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**PLANT 1 PAD CONTINUING RELEASE REMOVAL
ACTION WORK PLAN DECEMBER 1990**

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**DOE-ORO/USEPA
150
WORK PLAN**

PLANT 1 PAD CONTINUING RELEASE

REMOVAL ACTION WORK PLAN

FEEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO



December 1990

U. S. DEPARTMENT OF ENERGY
OAK RIDGE OPERATIONS OFFICE

PLANT 1 PAD
CONTINUING RELEASE
REMOVAL ACTION
WORK PLAN

DECEMBER 1990

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EXECUTIVE SUMMARY

The Department of Energy (DOE) has conducted a Removal Site Evaluation (RSE) under authorities delegated to the agency under Section 104 of the Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA), through Executive Order 12580. The RSE was performed to determine whether the conditions present at the Plant 1 Pad warrant a removal action under CERCLA, consistent with Section 300.410 of the National Contingency Plan (NCP). Based upon the information in the RSE, DOE has determined that a removal action is appropriate and has issued an Action Memorandum. The objective of the removal action is to implement interim actions to mitigate the continuing release of contaminants from the Plant 1 Pad until final remediation.

This document provides a work plan for United States Environmental Protection Agency (USEPA) review and comment which describes the removal action and is consistent with the 1990 CERCLA Consent Agreement between DOE and USEPA. In addition, the work plan fulfills the intent of the commitment made by DOE in Section 3.8d of the Amended Consent Decree to supply Ohio Environmental Protection Agency (OEPA) with a submittal for the Plant 1 Pad setting forth the closure plan information, data and schedules for review, comment and approval. DOE will submit to OEPA closure plan information, data and schedules as set forth under OAC 3745-66-10 through OAC 3745-66-20 and consistent with 1990 CERCLA Consent Agreement schedules for Operable Unit No. 3 with the revised FMPC Part B Permit Application by October 1991, consistent with Section 3.11 of the Amended Consent Decree.

The proposed removal action involves three major stages of activity which involve: (I) interim runoff control, (II) soil removal, new pad, and covered controlled storage construction, and (III) installation of sealed concrete over existing contaminated concrete and covered controlled storage construction.

The proposed removal action, coupled with the ongoing operational improvements described in this plan will significantly mitigate contaminated runoff from the Plant 1 Pad, provide an additional storage facility which meets 40 CFR 264 requirements for hazardous/mixed waste storage and provide a modern facility that will contribute to the efficient performance of FMPC's long term remedial actions.

1.0 INTRODUCTION

This document provides a work plan describing a proposed removal action for the Plant 1 Pad. The objective of the removal action is to mitigate the continuing release of contaminants from the Plant 1 Pad until final remediation is performed under Operable Unit No. 3. The proposed action is initiated by DOE under authorities delegated to it under Section 104 of CERCLA, through Executive Order 12580. As required by the 1990 CERCLA Consent Agreement between USEPA and DOE, this work plan, outlining the proposed removal action, is being submitted to USEPA to allow an opportunity for review and comment. This work plan is also being submitted to OEPA for review, comment, and approval in fulfillment of the commitment made by DOE in Section 3.8d of the Amended Consent Decree to supply OEPA with a submittal for the Plant 1 Pad setting forth the closure plan information, data and schedules.

The FMPC is not intending to perform closure of the Plant 1 Pad at this time; final closure of the Plant 1 Pad will occur with the final remedial action. The proposed removal action is protective of human health and the environment and will be conducted consistent with all CERCLA and RCRA requirements.

The proposed removal action work plan details three stages of activity. Stage I involves the installation of a membrane on the west edge of Plant 1 Pad extending into the adjacent grassy area where contaminated runoff has occurred. The membrane will provide a clean surface for rainwater runoff to the storm sewer system and provide run-on control during construction in this area. Stage II involves removal of soils from the area until a level of 35 pCi/gram of total uranium contamination is attained in the grassy area west of the existing Plant 1 Pad. The activity level of 35 pCi/gram for uranium was adopted from the NRC Branch Technical Position as presented in the Federal Register on October 23, 1981. A new 100,000 square foot pad will be constructed including two 40,000 square foot covered controlled storage structures. Stage III of activity involves installation of a clean layer of concrete, sealed between two impermeable barriers, over the 375,000 square feet of existing Plant 1 Pad. A 22,500 square foot covered storage area and new curbing will also be erected on the new concrete.

Each stage of the proposed removal action will greatly minimize the potential for continuing release of contamination from the Plant 1 Pad. Stage I, involving installation of the membrane and partial perimeter curb, will prevent continued contaminated runoff onto the adjacent grassy areas west of the pad and prevent contamination on the west edge of the pad and the grassy area from being transported to the storm sewer. Stage II, involving the construction of a new sealed concrete pad and covered storage, will significantly reduce the deterioration of drums through covered storage and prevent rainwater from providing a pathway for transport of contamination to the environment. Construction of curbs and control sumps within the covered structures will prevent the migration of contamination from leaking drums or spills to the environment. Stage III, involving the installation of sealed concrete over the existing pad

concrete, will immobilize the contamination under the sealed concrete and mitigate the potential for transport into the environment. In addition, by resurfacing the existing pad with new sealed concrete, curbing of the pad perimeter, and adjusting grades for stormwater control, the continuing release from the surface of the pad and through the pad to adjacent and underlying soils will be mitigated.

