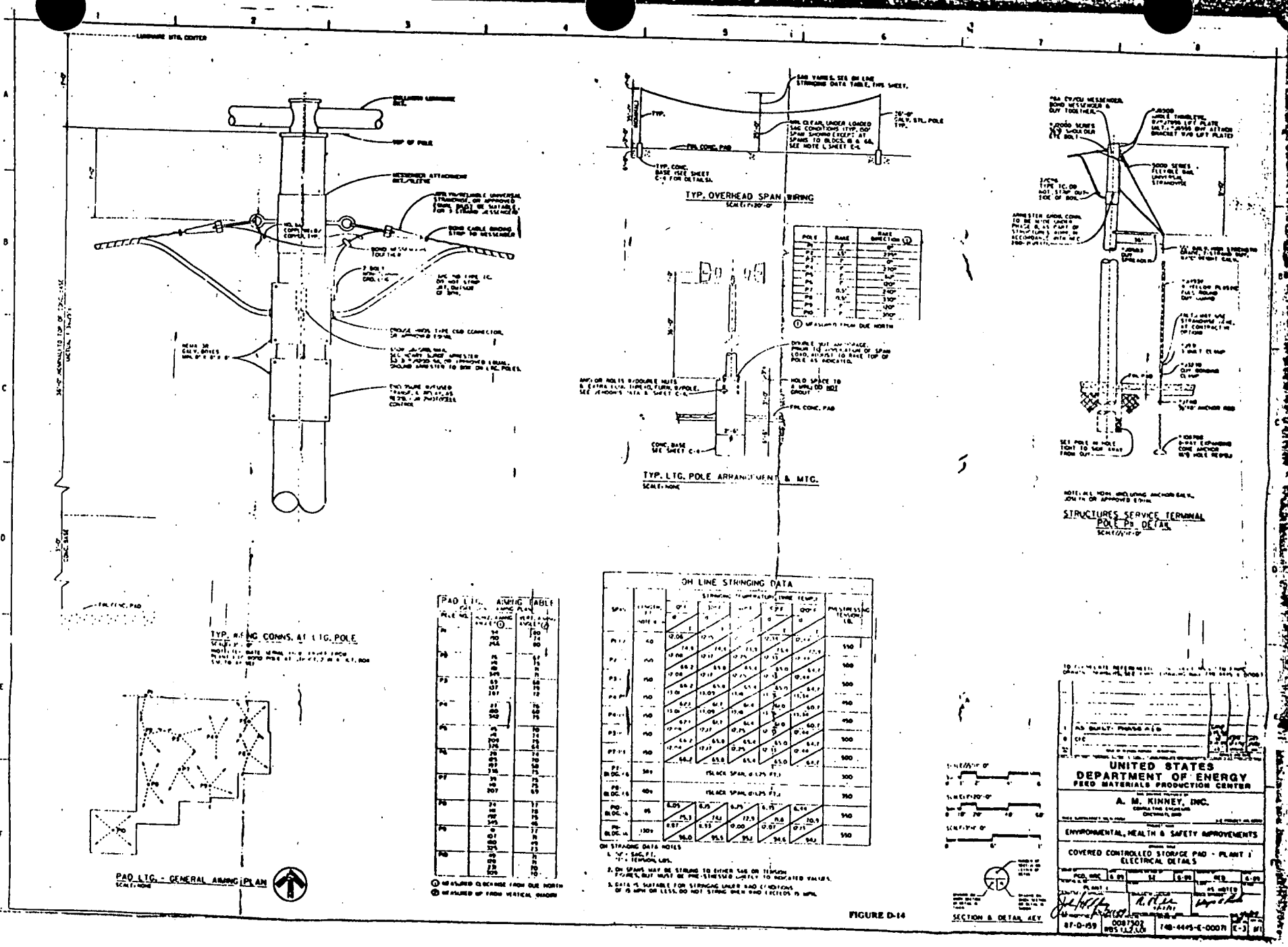
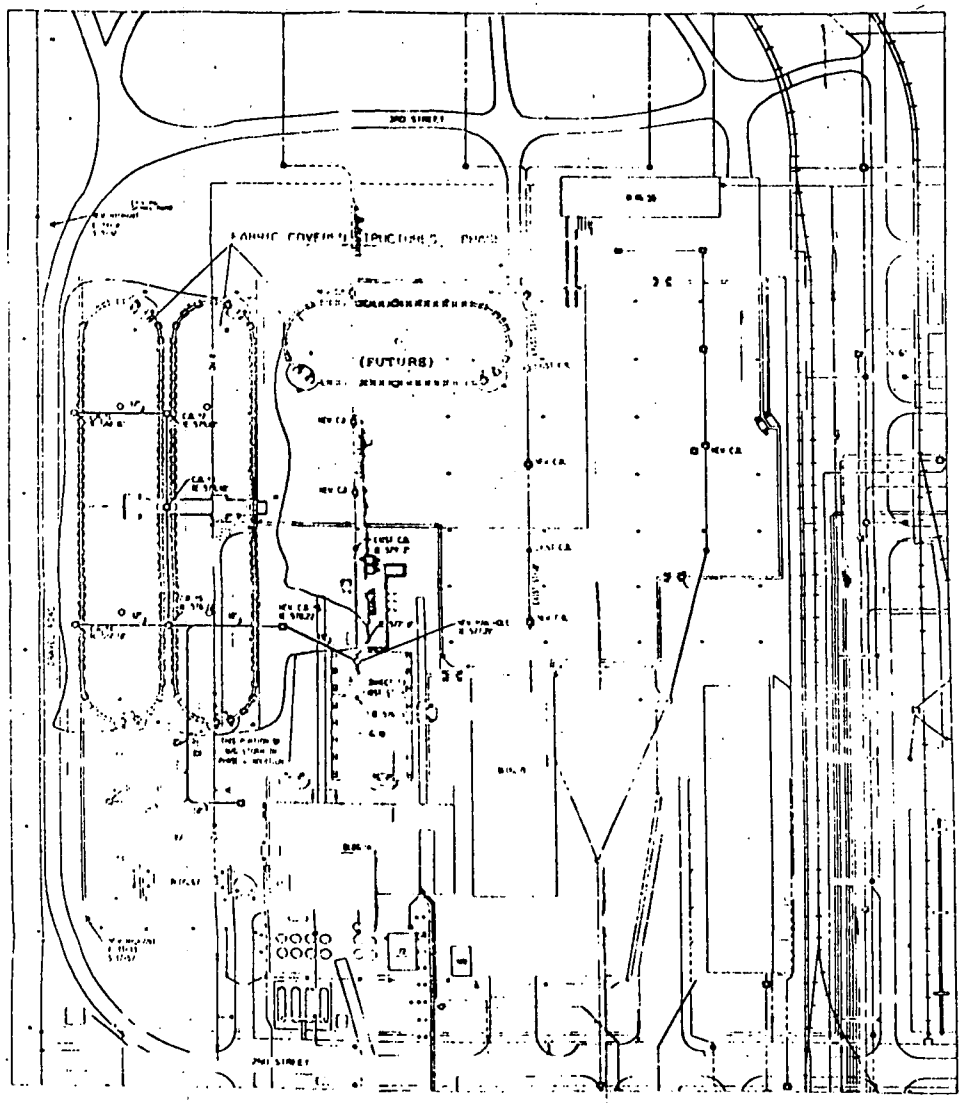
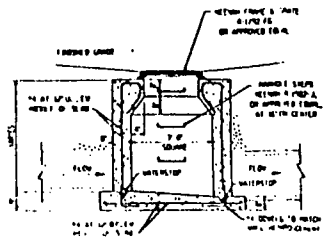


FIGURE D-14

-4457-



SITE PLAN



TYPICAL CATCH BASIN

FIGURE D-15

SECTION & DETAIL KEY

NOTES

AS BUILT NOTE

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

A. M. KINNEY, INC.

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

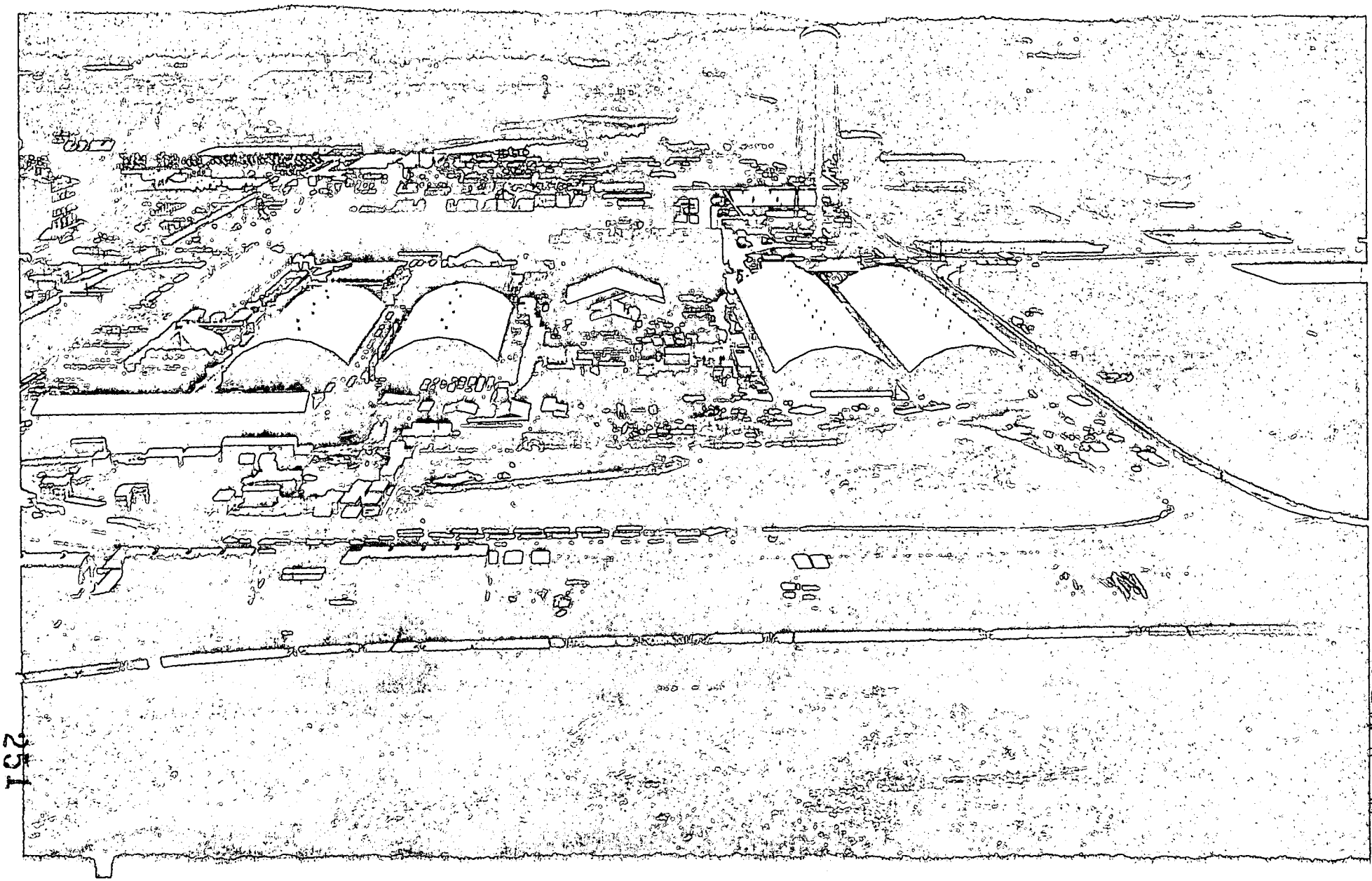
COVERED CONTROLLED STORAGE PAD - PLANT 1
SITE DRAINAGE

87-0-159 | 008 1502 | 748-4445-P-00072 | P-1 | 1

-4457-

FIG. D-16

PLANT 1 PAD



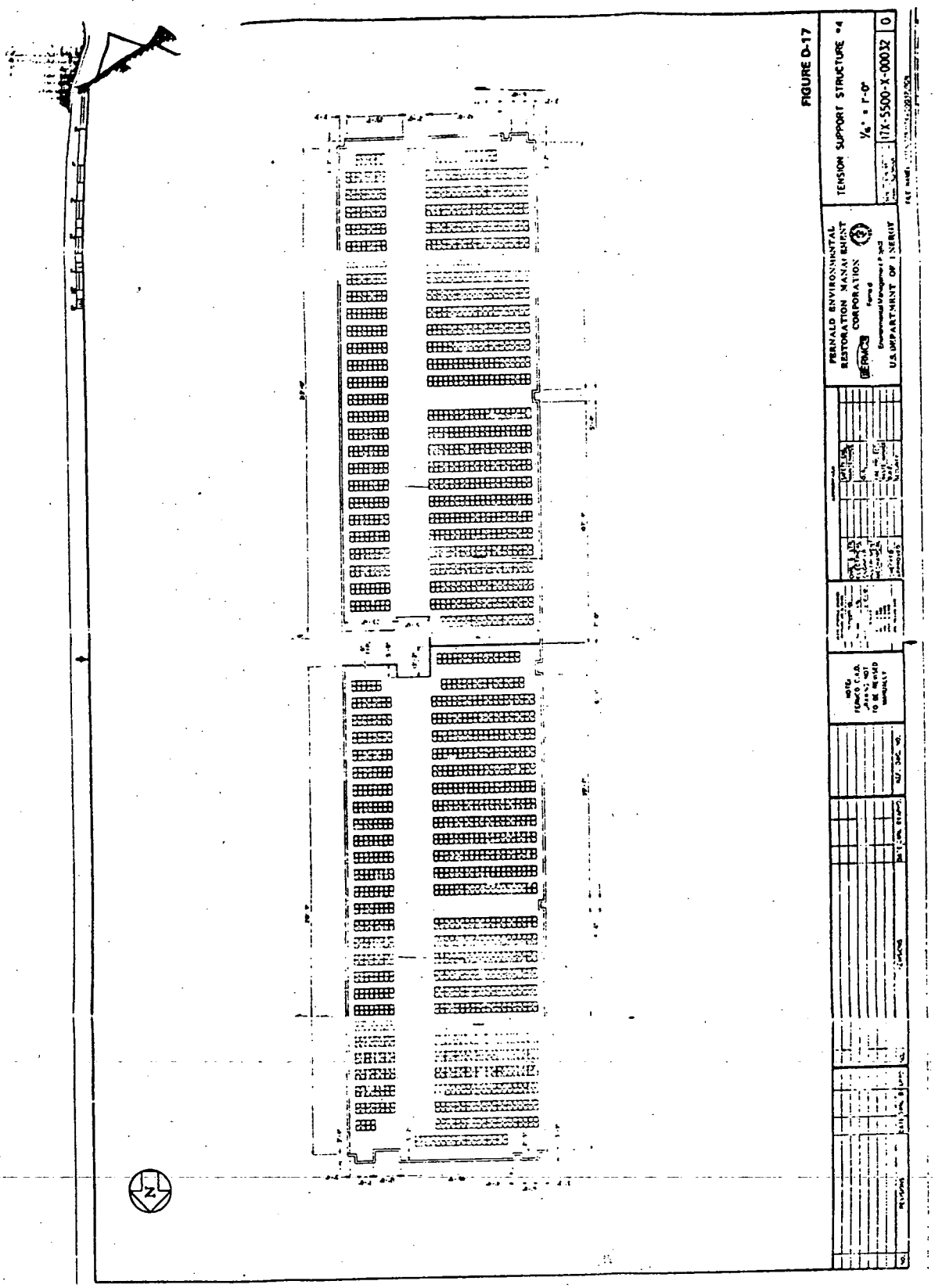


FIGURE D-17
TENSION SUPPORT STRUCTURE #4
1/8" = 1'-0"
17X-5500-X-00032
0
FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION
U.S. DEPARTMENT OF ENERGY
N