The three stages of the proposed removal action also contribute to the efficient performance of long-term remedial actions anticipated for the FMPC. Mitigating the continuing release of contamination from the Plant 1 Pad will reduce the total amount of contaminated soil that will need to be addressed under the final remedy. The removal of contaminated soil from the grassy area west of the Plant 1 Pad will eliminate the need for this action under the final remediation. The installation of sealed concrete over the existing contaminated, deteriorated Plant 1 Pad will mitigate further migration of this contamination, thus reducing the magnitude of future cleanup under the remediation. Finally, most of the currently conceived final remedy options for most of the other Operable Units will require large staging areas for containers holding exhumed waste materials. The construction upgrade of the Plant 1 Pad provides a significant staging area that will contribute to the efficient performance of final remedial actions.

2.0 FMPC BACKGROUND

The Feed Materials Production Center (FMPC) is a uranium production facility owned by the US Department of Energy. The location of the 1050 acre site is shown in Attachment 1, Figure 1. The FMPC was placed on the National Priorities List (NPL) in 1989. The DOE is conducting a Remedial Investigation and Feasibility Study (RI/FS) and other response actions under a 1990 CERCLA Consent Agreement with the USEPA.

Since the early 1950's, various chemical and metallurgical processes have been used to manufacture uranium products for the defense complex. The FMPC ceased these operations in July 1989. Substantial quantities and varieties of waste materials were generated during production operations. Some of the current waste inventory contains radioactive materials and some contains both radioactive and hazardous constituents, as defined under the Resource Conservation and Recovery Act (RCRA). It is expected that a large part of the waste materials handled during the remedial phase will also contain similar constituents.

Since July of 1989, uranium production has been halted at the FMPC, and restart of uranium production activities in the future is unlikely. As of October 1, 1990, responsibility for the FMPC is administratively transferred from the Defense Programs Division to the Environmental Restoration and Waste Management Division of the DOE in order to better manage the activities of the site.

3.0 PLANT 1 PAD BACKGROUND

3.1 MATERIAL STORAGE

Plant 1 is the "sampling plant" for the FMPC and is therefore the location for sampling of large amounts of uranium metal process residues and waste materials. The concrete storage pad associated with Plant 1, which has been designated as a Hazardous Waste Management Unit (HWMU), has been used as a drum storage location to support these operations since 1952. The Plant 1 Pad and adjacent unpaved area comprises approximately 12 acres on the northwest side of the process area as shown in Attachment 1, Figure 2.

The material types stored in the past, currently stored, and intended for future storage on the Plant 1 Pad are detailed in the Table 3-1.

TABLE 3-1

PAST, CURRENT, AND FUTURE PLANT 1 PAD USE

MATERIAL TYPE	PAST	CURRENT	FUTURE
Low Level Waste	X	X	X
Unevaluated Waste	X	X	
Copper Scrap	X	X	X
Construction Rubble	X	X	X
Recoverable Material	X	X	X
Mixed/RCRA Waste	X		X
CERCLA Waste		X	X

Low level wastes (LLW) include scrap pallets, drummed uranium residues, and miscellaneous drummed materials such as dirt, concrete, and asbestos. The low level wastes are intended to be stored on the pad until planned processing and disposal actions are completed.

The approximately 45,000 drums of unevaluated waste stored on the Plant 1 Pad will fall into one of three categories once a RCRA evaluation is completed per the schedules set forth in the Proposed Amended Consent Decree. The wastes will either be classified as RCRA wastes, mixed RCRA wastes or LLW. The majority of these containers are drums which contain various uranium residues from FMPC processes. The final completion date for the RCRA evaluation, as detailed in the Proposed Amended Consent

Decree is September 1992, with interim completion dates for specified material categories. The plan is to move the drums/containers, which are evaluated to be RCRA, into FMPC RCRA storage units as identified in the Part A Permit Application within 60 days after identification as a RCRA waste.

If storage space which meets RCRA and Ohio hazardous waste storage requirements is not available, DOE will store such wastes in a manner as protective of human health and the environment as possible. Also, DOE will perform daily leakage inspections on all such containers that are not located under cover, and shall, within sixty (60) days of a determination that sufficient RCRA storage space is not available, submit a plan and schedule for OEPA approval for short-term storage of such wastes. DOE will perform weekly inspection in accordance with 40 CFR 265.15 and 265.174, and OAC 3745-65-15 and 3745-66-74 on all such containers.

The 1,375 tons of copper scrap stored on the Plant 1 Pad are included as part of the DOE Oak Ridge Metals Management Program. The copper scrap is planned to be removed from the Plant 1 Pad at some future date, when the implementation phase of the program is finalized.

Construction rubble containers, including sea/land, boxes, and drums, are staged on the Plant 1 Pad prior to disposal. The containers primarily contain dirt, concrete, metal, and asbestos. This practice will continue as it minimizes handling/transportation of the waste on-site prior to disposal.

Recoverable materials, such as enriched residues with high uranium content and solid uranium metal, are also stored on the Plant 1 Pad. The FMPC is currently evaluating off-site shipment or indoor long term storage of this material.

Mixed/RCRA wastes have been stored on the Plant 1 Pad in the past and subsequently moved to RCRA storage upon evaluation. Once the Phase A/B construction is complete and the Part A Permit Application is revised to include the Plant 1 Pad, mixed/RCRA wastes are planned to be stored in the Phase A/B structures. The earliest date for mixed/RCRA waste storage is estimated to be November of 1991 pending a November 1990 start of the Phase A/B construction. Storage of evaluated RCRA/mixed waste on the Plant 1 Pad is not planned prior to completion of the Phase A/B construction unless existing FMPC storage facilities become filled. In this case, the actions as outlined under the unevaluated waste paragraph will be implemented.

CERCLA waste currently stored on the Plant 1 Pad includes drums of soil cuttings from RI/FS well borings that have been determined not to be hazardous wastes. The inventoried CERCLA well cuttings will be dispositioned pending receipt of representative analytical data as to their radionuclide concentration. In the future, the upgraded Plant 1 Pad will provide a staging area for any CERCLA related wastes, as necessary.

3.2 PAD CONDITION AND RELEASES

Materials containing varying amounts of uranium (U metal, UO_3 , UF_4 , and UO_2), thorium, and other hazardous substances are stored on the Plant 1 Pad. Some of the carbon steel drums used to store wastes on the pad have deteriorated as a result of extended exposure to the elements, thereby increasing the risk of release of hazardous material to the environment. Sections of the pad have no curbs for containment and therefore, some portion of the pad drains onto the adjacent grassed area, nor are there sumps for collecting and controlling the stormwater runoff from the pad. In addition, a portion of the drums are being evaluated for RCRA constituents and are undergoing characterization pursuant to 40 CFR 261. RCRA materials identified so far include drums of barium salts and drums of waste oils contaminated with 1,1,1-trichloroethane and lead. Materials containing quantities of solvents (1,1,1-trichloroethane, tetrachloroethylene, methylene chloride, and xylene) have also been identified on the pad.

On February 12, 1990, during the movement of material to RCRA storage, 200 drums were identified as having an accumulative inventory loss of 4,261 pounds. These materials have reportable quantity limits ranging from one pound to one thousand pounds, e.g. material codes, D004 and D005, and because some of the drums were in a deteriorated condition, a potential release above the reportable quantity may have occurred. The initial verbal report was made by DOE to all appropriate agencies on February 13, 1990 with a written report issued to the state and local emergency planning agencies on March 13, 1990.

On May 8, 1990, the FMPC reported a potential release of a hazardous waste from the Plant 1 Pad as the result of weight discrepancies discovered during the overpacking and movement of 319 containers stored on this pad. Pursuant to 40 CFR 355.40(b) and OAC 3750.06(D), a written follow-up report was submitted within 30 days of the occurrence of the event. The report was submitted on June 6, 1990, to the OEPA, the State Emergency Response Commission (SERC), and various local emergency planning committees.

Additionally, the pad has a number of cracks and control joints which may serve as a route of contamination release. On July 17, 1990, a minor event occurred on the Plant 1 Pad related to drum movements. A fork truck, which was routinely moving drums, drove over a deteriorated section of the pad and a drum shifted causing a spill. The material was cleaned up and operations were ceased until the conditions of the pad were improved. The rough surface of the pad has also been the subject of numerous complaints from Waste Operations personnel related to potential back injuries.

3.3 WATER DRAINAGE

The Plant 1 Pad is currently not covered and therefore, is exposed to any precipitation that may fall onto it. The majority of the runoff from the

pad drains to approximately 14 storm sewer catch basins and manholes which feed directly into the storm sewer system. From the storm sewer system, collected water is pumped to Manhole 175.

Prior to 1988, the runoff from the north and west side of the Plant 1 Pad flowed west through a culvert and into the Waste Storage Area where it eventually drained into Paddy's Run Creek. The detail of the water drainage from the Plant 1 Pad prior to October 1988 is shown in Figure 3-1.

Currently, stormwater draining from the pad area onto the adjacent soils has been rerouted to discharge to the existing process area storm sewer system. This water previously flowed through the Waste Pit Storage Area and discharged to Paddy's Run. The drainage ditch which redirected the flow to the storm sewer system was completed in 1988 and resulted in a reduced uranium discharge level to Paddy's Run. Two work items were completed to accomplish the rerouting of these flows. These items are as follows:

1. Integral curbs were provided along the southwest corner perimeter of the Plant 1 Pad. The runoff water collected, along with the existing localized storm sewer flow which previously discharged to Paddy's Run, was routed easterly, via a new storm sewer, to discharge into the existing process area stormwater collection system.
2. A previously existing drainage outlet culvert leading from the drainage area north and west of the Plant 1 Pad was plugged. The culvert is located under the west plant perimeter gravel roadway at the northwest corner of the Plant 1 Pad. The slope of the drainage ditch upstream of the culvert was reversed to flow east toward an existing plant storm sewer. A new inlet to the existing storm sewer line was constructed to collect this rerouted runoff and convey it to the existing Storm Water Retention Basin (SWRB). The current water drainage from the Plant 1 Pad is shown in Figure 3-2.