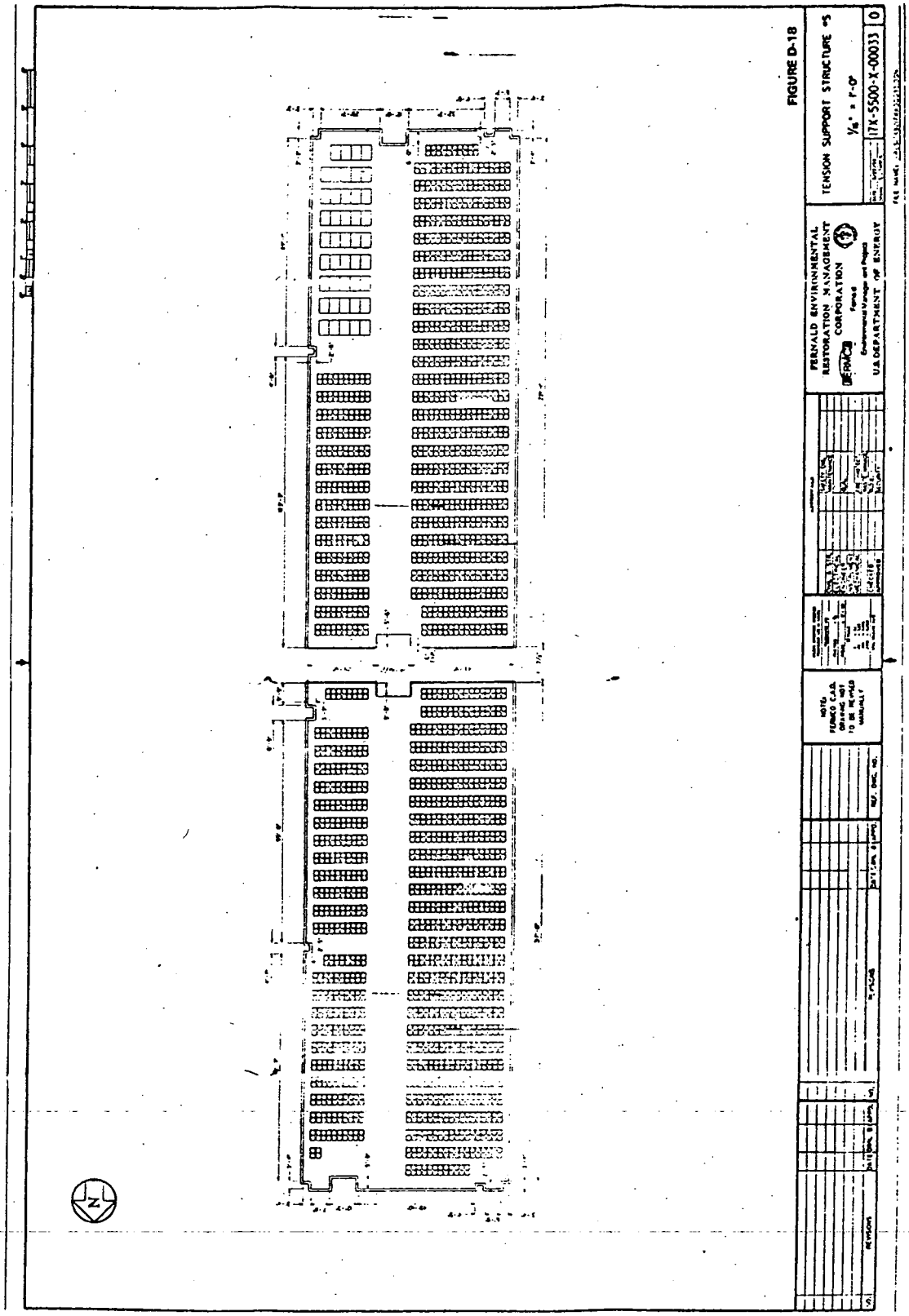
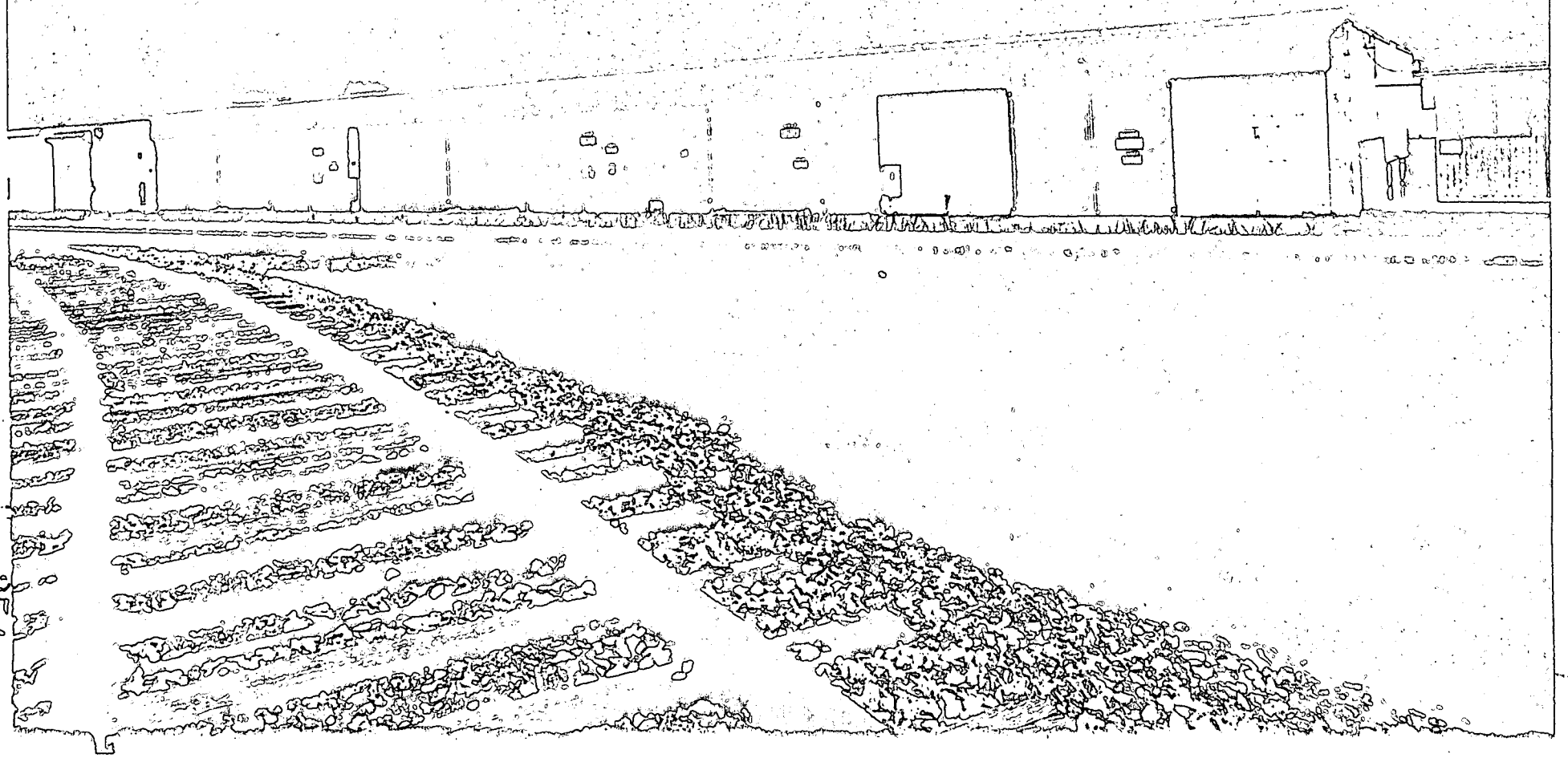
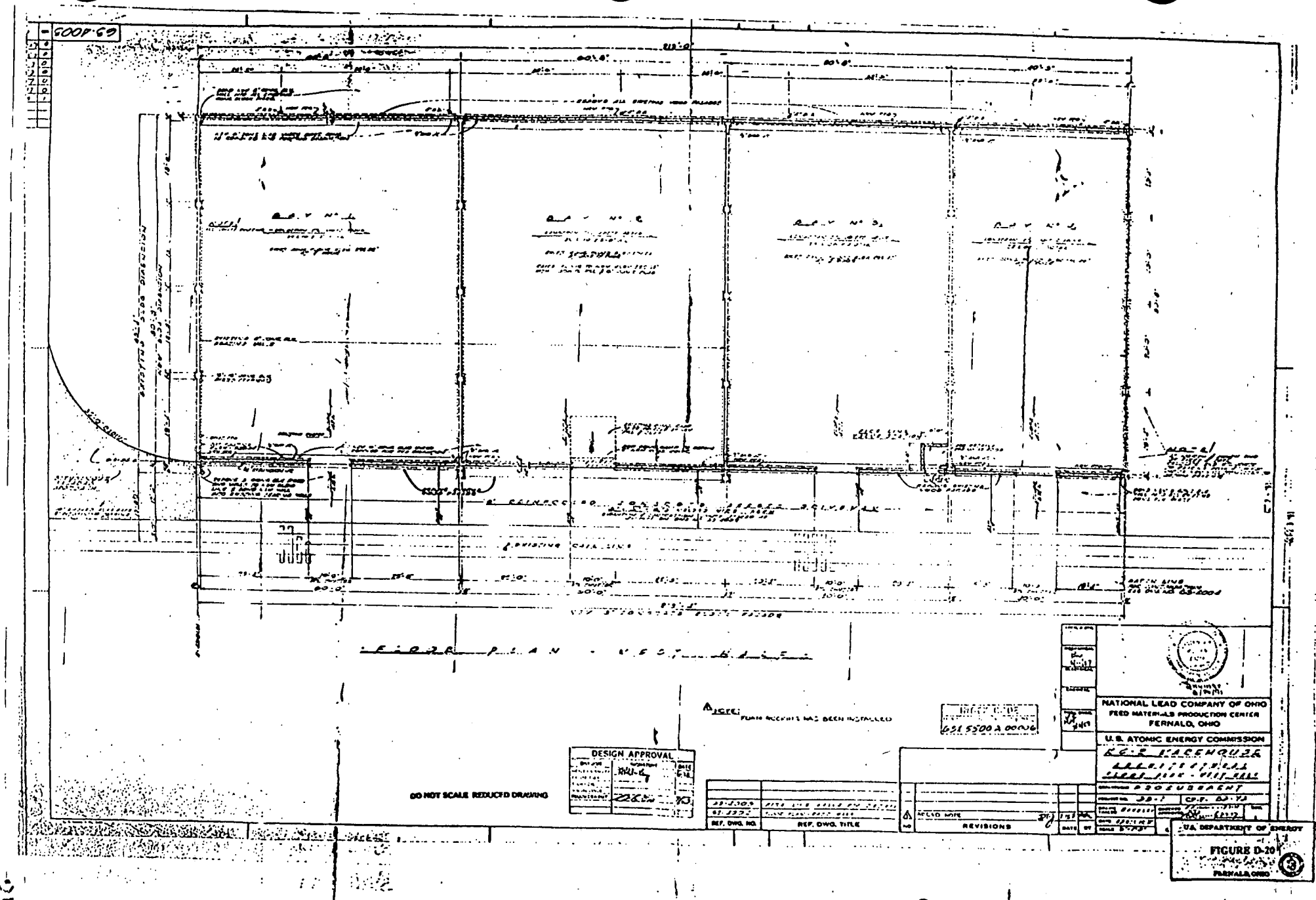


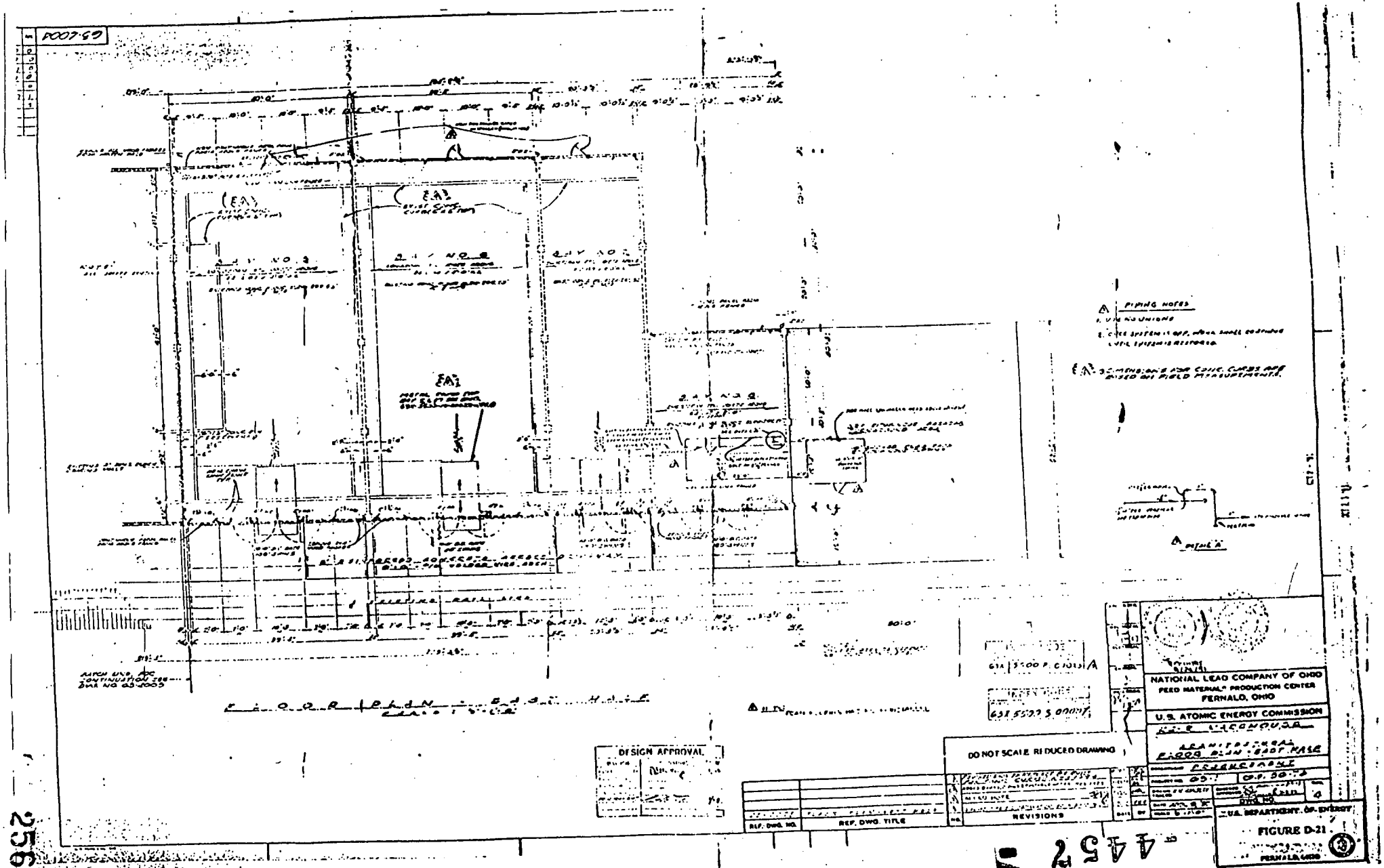
FIGURE D-18
TENSION SUPPORT STRUCTURE #5
1/8" = 1'-0"
ITK-5500-X-00033
0
FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION
U.S. DEPARTMENT OF ENERGY
NOTE:
FERMCO CAD DRAWING NOT TO BE REVISED MANUALLY
REVISIONS
STATUS
DATE
REF. DWG. NO.