3.4 RCRA STATUS

The Plant 1 Pad had been listed as an inactive unit in the FMPC's modified Part A Permit Application submitted to USEPA/OEPA in March 1989. At that time, a RCRA Storage Permit was not sought, based upon the previous projected RCRA storage requirements of the facility. Since a storage permit was not sought in the March 1989, Part A Application, no design capacity was listed on Form 3 of the Part A. The FMPC modified and resubmitted to OEPA its Part A Application in September 1990. The September 1990, modified Part A Application includes the TCLP hazardous waste numbers and includes the Plant 1 Pad intended storage design capacity. The June 1991, modified Part A Application resubmittal will include all of the FMPC HWMUs and include EPA waste codes/quantities consistent with the waste/material evaluations being conducted in accordance with the Proposed Amended Consent Decree. The FMPC will submit a modified Part B Application to USEPA/OEPA by October 1991, which will

modify the appropriate sections to include the Plant 1 Pad as a RCRA storage facility.

Because the FMPC is seeking a RCRA Storage Permit for the Plant 1 Pad, including the construction upgrade, a closure plan must be included in the facilities RCRA Permit Application meeting the requirements of OAC 3745-66-12 and 40 CFR 264.12. It is DOE's intention that the information, data, and schedules in the Proposed Amended Consent Decree Closure information submittal, be consistent with the information, data, and schedules developed pursuant to the 1990 CERCLA Consent Agreement. The submittal of this proposed Removal Action Work Plan, along with the closure plan information is intended to meet the Proposed Amended Consent Decree information commitment.

The intent of the Plant 1 Pad Closure requirements is to minimize the need for further maintenance of the facility after closure and to protect human health and the environment. The Plant 1 Pad Closure information to be included in the modified Part B Application and the Amended Consent Decree submittal will describe the following actions:

- Remove all stored material from the pad.
- Clean pad surface by high pressure washing.
- Collect and analyze wash water to determine proper disposition (Hazardous waste vs. nonhazardous waste).
- Collect and analyze rinseate samples to determine if the pad has been decontaminated.
- Repeat high pressure washing and rinseate analysis up to a total of three times, if needed, to achieve cleanup to regulatory levels.
- Certify closure.

It is important to note that the final remediation under Operable Unit No. 3, which includes the existing Plant 1 Pad and affected contiguous soils, will address any soil and perched water contamination.

3.5 STORED DRUM MANAGEMENT

In order to supplement the three stage removal action described in this work plan, the FMPC has set forth a program to minimize environmental impact of stored, drummed materials at the FMPC. The actions listed below are being or have been implemented to mitigate spills/leaks from drums on the Plant 1 Pad.

- Overpacking of deteriorated drums on the Plant 1 Pad.
- Daily drum leakage inspections.

- Weekly inspection consistent with 40 CFR 265.15 and 265.174 and OAC 3745-65-15 and 3745-66-74.
- Operation of a lined staging area for deteriorated drums prior to overpacking.
- Relocation of a lined staging area for deteriorated drums prior to overpacking.
- Completed rearrangement of remaining Plant 1 Pad drums to provide adequate aisle spacing for leakage inspections.
- Completed expedited repair of pad deterioration that would permit safe movement of the drums to achieve adequate aisle spacing. The repair consists of filling in deteriorated sections of the pad and cutting away severely cracked areas with subsequent replacement of the needed concrete. This repair was conducted in concert with the drum movements. Controls were used during the repair to minimize the spread of contamination and to drum the waste for subsequent evaluation.
- Completed erection of a 6,226 square foot tension support structure on the Plant 1 Pad as a demonstration project for storage/staging of contaminated materials/containers.

All of the above actions, as detailed in the "FMPC Drum Management Plan" are consistent with the Proposed Amended Consent Decree commitments and will result in a substantial environmental improvement at the FMPC.

4.0 SUMMARY OF EXISTING SAMPLING DATA

Extensive sampling has been completed in the Plant 1 Pad area in support of the proposed removal action, the FMPC Environmental Monitoring program, and the ongoing Remedial Investigation/Feasibility Study. These samples were collected to characterize the existing environmental conditions and to assess the nature and extent of any chemical or radiological contaminants present at that location. The sampling focused on the surface and subsurface soils adjacent to and under the Plant 1 concrete pad and the groundwater present in the glacial till and the regional aquifer in the vicinity of the pad. The following presents a brief summarization of the results of these characterization efforts. The Removal Site Evaluation, as presented in Attachment 1, presents a summarization of available data collected in the vicinity of the pad. Off-site laboratories included ORNL and IT in Oak Ridge, Tennessee and Enwright Labs in Greenville, South Carolina.

4.1 SOILS

Soil sampling has been completed both adjacent to and under the existing Plant 1 Pad. This sampling included:

- * Collection of surface soil samples at 21 locations at discrete depth intervals immediately off the western edge of the pad in support of the proposed removal action. Samples were collected in accordance with FMPC Environmental Monitoring Procedures with radiochemical, inorganic and EP Toxicity analysis performed at the FMPC Laboratories and volatile organic analysis at off-site laboratories.
- * Collection of surface soil samples at 7 locations beneath the concrete on the western edge of the pad in support of the proposed removal action. Samples were collected in accordance with FMPC Environmental Monitoring procedures, with radiochemical, inorganic and EP Toxicity analysis at the FMPC Laboratories and volatile organic analysis at off-site laboratories.
- * Collection of surface soil samples from 47 locations in the grassy area west of the pad, in support of the proposed removal action. Samples were collected in accordance with FMPC Environmental Monitoring procedures, with radiochemical analysis performed at the FMPC Laboratories.
- * Collection of 23 surface soil samples from directly beneath the concrete pad, in support of the FMPC Environmental Monitoring Program. Samples were collected in accordance with Environmental Monitoring procedures, with radiochemical analysis performed at the FMPC Laboratories and inorganic and organic analysis performed at off-site laboratories.
- * Collection of subsurface soil samples during the completion of 6 borings through the pad and 17 borings adjacent to the pad as part of the ongoing FMPC RI/FS. Samples were collected and analyzed in accordance with protocols defined within the FMPC RI/FS Work Plan Rev.3.