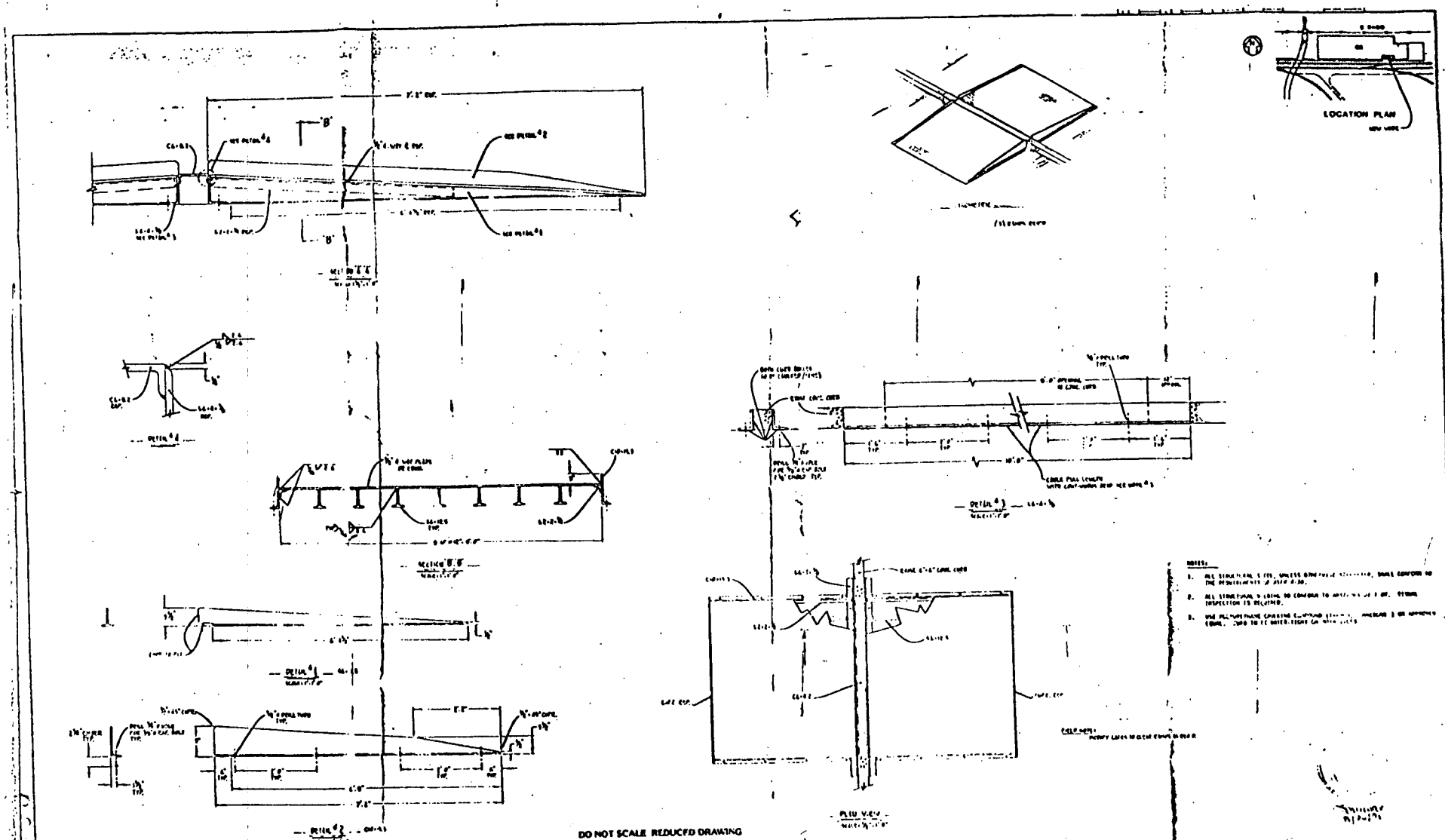
FIG. D-19

KC-2 WAREHOUSE (BLDG. 63)




FIRST PLAN - WEST HALF
DO NOT SCALE REDUCED DRAWING
DESIGN APPROVAL
REF. DWG. NO.
REF. DWG. TITLE
REVISIONS
NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO
U.S. ATOMIC ENERGY COMMISSION
U.S. DEPARTMENT OF ENERGY
FIGURE D-20
FERNALD OHIO


NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO
U.S. ATOMIC ENERGY COMMISSION
DO NOT SCALE REDUCED DRAWING
DESIGN APPROVAL
REVISIONS
REF. DWG. TITLE
U.S. DEPARTMENT OF ENERGY
FIGURE D-21



NO.	REVISIONS	DATE	DWN BY	APPD	NO.	REVISIONS	DATE	DWN BY	APPD

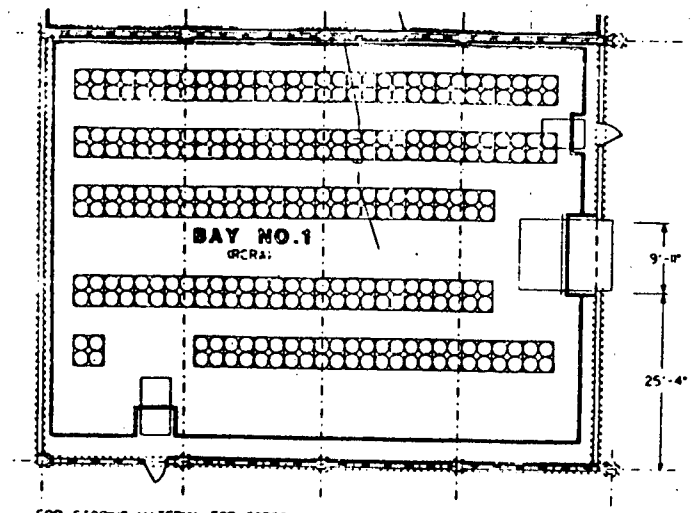
REF. DWG. NO.

APPROVALS

WESTINGHOUSE MAT'LS. CO. OF OHIO
FERNALD, OHIO
FEED MATERIALS PRODUCTION CENTER
U.S. DEPARTMENT OF ENERGY

U.S. DEPARTMENT OF ENERGY

FIGURE D-22
FERNALD, OHIO



FOR STORING MATERIAL FOR CODED "A,B,E,F,C, & K" REACTIVITY . HES

FIGURE D-23

APPROVALS					
CIVIL & STR.			SAFETY ENG.		
ELECTRICAL			MAINTENANCE		
ENGINEER			O.A.		
INSTRUMENT					
MECHANICAL			ENV. PROJECT.		
			WASTE MANAGE		
CHECKED			D.O.E.		
APPROVED			SECURITY		

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO
FERNALD
ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

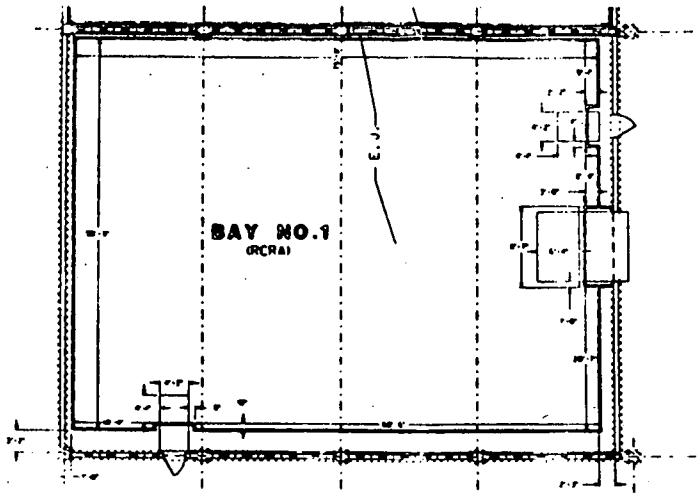
PLANT 63 — KC-2 WAREHOUSE

BAY #1
DRUM PALLET LAYOUT
3/32" = 1'-0"

WES 9748
DATE MAR. 22, 1993
DRAWN JSB

63X-5500-X-00029 | 0

FILE NAME: /usr/model/res/resl748/63bo/l.jp



FOR STORING MATERIAL FOR CODED 'A,B,E,F,G, & K' REACTIVITY CODES

FIGURE D-24

APPROVALS			
CIVIL & STR.		SAFETY ENG.	
ELECTRICAL		MAINTENANCE	
ENGINEER		Q.A.	
INSTRUMENT			
MECHANICAL		FIRE PROTECT.	
		WASTE MANAGE	
CHECKED		D.O.E.	
APPROVED		SECURITY	

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

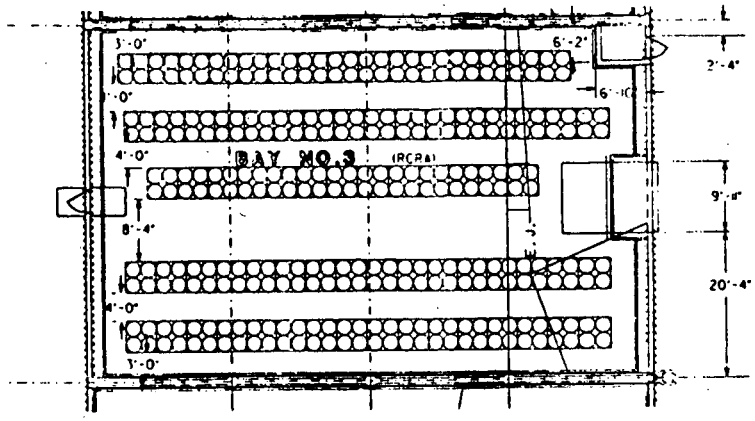
PLANT 63 — NO. 2 WAREHOUSE

BAY #1
DRUM PALLET LAYOUT
3/32" = 1'-0"

RES 4748
DATE Mar. 22, 1993
DRAWN JAW

63X-5500-X-00029 | 0

FILE NAME: /usr/model/res/res1748/63bay1.dgn



FOR STORING MATERIAL FOR CODED "A,B,E,F,G, & K" REACTIVITY CODES

FIGURE D-25

APPROVALS					
			SAFETY ENG.		
CIVIL & STR.			MAINTENANCE		
ELECTRICAL					
ENGINEER			Q.A.		
INSTRUMENT					
MECHANICAL			FIRE PROTECT.		
			WASTE MANAGE		
CHECKED			D.O.E.		
APPROVED			SECURITY		

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

PLANT 63 — KC-2 WAREHOUSE

BAY #3
DRUM PALLET LAYOUT
1/12" = 1'-0"

RES. 91748
DATE NOV. 27, 1992
DRAWN JEW

63X-5500-X-00031 | 0

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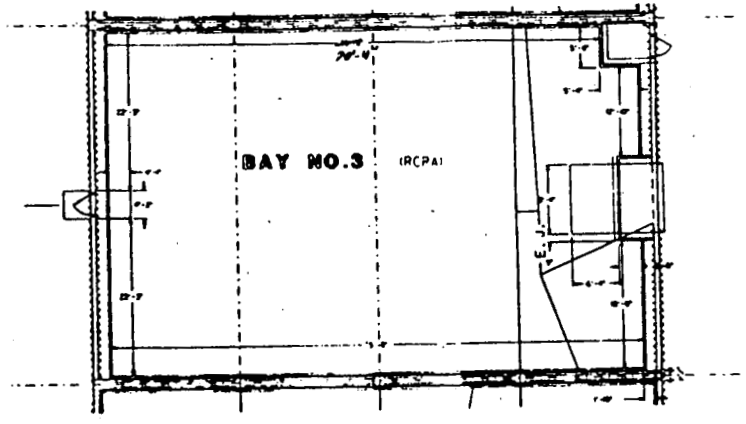


FOR STORING MATERIAL FROM CODED "A,B,E,F,... & K" REACTIVITY CODES

FIGURE D-26

APPROVALS					
			SAFETY ENG.		
CIVIL & STR.			MAINTENANCE		
ELECTRICAL					
ENGINEER			O.A.		
INSTRUMENT					
MECHANICAL			FIRE PROTECT.		
			WASTE MANAGE.		
CHECKED			D.O.E.		
APPROVED			SECURITY		

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

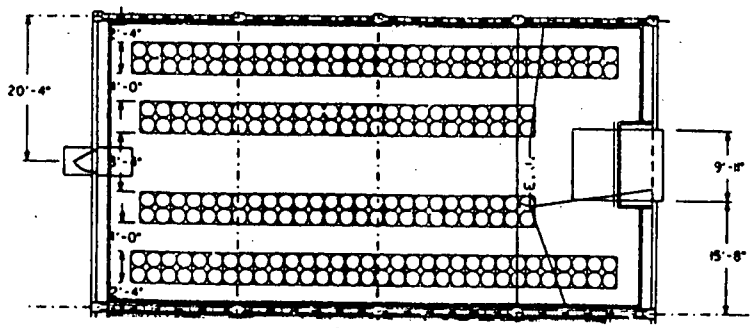
PLANT 63 — KC-2 WAREHOUSE

BAY #3
DRUM PALLET LAYOUT
3/32" = 1'-0"

RES 4748
DATE NOV. 22, 1992
DRAWN JBW

63X-5500-X-00031 | 0

FILE NAME: /usr model/res/res1748/63bay3.dgn



BAY NO.4

(PCHA)

FOR STORING MATERIAL FOR CODED "a,B,E,F,G, & K" REACTIVITY CODES

FIGURE D-27

APPROVALS				
CIVIL & STR.			SAFETY ENG.	
ELECTRICAL			MAINTENANCE	
ENGINEER			O.A.	
INSTRUMENT				
MECHANICAL			FIRE PROTECT.	
			WASTE MANAGE	
CHECKED			D.O.E.	
APPROVED			SECURITY	

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO

FERNALD, OHIO

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

U.S. DEPARTMENT OF ENERGY

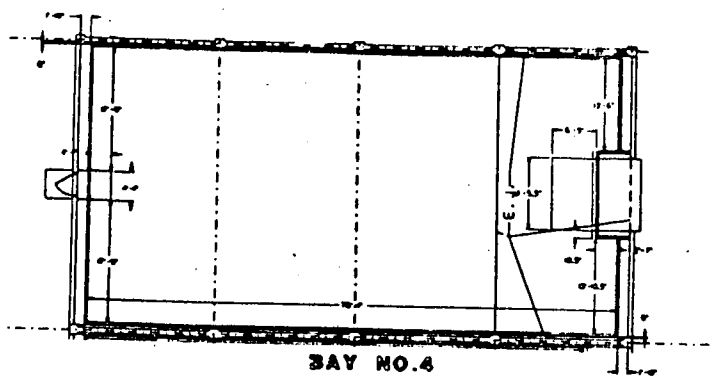
PLANT 63 — KC-2 WAREHOUSE

BAY #4
DRUM PALLET LAYOUT
3/32" = 1'-0"

RES 1748
DATE Mar. 22, 1993
Drawn JSW

63X-5500-X-00032 | 0

FILE NAME: /usr/model/res/res1748/63bay4.dgn



BAY NO.4

(RCRA)