Available analytical results for the noted samples, with the exception of the 23 surface soils samples beneath the pad, are presented in Attachment 1. The 23 surface soil samples, which were just recently collected, are currently undergoing laboratory analysis for substances on the Hazardous Substance List.

4.1.1 SURFACE SOIL SAMPLES

As identified above, surface soil samples were collected from 28 locations along the western edge of the pad, 23 locations under the pad and from 47 locations in the grassy area to the west of the pad. Surface soil samples were analyzed for a range of radiological and chemical parameters. Collected samples were analyzed for one or more of the following:

- * Total Thorium
- Total Uranium
- * Total Metals (Eight Primary)
- EP Toxicity (Metals)
- * Volatile Organics
- * Hazardous Substance List (HSL)

As identified in Attachment 1, analysis for total metals was completed on a series of surface soil samples along and under the western edge of the concrete pad. As depicted in Appendix A, analytical results from the soil samples indicated a range of concentrations for barium and lead. No significant variation occurred between the samples collected beneath the pad and those collected adjacent to the pad. Two samples located under the western edge of the pad (locations 22 and 23) exhibited the highest concentrations of barium (236 and 1080 ppm) in the uppermost depth samples. The maximum total lead concentrations were typically found in samples collected adjacent to the pad as compared to under the pad. No significant concentrations of the remaining six primary metals were identified in the collected samples.

EP Toxicity analysis for the eight primary metals was also completed on the surface soil samples adjacent to the western edge of the pad. The results of this analysis indicated no individual samples exceeding the regulatory threshold in 40 CFR 261. More significantly, the results of the EP Toxicity analysis provides an indication of the relative immobility of the metals within the clay rich till matrix underlying the Plant 1 Pad area.

Volatile organic analysis was performed on samples collected from the 28 locations adjacent to the western edge of the pad. This analysis included the target organic compounds of xylene, acetone, methylene chloride and carbon disulfide. As summarized in Attachment 1, these target organics were identified in low concentrations (less than 40 ppb) in several discrete samples. These concentrations typically showed significant reductions with depth. As previously defined, 23 supplemental samples collected from beneath the Plant 1 Pad are currently undergoing analysis for the parameters on the Hazardous Substance List. This data is anticipated to be received in late November 1990. Additionally, full Hazardous Substance List analysis was completed on 2 individual samples collected from immediately below the concrete in two RI/FS borings as identified and reported in Section 4.1.2.

Radiochemical analysis was completed on all collected surface soil samples as shown in Attachment 1. Radiochemical analysis of the samples collected adjacent to and under the western edge of the pad and in the grassy area west of the pad indicated the existence of above background concentrations of uranium in surface soils across the area proposed to be impacted by the

removal action. As expected, these concentrations showed significant reductions with depth, being generally limited to the upper 2 feet of soil. Available surface soil sampling data from beneath the pad (not at the western edge) detected significantly lower concentrations than those collected adjacent to the pad. Concentrations from surface soil samples beneath the pad typically exhibited concentrations less than 30 ppm of total uranium, with an arithmetic mean of 25 ppm of total uranium. These concentrations are consistent with those identified in the uppermost samples from the RI/FS subsurface borings, as presented in Section 4.1.2.

Above background concentrations of other naturally occurring radionuclides were also detected in discrete surface soil samples. No general area of contamination or trend could be established from this data. In general, no individual soil sample exhibited the presence of a naturally occurring radionuclide in concentrations significantly above background without the presence of elevated total uranium concentrations in the same sample.

4.1.2 SUBSURFACE SOIL SAMPLES

As part of the ongoing RI/FS at the FMPC, 6 borings were completed through the Plant 1 Pad, 4 borings immediately adjacent to the pad, and an additional 13 borings in the vicinity of the pad area. Analytical results from these samples are presented in Attachment 1. These borings were completed in a manner consistent with the protocols defined within the RI/FS Work Plan and the Production and Additional Suspect Area Addenda to the Work Plan. The borings were advanced to a maximum depth of 20 feet or until significant water was encountered within the glacial till. In the event significant water was encountered, a 2 inch diameter PVC piezometer was set to support groundwater quality and flow characterization. Water quality information collected from these piezometers is discussed in Section 4.2.

Subsurface soil samples collected during drilling were typically analyzed for total uranium and total thorium. More extensive analysis was completed on samples from two borings through the pad (1345 and 1346), including analysis for the parameters on the HSL. Radiochemical results from the samples from the borings through the pad indicated above background concentrations of uranium residing in the upper 2 feet of soils beneath the pad. These concentrations were typically localized to the upper foot of soils with concentrations averaging less than 35 ppm of total uranium. Uranium concentrations decrease sharply with depth, consistent with the surface soil samples collected adjacent to the pad. This significant decrease in concentration with depth is consistent with the hypothesis that the uranium was typically introduced into the environment in an insoluble form. Vertical migration within the soil matrix has been limited due to the impermeability of the underlying clays and the natural affinity of uranium and other metals for clays and other soil particles.