FOR STORING MATERIAL FOR CODED "A,B,E,F,G, & K" REACTIVITY CODES

FIGURE D-28

APPROVALS			
CIVIL & STR.		SAFETY ENG.	
ELECTRICAL		MAINTENANCE	
ENGINEER		O.A.	
INSTRUMENT			
MECHANICAL		FIRE PROTECT.	
		WASTE MANAGE.	
CHECKED		O.O.C.	
APPROVED		SECURITY	

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO

FERNALD, OHIO

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

U.S. DEPARTMENT OF ENERGY

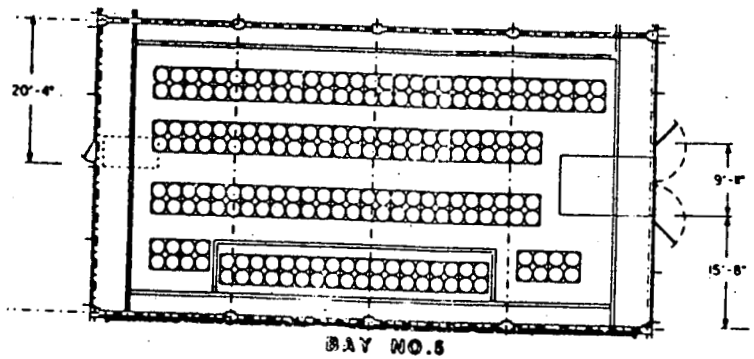
PLANT 63 — KC-2 WAREHOUSE

BAY #4
DRUM PALLET LAYOUT
1/32" = 1'-0"

DATE NOV. 22, 1993

63X-5500-X-00032 | 0

FILE NAME: /usr/model/res/resl748/63bay4.dgn



BAY NO.5

(RCRA)

FOR STORING MATERIAL FOR CODED 'A,B,E,F,G, & K' REACTIVITY CODES

FIGURE D-29

APPROVALS					
CIVIL & STR.			SAFETY ENG.		
ELECTRICAL			MAINTENANCE		
ENGINEER					
INSTRUMENT			Q.A.		
MECHANICAL					
			FIRE PROTECT.		
			WASTE MANAGE		
CHECKED			Q.O.E.		
APPROVED			SECURITY		

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO

FERNALD, OHIO

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

U.S. DEPARTMENT OF ENERGY

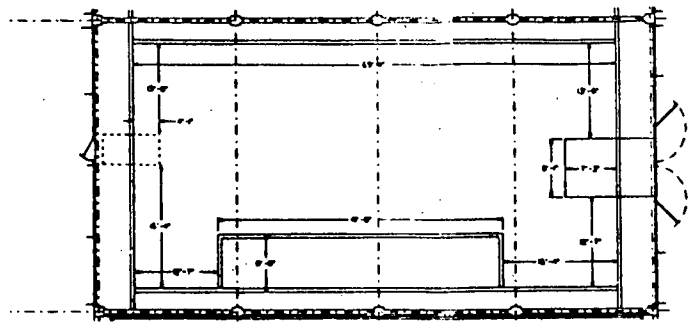
PLANT 63 — KC-2 WAREHOUSE

BAY #5
DRUM PALLET LAYOUT
3/32" = 1'-0"

RES #748
DATE MAR. 17, 1993
DRAWN JSW

63X-5500-X-00033 | 0

FILE NAME: /usr/model/res/resi748/63bay5.dgn



BAY NO.5

(RCRA)

FOR STORING MATERIAL FOR CODED "A,B,E,F,G, & K" REACTIVITY CODES

FIGURE D-30

APPROVALS					
			SAFETY ENG.		
CIVIL & STR.			MAINTENANCE		
ELECTRICAL					
ENGINEER			O.A.		
INSTRUMENT					
MECHANICAL			FIRE PROTECT.		
			WASTE MANAGE		
CHECKED			D.O.E.		
APPROVED			SECURITY		

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

PLANT 63 — KC-2 WAREHOUSE

BAY #5
DRUM PALLET LAYOUT
1/32" = 1'-0"

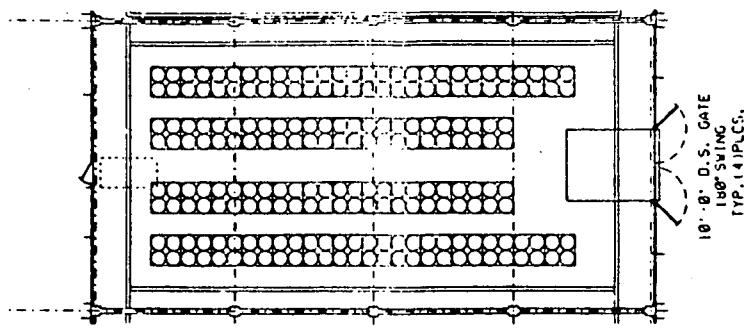
RES 4740
DATE MAR. 17, 1993
DRAWN JSW

63X-5500-X-00033 | 0

FILE NAME: /usr/model/res/resi749/63bay5.rpn

-4452-

FIGURE D-31



BAY NO.8

FOR STORING MATERIAL FOR CODED "A,B,E,F,G, & H" REACTIVITY CODES

APPROVALS					
CIVIL & STR.			SAFETY ENG.		
ELECTRICAL			MAINTENANCE		
ENGINEER			G.A.		
INSTRUMENT					
MECHANICAL			FME PROJECT.		
			WASTE MANAGE		
CHECKED			D.O.E.		
APPROVED			SECURITY		

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO
FERNALD
ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

PLANT 63 — KC-2 WAREHOUSE

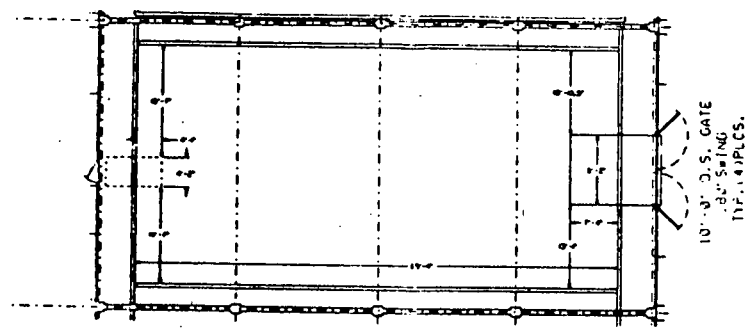
BAY #6
DRUM PALLET LAYOUT
3/32" = 1'-0"

WES NYAB
DATE MAR. 17, 1993
DRAWN JAW

63X-5500-X-00034 | 0

FILE NAME: /usr/model/ces/ces1743/63x-5/6.3gp

FIGURE D-32



BAY NO.6
(RCRA)
FOR STORING MATERIAL FOR CODED "A,B,E,F,G, & K" REACTIVITY CODES

APPROVALS			
CIVIL & STR.		SAFETY & MAINTENANCE	
ELECTRICAL			
ENGINEER		Q.A.	
INSTRUMENT			
MECHANICAL		FIRE PROTECT. WASTE MANAGE	
CHECKED		D.O.E.	
APPROVED		SECURITY	

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

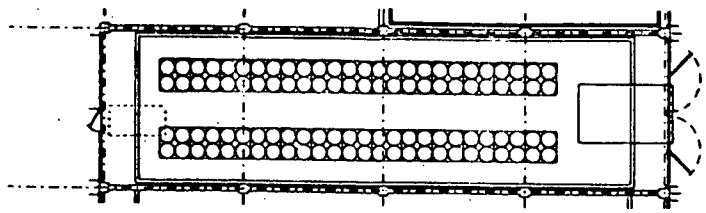
PLANT 63 — KC-2 WAREHOUSE

BAY #6
DRUM PALLET LAYOUT
3/32" = 1'-0"

RES. 1748
DATE NOV. 17, 1995
DRAWN JSW

63X-5500-X-00034 | 0

FILE NAME: /usr/model/res/res1748/63bay6.dgn



BAY NO.7

(RCRA)

FOR STORING MATERIAL FOR CODED 'A,B,E,F,G, & K' REACTIVITY CODES

FIGURE D-33

APPROVALS			
CIVIL & STR.		SAFETY & MAINTENANCE	
ELECTRICAL			
ENGINEER		Q.A.	
INSTRUMENT			
MECHANICAL		PROJECT	
		WASTE MANAGE	
CHECKED		Q.O.E.	
APPROVED		SECURITY	

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

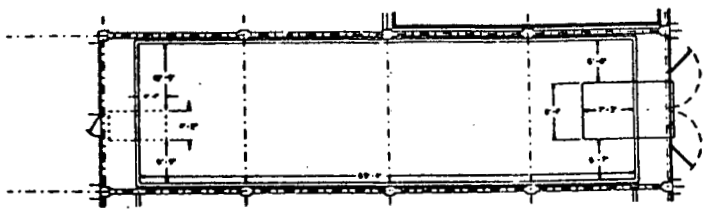
PLANT 63 — RC-2 WAREHOUSE

BAY #7
DRUM PALLET LAYOUT
7/32" = 1'-0"

RES. 4748
DATE MAR. 17, 1993
DRAWN JBW

63X-5500-X-00035 | 0

FILE NAME: /usr/model/res/resl748/63bay7.dgn



BAY NO.7

(RCRA)

FOR STORING MATERIAL FOR CODED 'A,B,E,F,G, & K' REACTIVITY CODES

FIGURE D-34

APPROVALS					
CIVIL & STR.			SAFETY ENG.		
ELECTRICAL			MAINTENANCE		
ENGINEER			O.A.		
INSTRUMENT					
MECHANICAL			SAFE PROTECT.		
			WASTE MANAGE		
CHECKED			D.O.E.		
APPROVED			SECURITY		

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO

FERNALD, OHIO

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

U.S. DEPARTMENT OF ENERGY

PLANT 63 — KC-2 WAREHOUSE

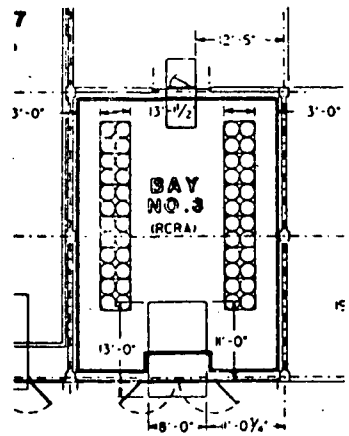
BAY #7
DRUM PALLET LAYOUT
1/32" = 1'-0"

WES 1748
DATE Mar. 17, 1993
DRAWN JSW

63X-5500-X-00035 | 0

FILE NAME: /usr/model/res/res1748/63bay7.dgn

FIGURE D-35



FOR STORING MATERIAL FOR CODES A,B,E,F,G, & K REACTIVITY CODES

APPROVALS					
CIVIL & STR.			SAFETY ENG.		
ELECTRICAL			MAINTENANCE		
ENGINEER			Q.A.		
INSTRUMENT					
MECHANICAL			FIRE PROTECT.		
			WASTE MANAGE.		
CHECKED			D.O.E.		
APPROVED			SECURITY		

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

PLANT 63 — RCRA WAREHOUSE

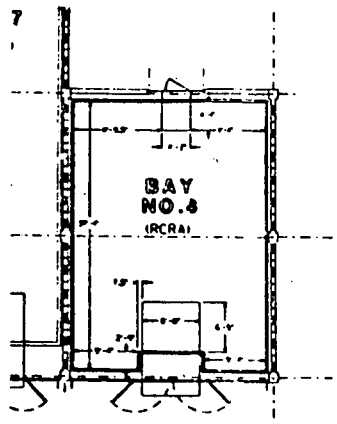
BAY #8
DRUM PALLET LAYOUT
3/32" = 1'-0"

63X-5500-X-00036 | 0

FILE NAME: [illegible]

-4452-

FIGURE D-36



APPROVALS			
CIVIL & STR.		SAFETY ENG.	
ELECTRICAL		MAINTENANCE	
ENGINEER		O.A.	
INSTRUMENT			
MECHANICAL		FPC PROJECT	
		WASTE MANAGE	
CHECKED		D.O.E.	
APPROVED		SECURITY	

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

PLANT 63 — KC-2 WAREHOUSE

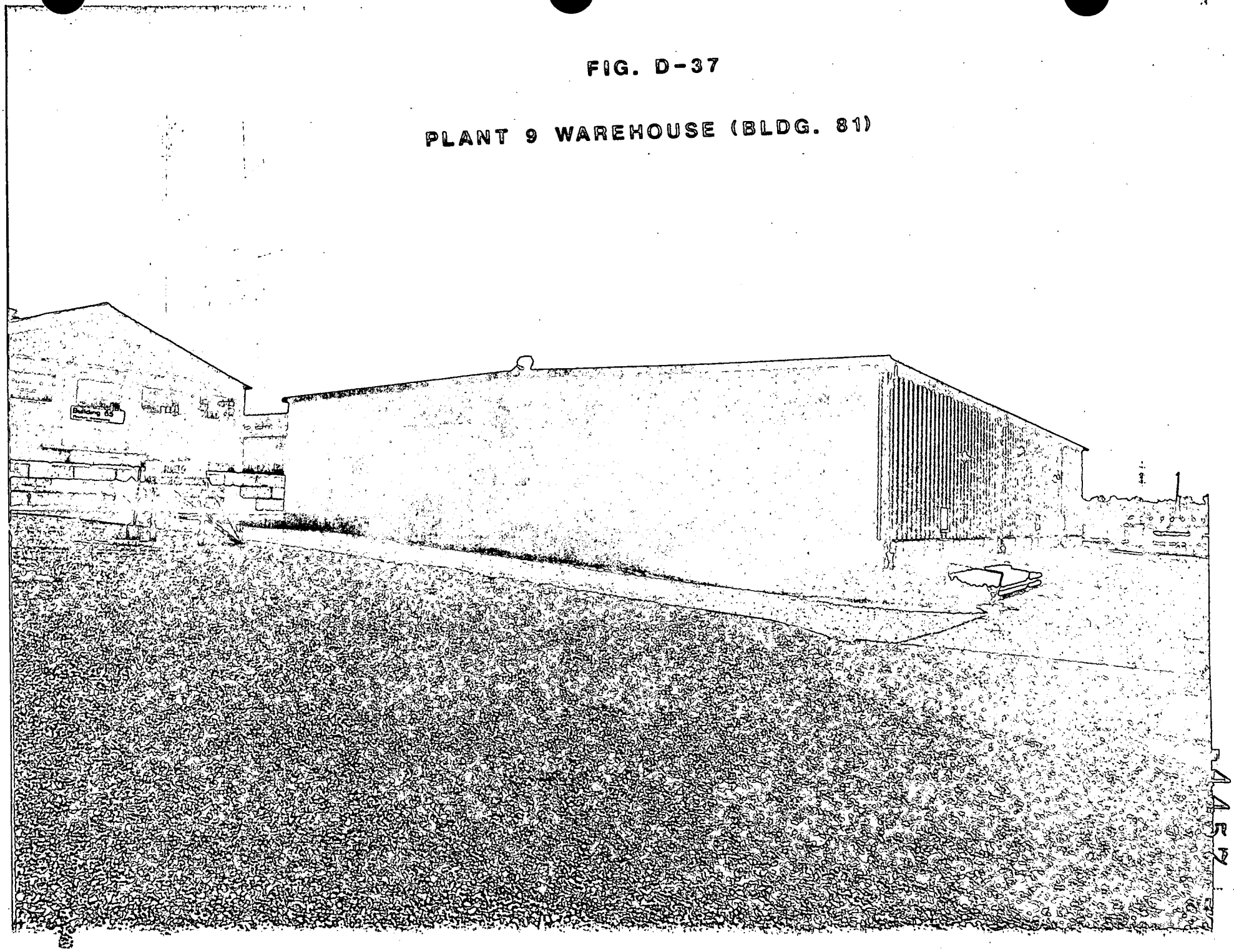
BAY #8
DRUM PALLET LAYOUT
3/32" = 1'-0"