Subsurface soil samples collected from RI/FS borings off the edge of the Plant 1 Pad and those completed in the vicinity of the pad exhibited above background concentrations of total uranium in the uppermost samples.

These concentrations, which averaged less than 50 ppm of total uranium, decreased sharply with depth and typically were within the range of background in samples collected from greater than 2 feet in depth. Analytical results from these borings were generally consistent with the surface soil samples collected from the same areas.

Soils samples collected from borings 1345 and 1346, located on the Plant 1 Pad, were analyzed for the substances on the HSL including volatile and semi-volatile organics, inorganics, pesticides and PCBs. Of the parameters on the HSL, only one organic parameter, trichlorethane, was detected in measureable concentrations (10 mg/kg) in one of the samples from 1346. No pesticides or PCBs were detected in the samples collected from the borings. As identified in Attachment 1, inorganic parameters on the HSL were identified in the samples in varying concentrations. As identified in Section 4.2, none of the listed inorganic parameters or trichlorethane were detected in collected groundwater samples. Surface soil samples collected from 23 locations beneath the concrete on the pad will provide additional data to assess the statistical significance of the inorganic analytical data from borings 1345 and 1346.

4.2 GROUNDWATER

Significant quantities of groundwater were encountered during the drilling of five of the six borings through the Plant 1 Pad. As identified in Attachment 1, piezometers were set in each of these borings for purposes of withdrawing representative groundwater quality samples. The highest concentration of total uranium in groundwater from the piezometers on the Plant 1 Pad was 441 ppb in well 1339. The remaining piezometers exhibited concentrations significantly less than 1339, with the maximum concentration less than 45 ppb. Based upon the available information (i.e. lithologic data, depth to groundwater, etc.), there is no evidence to support the potential interconnection between 1339 and the other piezometers on the pad. Additionally, as defined below, samples withdrawn from wells screened within the sand and gravel aquifer hydraulically downgradient of the pad have not exhibited the presence of significant concentrations of radiological constituents.

Borings completed along the edge of the Plant 1 Pad exhibited concentrations of uranium in ground water consistent with the samples collected from piezometers on the pad. The maximum concentration of total uranium in these piezometers was 40 ppb. Data from boring 1347 is currently not available and is anticipated to be received in December, 1990. Concentrations of total uranium in the 17 piezometers completed in the vicinity of the pad were significantly higher than those on or off the edge of the pad. The maximum concentration of total uranium in the piezometers installed in the vicinity of the Plant 1 Pad was 748 ppb, with an average concentration of 207 ppb. Only one of the borings in the vicinity of the Plant 1 Pad was located within the boundaries of the proposed pad expansion portion of the removal action. This boring, 1341, exhibited a total uranium concentration of 28 ppb.

As depicted in Attachment 1, a three well cluster (Location 55) resides immediately to the east of the Plant 1 Pad. This well cluster includes wells of 1000, 2000, and 3000 series. The 2000 and 3000 series wells are screened within the regional groundwater aquifer and are located hydraulically downgradient of the pad. Numerous samples have been collected from these wells as part of the ongoing RI/FS and FMPC Environmental Monitoring Program. This data, which is summarized in Attachment 1, exhibits wells 2055 and 3055 to be within the range of background for all naturally occurring parameters including the radionuclides and inorganic constituents. No above background concentrations of organic constituents were identified in the samples collected from these wells. The excellent water quality found in the Location 55 well cluster immediately downgradient of the Plant 1 Pad strongly supports the hypothesis that the low concentration of contaminants in the soils under and in the vicinity of the pad are being bound by the clay rich soils. Data collected from these wells strongly support the proposed Plant 1 Pad removal action.

5.0 NEED FOR REMOVAL

Consistent with Section 40 CFR 310.410 of the NCP, the DOE shall determine the appropriateness of a removal action (interim response). Section 40 CFR 300.415 (b) (2) of the NCP defines eight factors that should be considered in determining the appropriateness of a removal action. Five of these factors, listed below, are specifically applicable to this assessment.

40 CFR 300.415 (b) (2) (i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

40 CFR 300.415 (b) (2) (ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems.

40 CFR 300.415 (b) (2) (iii) Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release.

40 CFR 300.415 (b) (2) (v) Weather conditions that may cause hazardous substance or pollutants or contaminants to migrate or be released.

40 CFR 300.415 (b) (2) (vi) Threat of fire or explosion.

The DOE has determined that an interim response is appropriate, due to the current and on going potential for release of contaminants from the Plant 1 Pad area. The released contamination has the potential to migrate into the environment, where it may result in human exposure or contamination of drinking water supplies. An interim response to control stormwater runoff from this area and deter the further releases of contaminants from leaking

drums should be undertaken. The Removal Site Evaluation (RSE) is included in Attachment 1.

6.0 PROPOSED PLANT 1 PAD REMOVAL ACTION

The objective of the removal action is to implement interim actions to mitigate the continuing release of contaminants from the Plant 1 Pad until final remediation.

6.1 Stage I - Installation of a Membrane and Partial Perimeter Curb

The first stage of the proposed removal action involves the installation of a membrane and partial perimeter curb on the northwest side of the Plant 1 Pad and continuing into the grassy area west of the pad as shown in Figure 6-1. The purpose of the membrane (herculite or similar material) is to provide a means of preventing stormwater runoff from coming into contact with the existing concentrations of hazardous substances residing in the surface soils along the western edge of the pad. The installation of the curb will clearly define the existing drainage divide and provide a mechanism for the membrane to be anchored. The membrane will provide run-on control for Stage II of the removal action by acting as a clean surface to channel rain water runoff. After the contaminated soils are removed from the Stage II area, the membrane will continue to be placed over the excavation area until the placement of concrete for the new pad sections. During the Stage III removal action, both the membrane and partial perimeter curb will be removed in preparation of the new surface.

6.2 Stage II - Soil Removal and Phase A/B Construction

Stage II of the removal action involves removal of contaminated soil down to an average activity concentration of 35 pCi/gram of total uranium followed by the Phase A/B pad construction. Phase A/B is new pad construction and will provide 80,000 square feet of covered controlled storage with the erection of two 40,000 square foot structures. Final construction drawings and specifications are provided in Attachment 4 for information. These construction plans provide a detailed description of the proposed construction activities. These structures will be erected on curbs for containment and will be internally subdivided into four discrete quadrants. Each quadrant will be provided with a centrally located trench drain which will lead to a sump. These drains and sumps have no connection to site drainage systems and serve only to collect rinseate in the event of a leak or spill. The trench drains and sumps will be sealed with a chemically resistant epoxy coating. Similarly, the new concrete pad storage surface will be sealed with an 86 mil chemically resistant polyurethane wear surface. The area involved includes approximately 86,000 square feet of grassed area and 7,000 square feet of overlap on the existing pad's west side. Water drainage after completion of Stage II action is shown in Figure 6-2.

Stage II of the removal action will involve the excavation of approximately 3,300 cubic yards of material (soil and concrete) based upon the sampling and analysis results of the area. Approximately 15% or 495 cubic yards of the material is estimated to exceed 100 pCi/gram of total uranium contamination and will be containerized and staged on the existing Plant 1 Pad. The containerized rubble will then be sampled and analyzed per Section 8.0 of the Work Plan and if determined to be non-RCRA will be scheduled for disposal off-site. If the containers are determined to contain RCRA constituents, the containers will be properly labeled and placed into proper storage.

The remaining 85% of material removed during Stage II excavation is estimated to contain between 35 pCi/gram and 100 pCi/gram of total uranium. This material will be stockpiled north of Plant 1 on a membrane liner (herculite or polyethylene) and covered with a membrane liner to minimize run-on or run-off. The stockpiled material will be sampled and analyzed per Section 8.0 of the Work Plan to verify it is non-RCRA. Upon verification that the stockpiled soils are non-RCRA, the soils will be seeded to provide a more durable erosion control barrier. In the unlikely event that the stockpiled material is determined to be RCRA, the stockpiled soil will be containerized, labeled, and moved to appropriate storage.

The excavated area described in the Stage II removal will be covered with the membrane liner as described in Stage I until analytical verification is received. Backfill of the excavated areas will be performed following analytical verification that the build over criteria of an average activity concentration of 35 pCi/gram of total uranium has been achieved. Experience to date on other site construction actions support the usage of total uranium concentrations as an indicator of the presence of concentrations of other hazardous substances. The usage of total uranium analytical results as the decision factor for initiating backfill activities allows construction to proceed in several days versus a week or more for other types of analyses. All of the soil excavations described in Stage II of the removal action will be based on the existing analytical data and verified by followup sampling as detailed in Section 8.0. Based on previous experience, it is anticipated that this method will conservatively achieve the build-over criteria and provide for protection of the human health and environment.

Upon achieving the proper subgrade, clean granular fill will be placed and compacted and a 12 mil polyethylene film vapor barrier will overlay the granular base fill material. Reinforcing steel will then be set prior to the placement of an 8" structural slab. Trench drains and sumps will be formed and placed concurrent with the concrete pad with coatings being subsequently applied. The erection of the permanent tent structures represents the final construction activities of Stage II.

It is planned to initiate excavation at the south end of the jobsite as existing grades form a central swale which runs northward. Therefore, stormwater runoff will flow away from the new, clean excavation based upon existing contours. (See Sheet C-2 of the project plans, Attachment 4.)

This method will effectively control contaminated runoff from entering the newly excavated jobsite.

All earthwork and excavation operations shall be performed as described in the contract specifications, Division 2, Subsection 02100.05, Attachment 4. Adjacent and contiguous grades shall be cut and/or diked as necessary to prevent surface runoff from these areas into the newly excavated area. In addition, all diking shall be performed utilizing clean fill and all dikes shall be covered with a membrane as described in Section 6.1. The membrane shall extend over the dike and approximately 20 feet into unexcavated areas. All joints shall be overlapped a minimum of 1 foot and taped to form a seal. This method of diking and covering will essentially maintain a dry condition surrounding excavated areas and prevent contaminated surface runoff into new excavated areas. Prompt and timely backfill of the excavated areas with clean bank-run gravel will prevent jobsite erosion. Any decontamination of excavation equipment will be conducted at the FMPC decontamination facility prior to off-site release.

6.3 Stage III - Phase C, D, and E Construction

Stage III of the removal action consists of construction of the remaining pad upgrade. Phases C, D, and E primarily involve the resurfacing and curbing of the existing pad and the construction of an additional 22,500 square feet of covered controlled storage in Phase D. The new concrete surface and the controlled storage area in Phase D will be sealed and coated as described in Phase A/B. Improved lighting and drainage control are additional facets of Phases C, D, and E.