63X-5500-X-00036 | 0

FILE NAME: [illegible]

FIG. D-37

PLANT 9 WAREHOUSE (BLDG. 81)



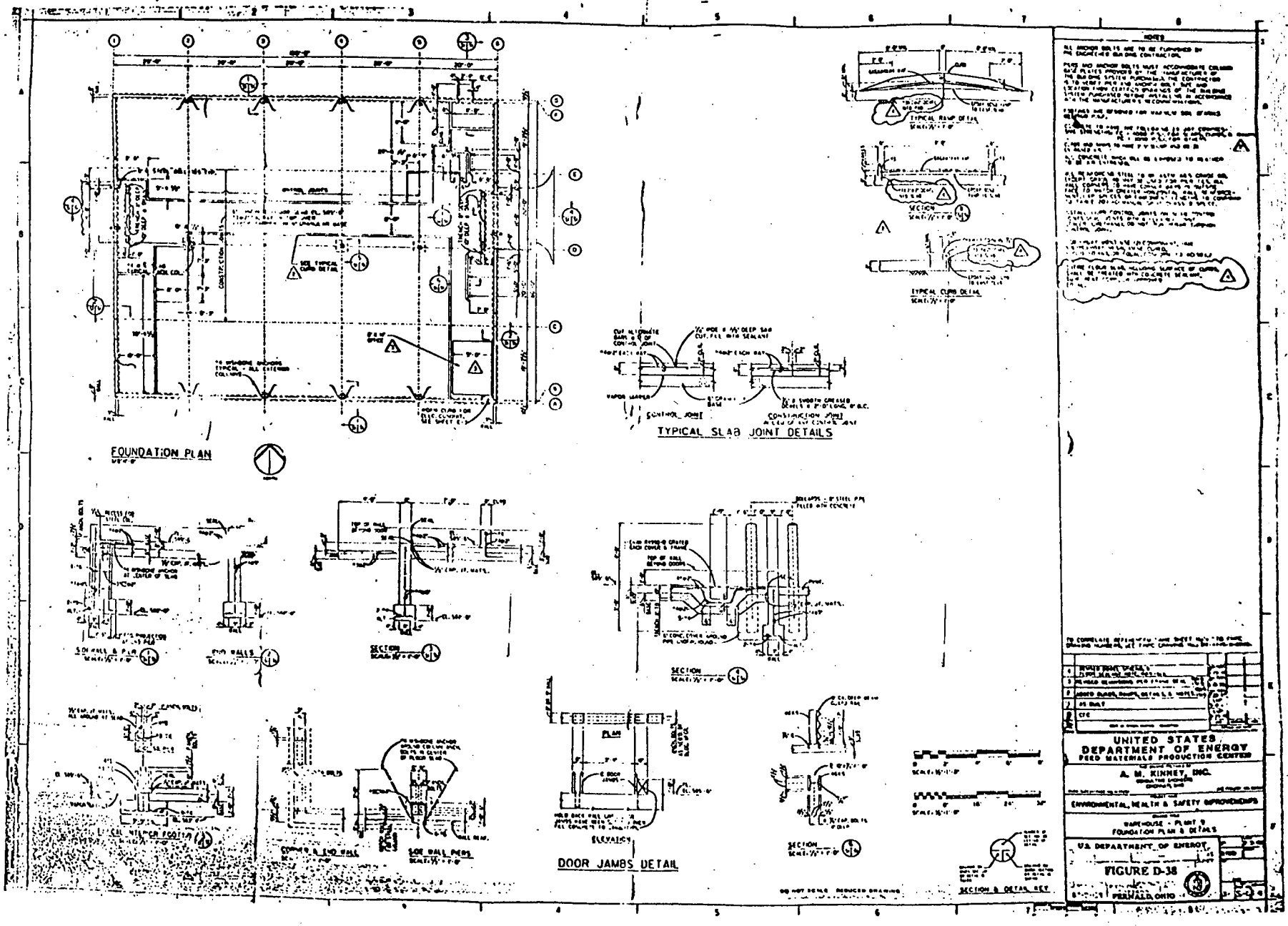

FOUNDATION PLAN
TYPICAL SLAB JOINT DETAILS
CONTROL JOINT
CONSTRUCTION JOINT
TYPICAL RAMP DETAIL
SECTION
TYPICAL CURB DETAIL
SECTION
DOOR JAMBS DETAIL
ELEVATION
PLAN
SECTION
SECTION & DETAIL KEY
NOTES
UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
A. M. KINNEY, INC.
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
WAREHOUSE - PLANT 9
FOUNDATION PLAN & DETAILS
U.S. DEPARTMENT OF ENERGY
FIGURE D-38
FERNALD, OHIO

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FIGURE D-39

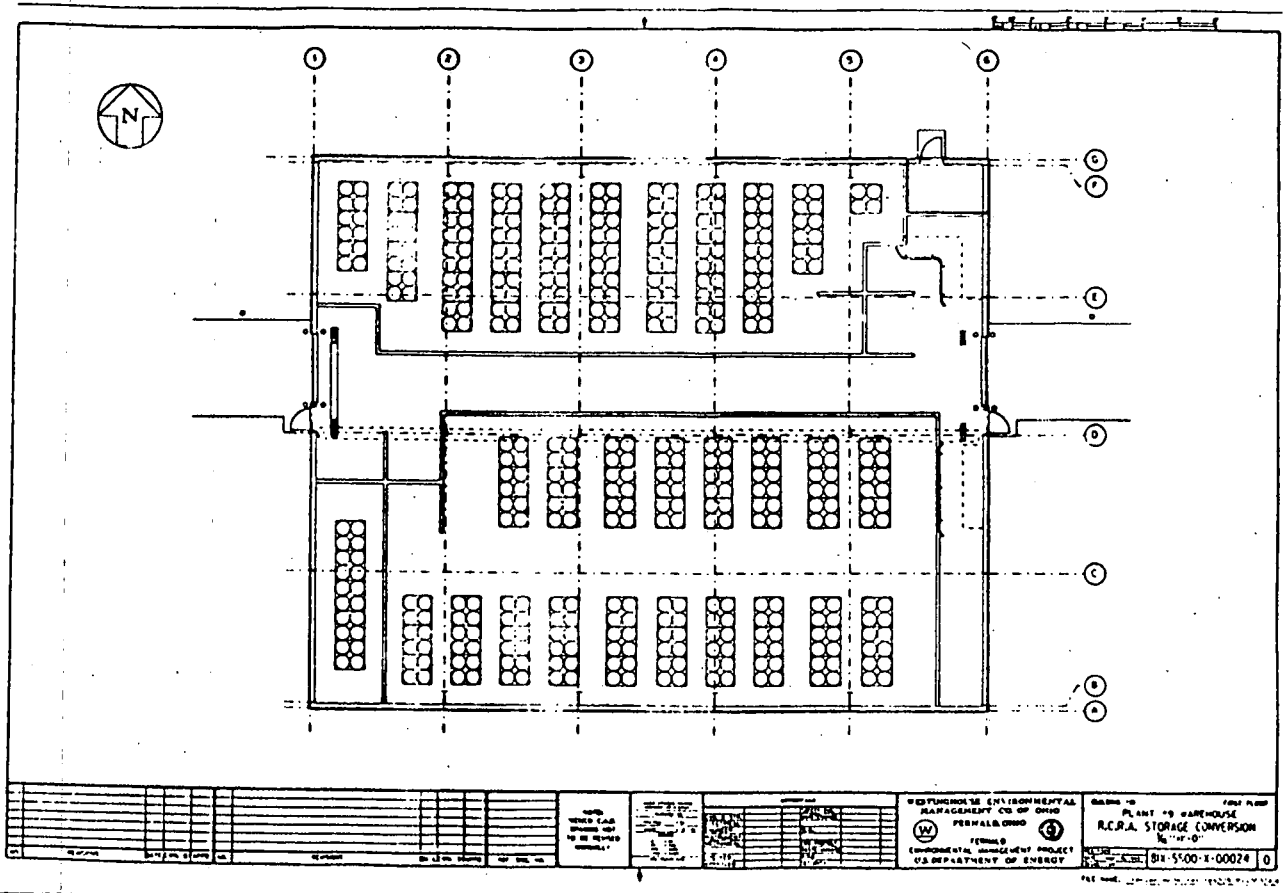
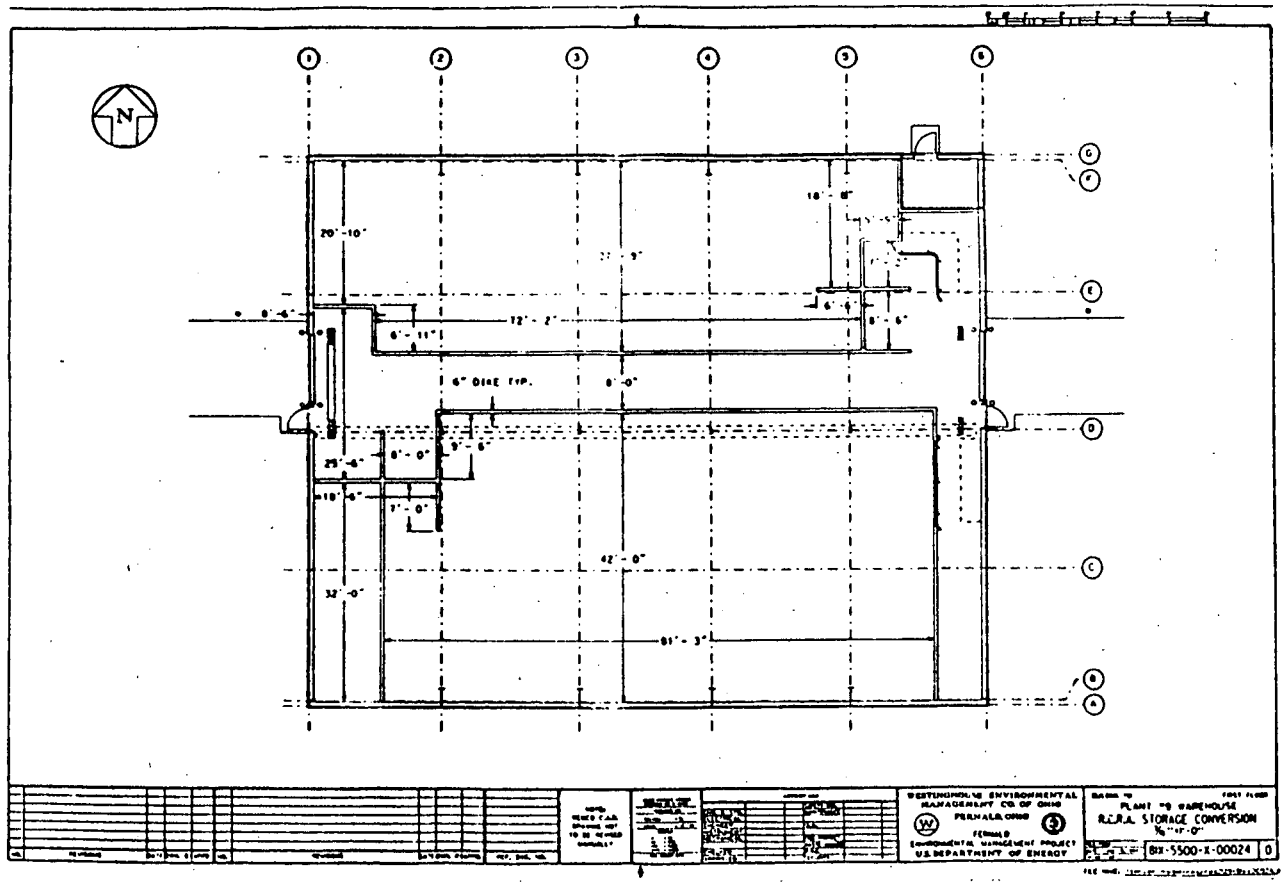

N
WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO OF OHIO
PERMALOY
ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY
PLANT 19 WAREHOUSE
R.C.R.A. STORAGE CONVERSION
BIX-5100-X-00024
0

FIGURE D-40


N
1
2
3
4
5
6
C
F
E
D
C
B
A
20'-10"
18'-8"
6'-4"
12'-2"
6'-11"
6" DIKE TYP.
8'-0"
25'-4"
8'-0"
9'-6"
18'-6"
7'-0"
42'-0"
32'-0"
81'-3"
WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
PERMALOG, OHIO
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY
PLANT #9 WAREHOUSE
R.C.R.A. STORAGE CONVERSION
1/8"=1'-0"
OU-5500-X-00024
0

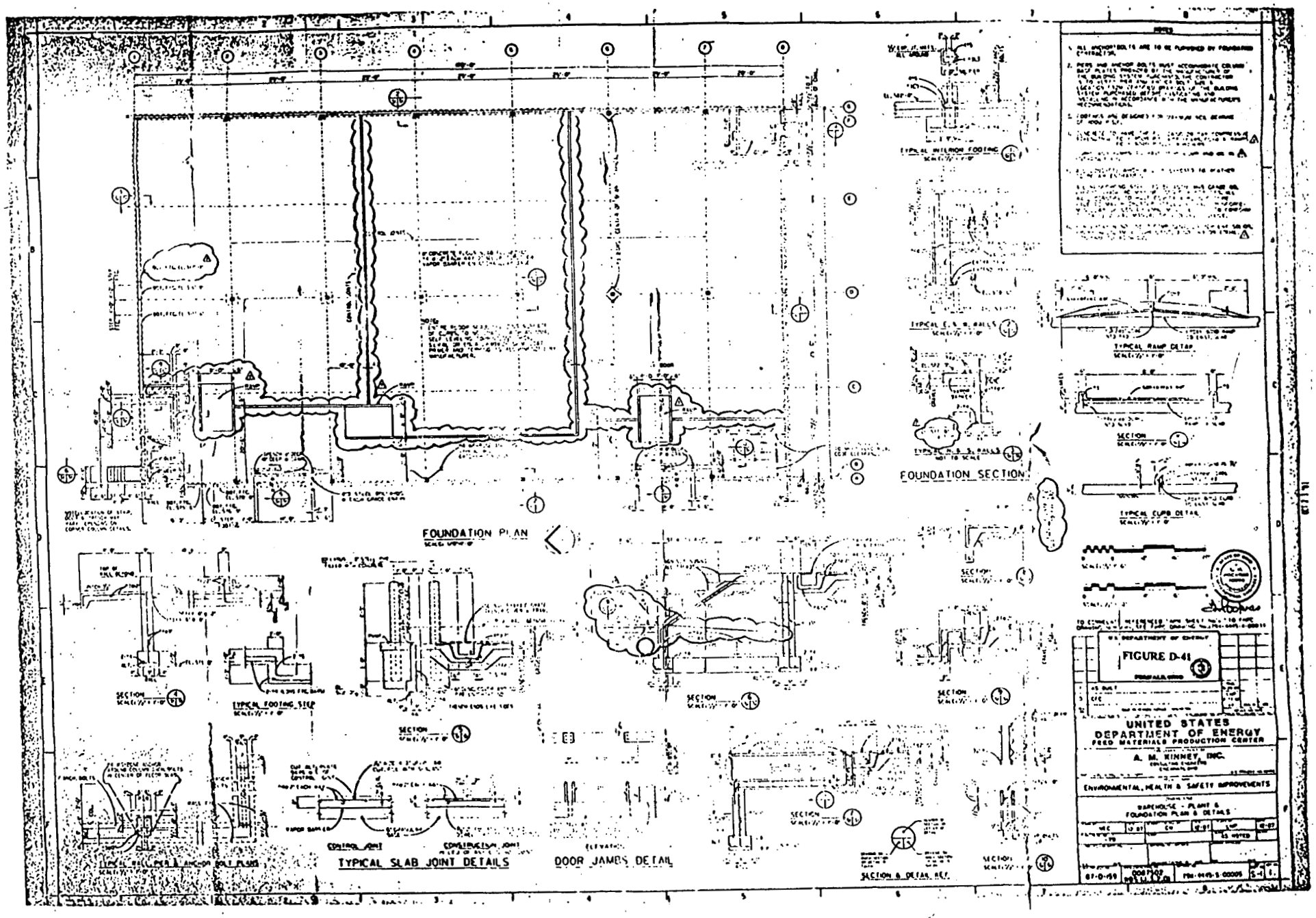

FOUNDATION PLAN
FOUNDATION SECTION
TYPICAL SLAB JOINT DETAILS
DOOR JAMBS DETAIL
TYPICAL RAMP DETAIL
TYPICAL CURB DETAIL
TYPICAL FOOTING STEP
FIGURE D-41
UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
A. M. KINNEY, INC.
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
WAREHOUSE - PLANT & FOUNDATION PLAN & DETAILS

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FIGURE D-42

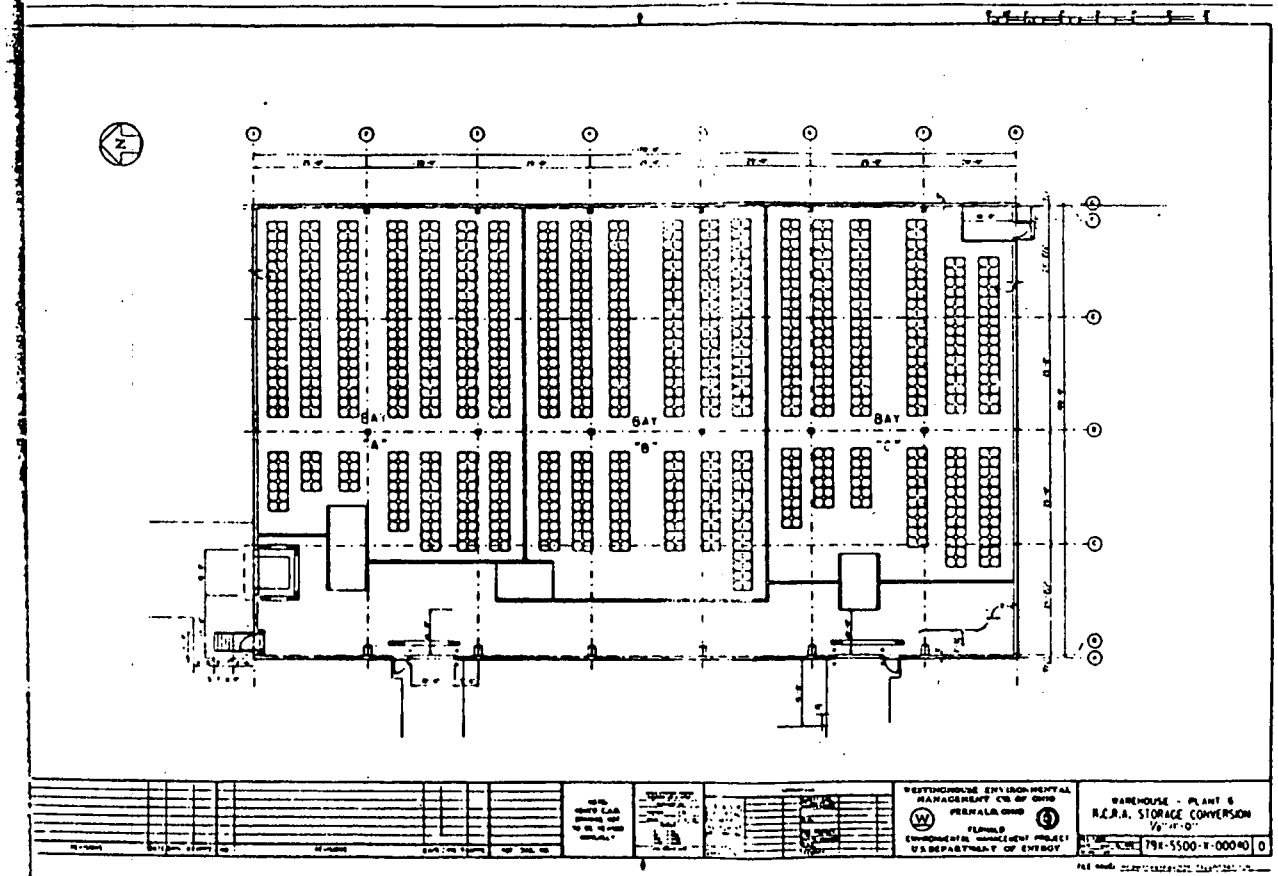
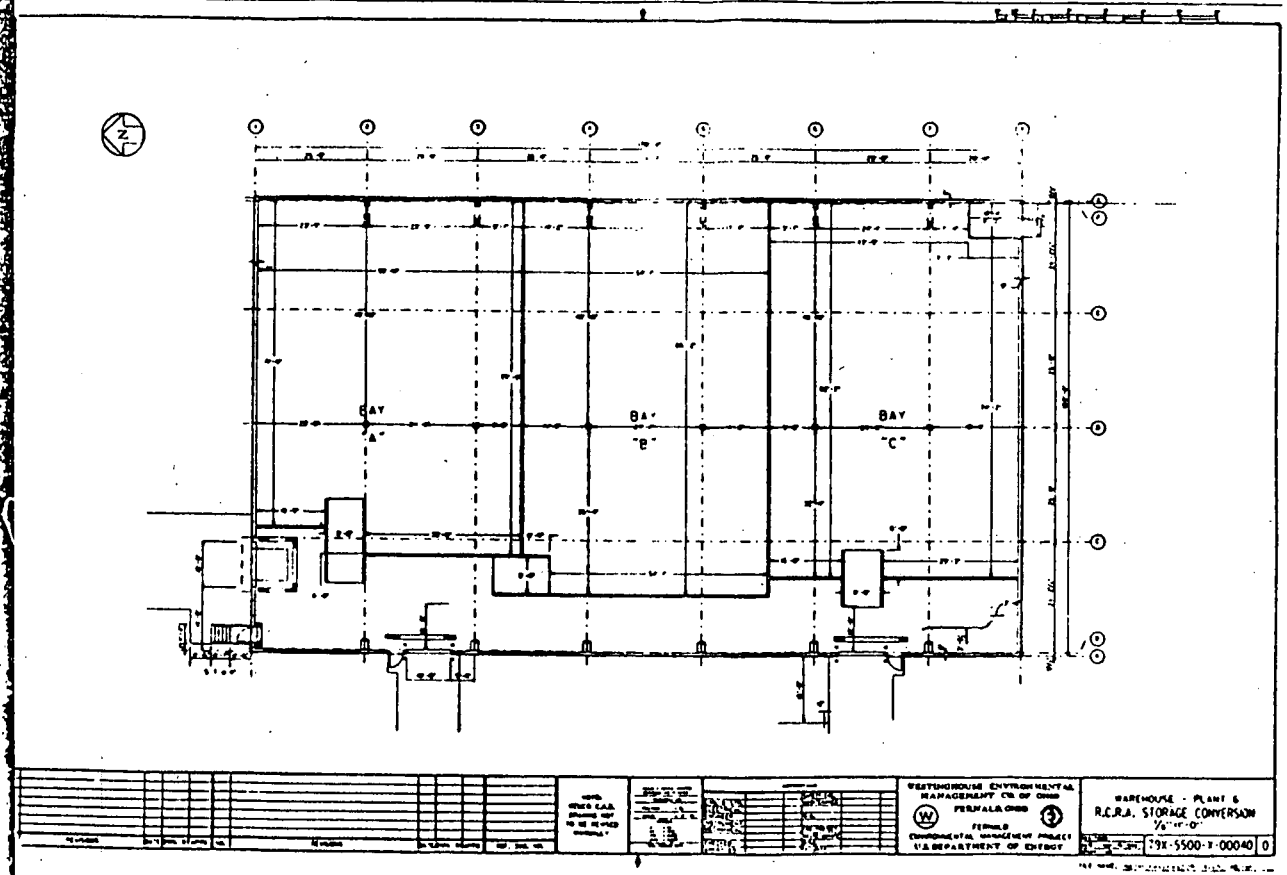

BAY "A"
BAY "B"
BAY "C"
WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD OHIO
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY
WAREHOUSE - PLANT 6
R.C.R.A. STORAGE CONVERSION
1/8"=1'-0"
79X-5500-X-00040
0

FIGURE D-43


BAY "A"
BAY "B"
BAY "C"
WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
PERMALOKS
ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY
WAREHOUSE - PLANT 6
R.C.R.A. STORAGE CONVERSION
1/8"=1'-0"
19X-5500-X-00040
0

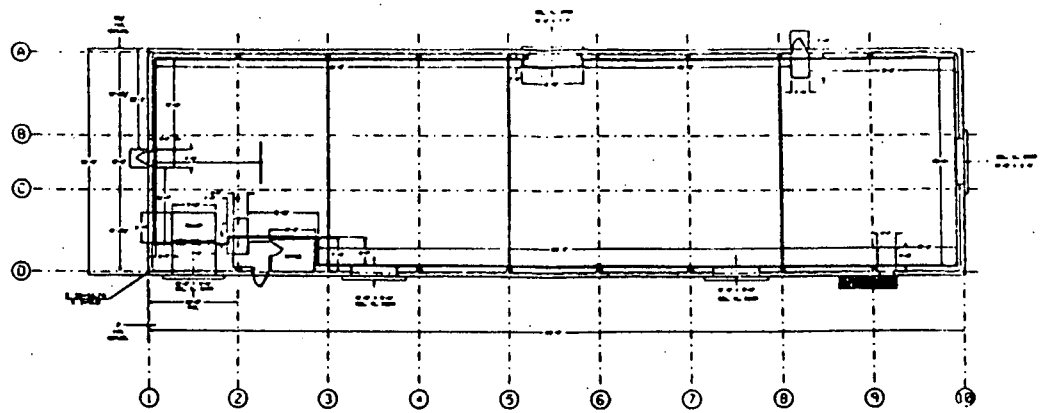


FIGURE D-44

WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY

CP WAREHOUSE
R.C.R.A. STORAGE CONVERSION
1/8" = 1'-0"

56X-5500-A-0002 | 1

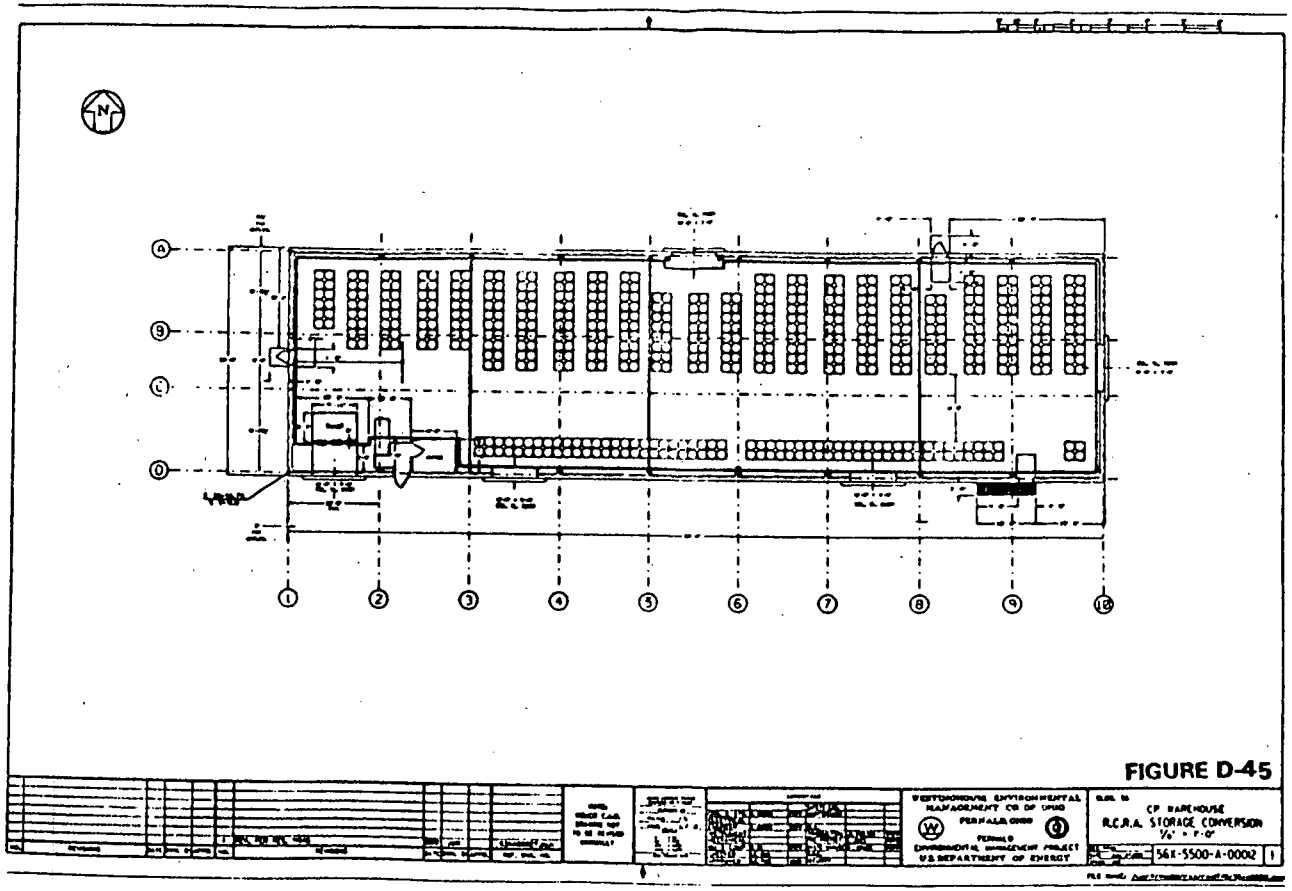


FIGURE D-45

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CP STORAGE WAREHOUSE-BLDG. 56 (BUTLER BLDG.)

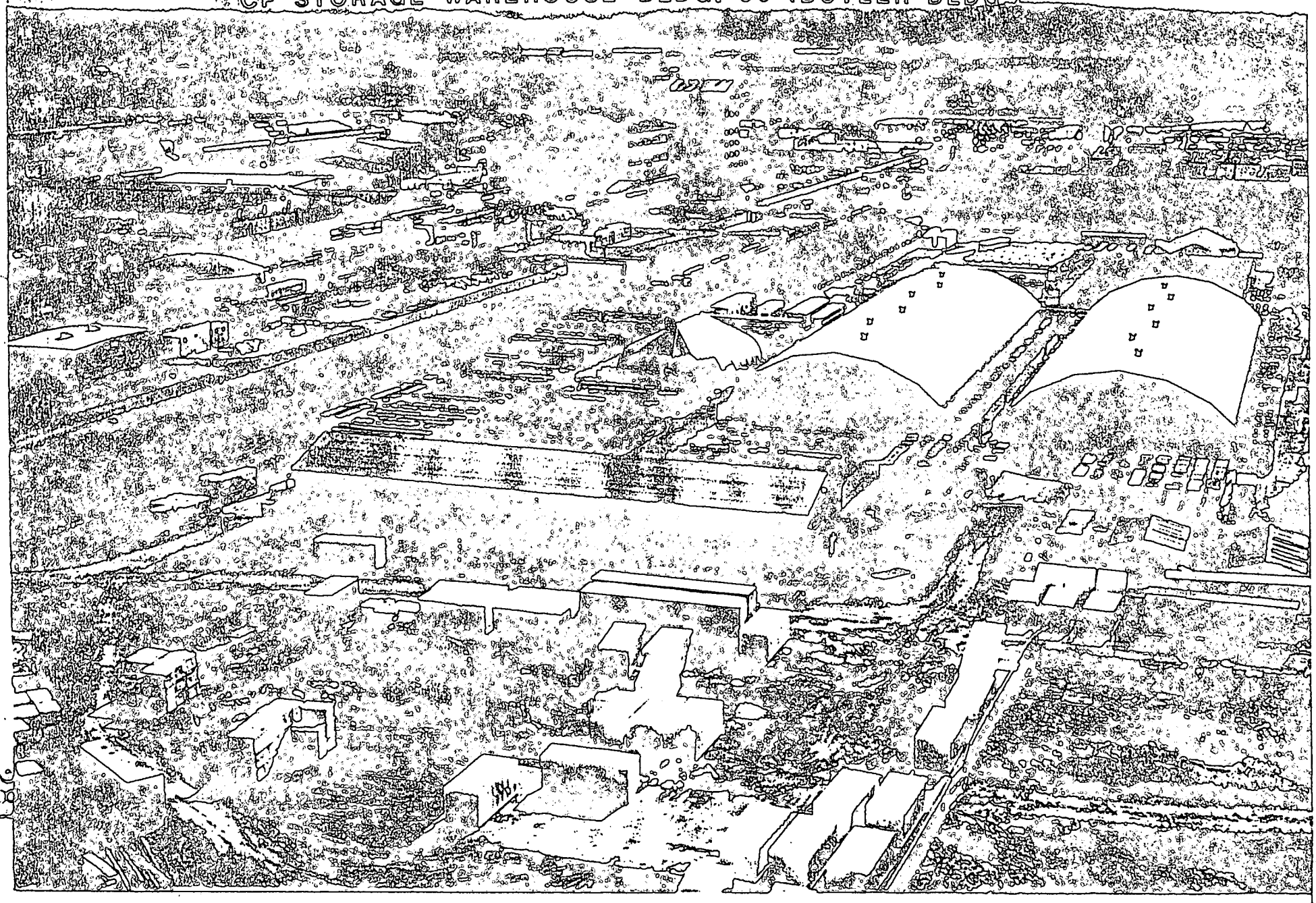
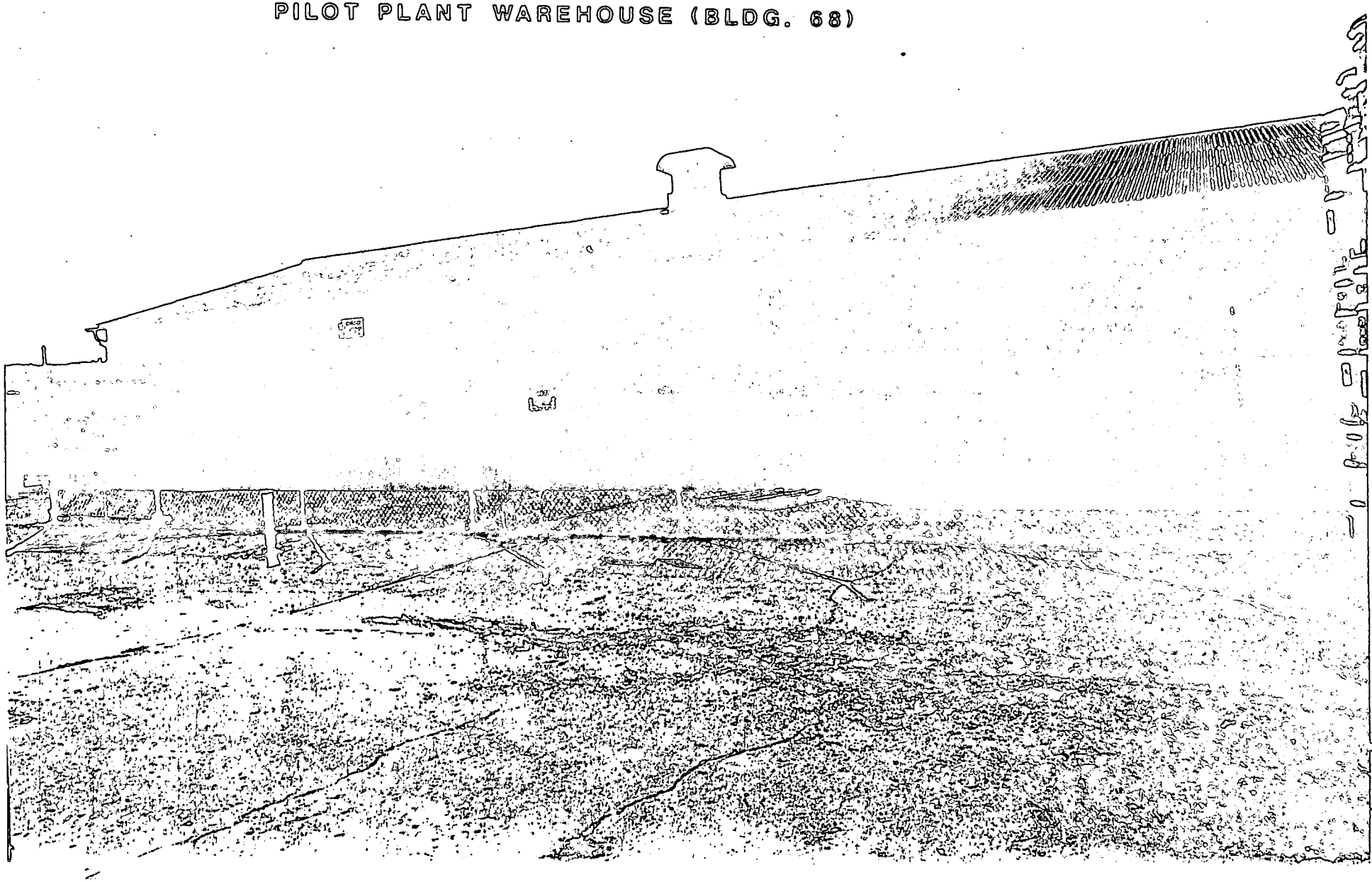
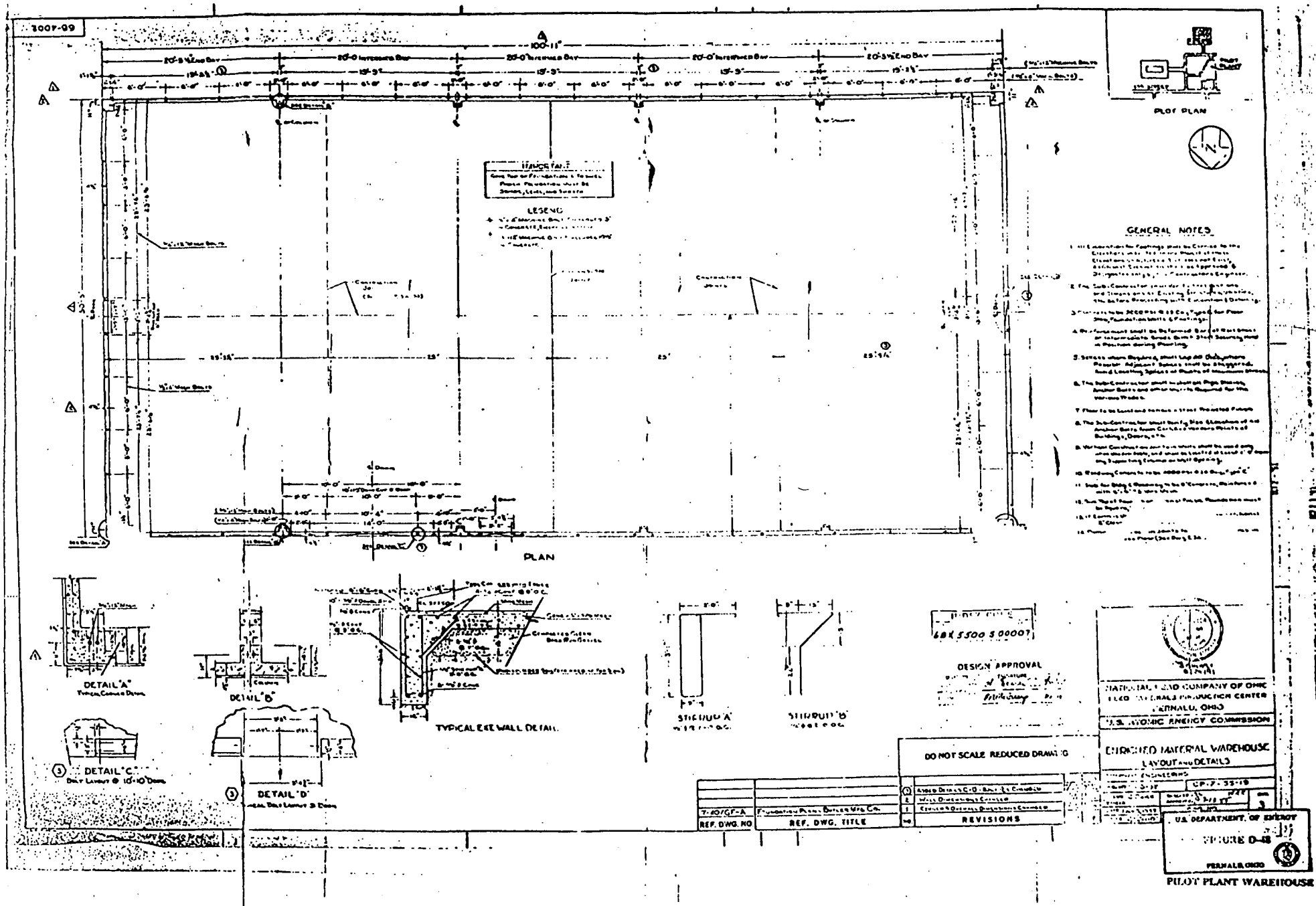


FIG. D-47

PILOT PLANT WAREHOUSE (BLDG. 68)





PILOT PLANT WAREHOUSE

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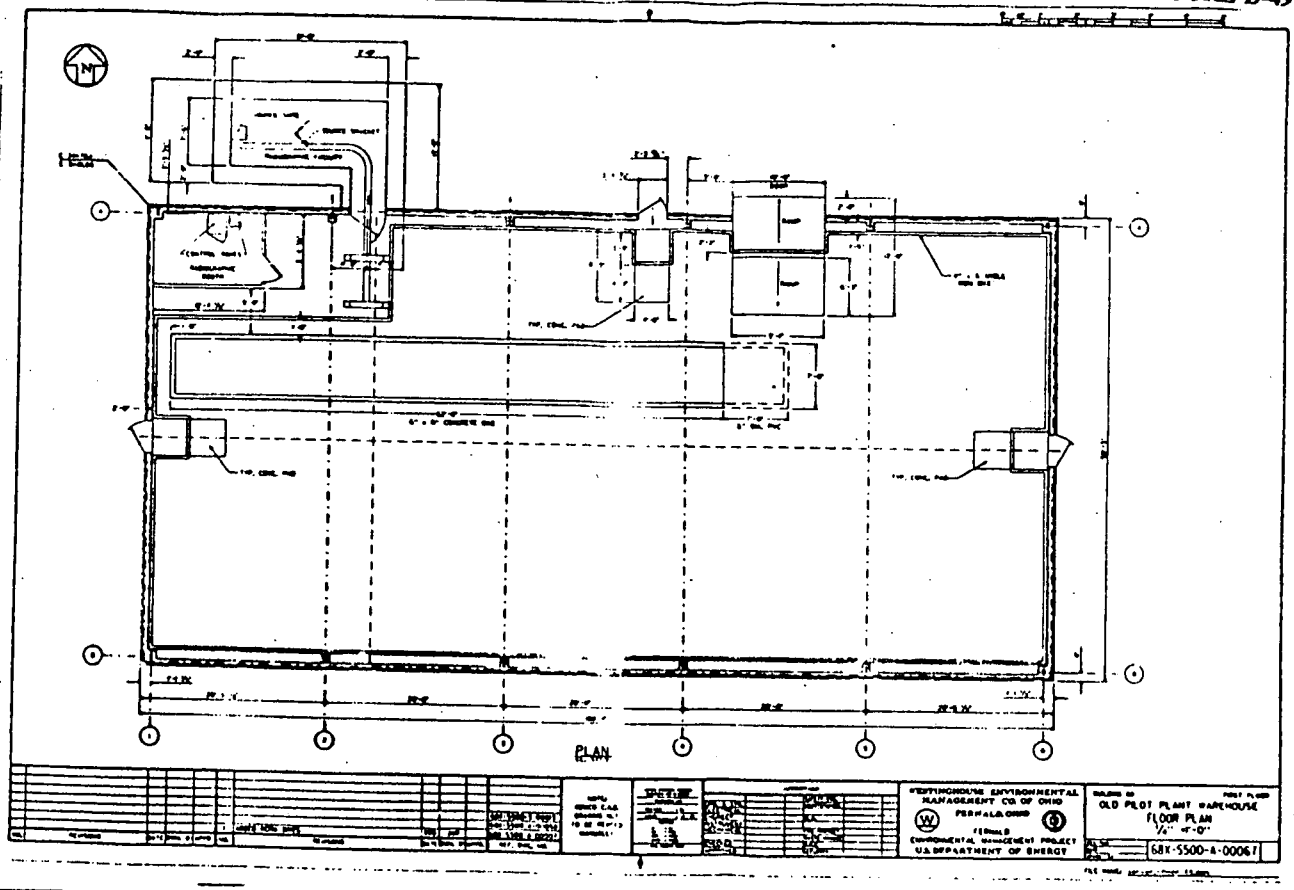
FIGURE D-49


PLAN
WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO OF OHIO
PORTSMOUTH, OHIO
ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY
OLD PILOT PLANT WAREHOUSE
FLOOR PLAN
1/4" = 1'-0"
68X-5500-A-00067

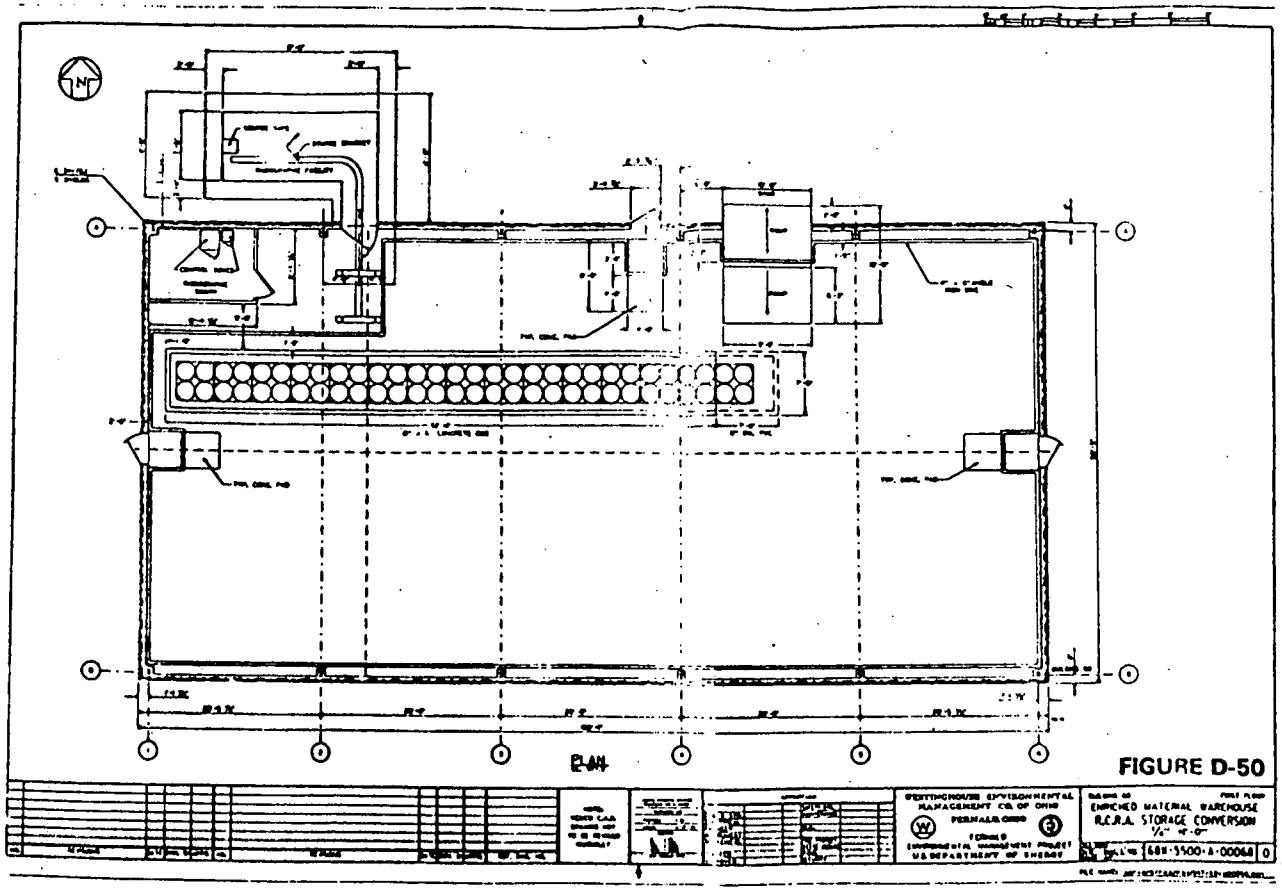

PLAN
WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
PORTSMOUTH, OHIO
FOR THE ENVIRONMENTAL MANAGEMENT PROJECT
U.S. DEPARTMENT OF ENERGY
ENRICHED MATERIAL WAREHOUSE
R.C.R.A. STORAGE CONVERSION
688-5100-A-00064
0

FIGURE D-50

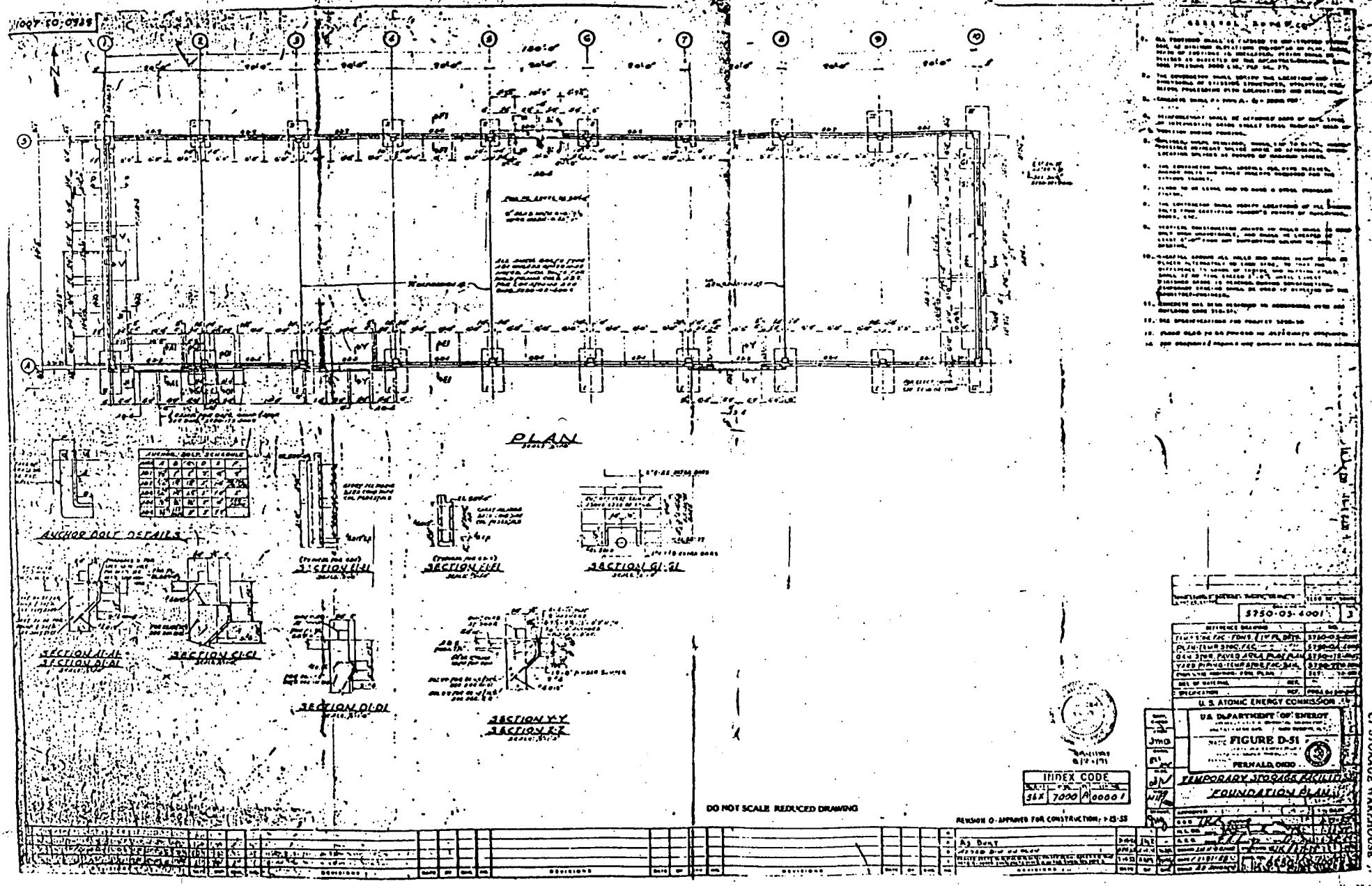

PLAN
ANCHOR BOLT DETAILS
SECTION A1-A1
SECTION D1-D1
SECTION C1-C1
SECTION D1-D1
SECTION E1-E1
SECTION F1-F1
SECTION G1-G1
SECTION Y-Y
SECTION Z-Z
DO NOT SCALE REDUCED DRAWING
REVISION 0 - APPROVED FOR CONSTRUCTION
INDEX CODE
SLX 7000 A 00001
U. S. ATOMIC ENERGY COMMISSION
U.S. DEPARTMENT OF ENERGY
FIGURE D-51
PERNAD, OHIO
TEMPORARY STORAGE FACILITY
FOUNDATION PLAN
S750-03-4001
CP STORAGE WAREHOUSE

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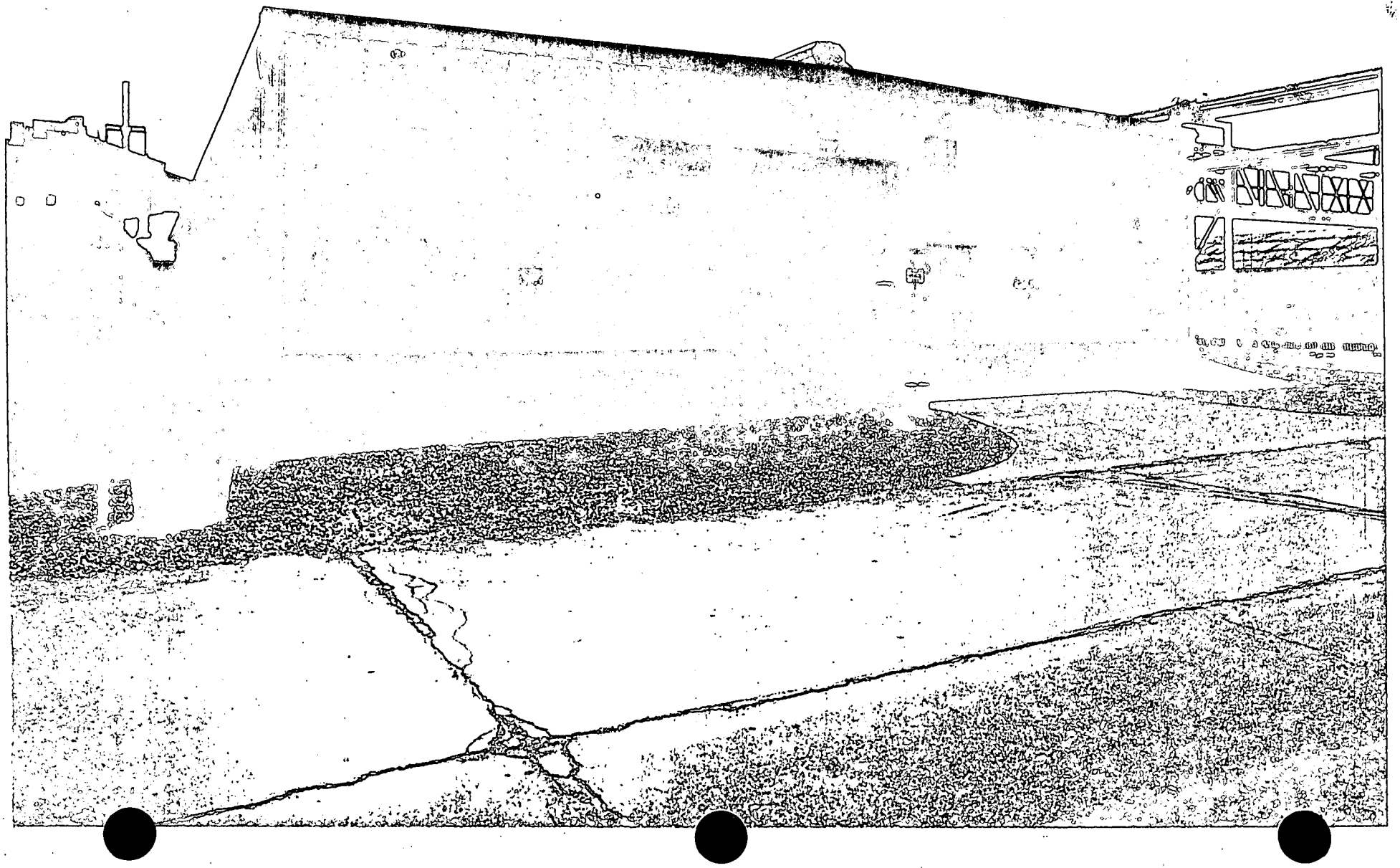
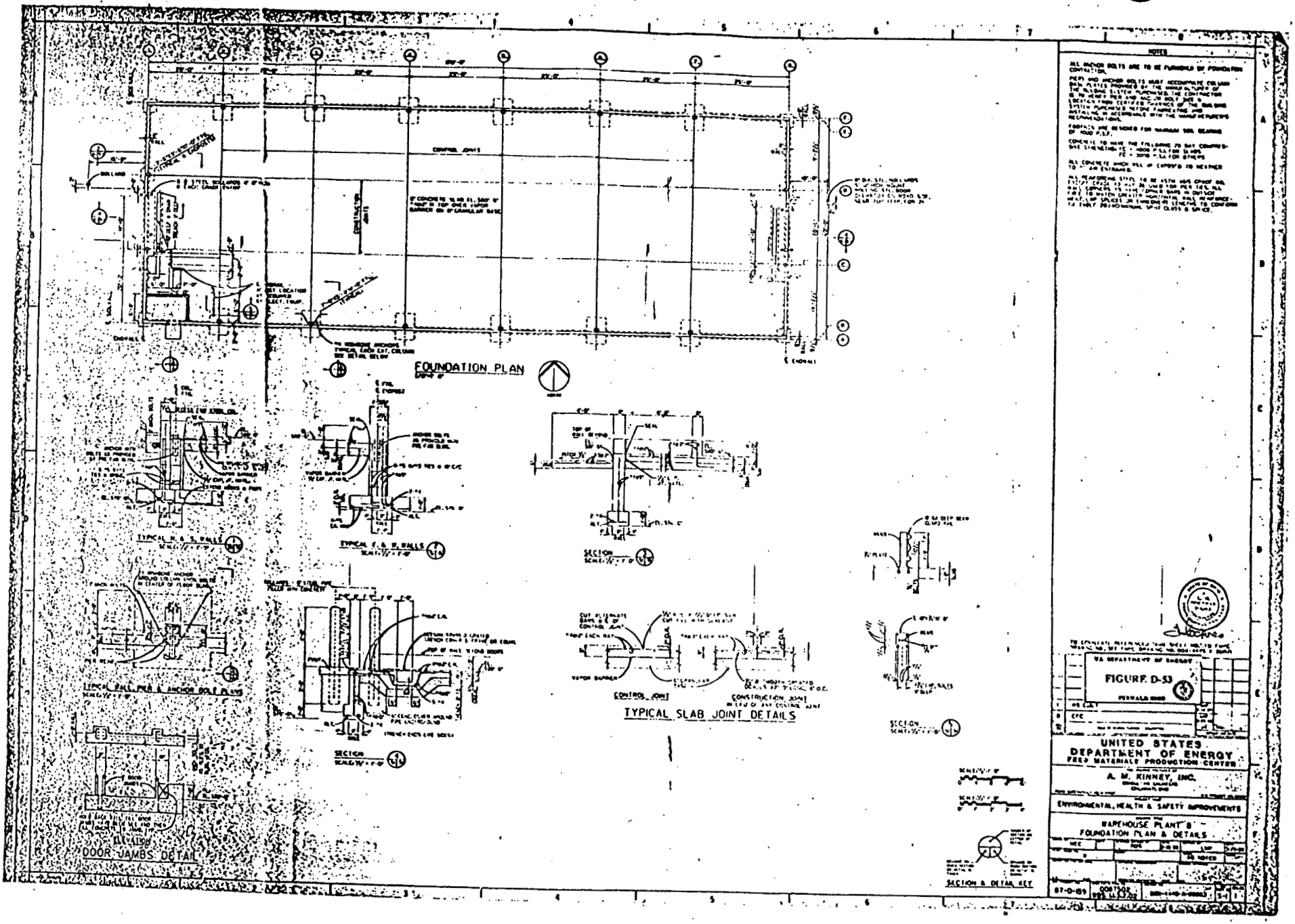
FIG. D-52

PLANT 8 WAREHOUSE (BLDG. 80)




FOUNDATION PLAN
TYPICAL SLAB JOINT DETAILS
CONTROL JOINT
CONSTRUCTION JOINT
SECTION
DOOR JAMBS DETAIL
SECTION & DETAIL KEY
NOTES
FIGURE D-53
UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
A. M. KINNEY, INC.
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
WAREHOUSE PLANT 8
FOUNDATION PLAN & DETAILS

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