Stage III work will include removal and disposal of contaminated soils and concrete for the purpose of installing spill retention areas within the structure, upgrading the existing catch basins, and the capping of the old pad surface. The surface will be prepared by sweeping of the existing pad surface which may generate an estimated 10 cubic yards of material from the concrete area. This portion of the pad upgrade will remove approximately 5,000 cubic yards of soil and rubble which is necessary for the new construction.

After preparation of the existing pad, a polyethylene barrier will be placed prior to installing the new layer of concrete. In addition, all new wearing surfaces will be covered with 86 mils of chemically resistant polyurethane. The trenches and sumps in the controlled areas will be coated with epoxy. Water drainage after completion of Stage III action is shown in Figure 6-3.

Detailed construction drawings of the Phase C, D, and E construction will be prepared per the schedule in Section 7.2.

7.0 PROGRAM MANAGEMENT

7.1 Responsibilities

The DOE has been the lead agency for this removal action and will coordinate and execute continuation of this removal action. As stated in the Consent Agreement under CERCLA 120 and 106(a), if the DOE determines under Section 104 that any activities or work being implemented under this Consent Agreement may create an imminent threat to human health or the environment from the release or threat of release of hazardous substance, pollutant, contaminant, or hazardous constituent, it may stop any work or activities for such period of time as needed to respond and take whatever action is necessary to abate the danger. Reporting to the USEPA will be in accordance with Section XXIII of the Consent Agreement.

USEPA and OEPA shall review, comment and approve the work plan and follow progress through meetings and the Consent Agreement and Amended Consent Decree progress reports.

Westinghouse Materials Company of Ohio (WMC0), the Maintenance and Operations Contractor at the FMPC, will coordinate, manage, implement, monitor activities and prepare all reports associated with the removal actions in a manner consistent with DOE and regulatory guidance.

This removal action shall be managed by the WMC0/DOE Operable Unit 3 team, to ensure compatibility with the final remedial action(s) selected for Operable Unit 3. Data and results from this removal action will be used to evaluate the final remedial options for Operable Unit 3. FMPC site personnel will manage the project using FMPC-2201 Topical Manual, Project Management Procedures.

All personnel involved will be trained in accordance with 29 CFR 1910.120, the standard operating procedures for the work involved, and with the requirements of the approved work plans. The effectiveness and integrity of these installations will be assessed on a periodic basis. This will be accomplished by personnel normally assigned those duties. Environmental Compliance will monitor and report to WMC0 management on runoff samples outside the controlled area and Maintenance will inspect and repair the facility.

7.2 Schedules

An overall integrated schedule for the three stages of the proposed removal action is shown in Figure 7-1. Detailed schedules of each of the Stages, I, II, and III, will be provided in future deliverables during the removal action.

8.0 SAMPLING AND ANALYSIS PLAN

Sampling Objectives

As identified in Section 4.0, extensive soil and groundwater sampling has been previously conducted in the vicinity of the Plant 1 Pad. Additional sampling is proposed to be conducted to support the Plant 1 Pad Removal Action to achieve the following objectives:

- Complete a hazardous waste determination on containerized waste materials generated incidental to completing the construction activities associated with the Removal Action.
- * Ensure defined soil concentration based build-over criteria are attained during the Removal Action.
- Provide long-term monitoring of the Removal Action system to ensure continued protection of human health and the environment.

To achieve the sampling objective, samples are proposed to be collected during the construction phase of the Removal Action and as a part of a long-term monitoring program.

Construction-Related Sampling

As previously described, construction activities associated with the Removal Action will involve the removal of a limited amount of concrete and soil along the western edge of the Plant 1 Pad. These excavation activities are being completed to support the construction of a pad expansion which will support the erection of two 40,000 square feet structures (Phase A/B). The affected area includes approximately 86,000 square feet of a grassed area and 7,000 square feet of existing concrete pad. Additionally, approximately 20-30 drums of sweepings will be generated from the existing Plant 1 Pad in support of the implementation of Stage III activities.

Soil Sampling

Removal and movement of soils will be strictly minimized during the Removal Action. Soils along the western edge of the pad will be excavated only to the extent necessary to attain required construction grades and to ensure that an interim residual radioactivity (new construction) build-over criteria of 35 pCi/g of total uranium is attained as averaged over an established grid interval.

The criteria of 35 pCi/g (52 ppm) of total uranium in soil has been adopted as a removal action cleanup level pending the establishment of final cleanup standards through the RI/FS process. The selected criteria represents a conservative action level which is both protective of human health and the environment, and is consistent with DOE, NRC and proposed

USEPA policies and guidance. The criteria was adopted from the NRC Branch Technical Position as presented in the Federal Register on October 23, 1981. The NRC Branch Technical Position presents five options for the disposal or onsite storage of thorium or uranium wastes from past nuclear operations. Option 1 of the NRC Position paper proposes residual radioactivity guidelines for natural thorium and depleted and enriched uranium for properties with no future land use restrictions. For depleted uranium, the NRC Position paper proposes a residual radioactivity guideline of 35 pCi/g under the unrestricted future use scenario.

Available sampling data indicate the average isotopic ratio for the soils in the vicinity of the Plant 1 Pad to be in the depleted range. The 35 pCi/g criteria is considered a conservative interim cleanup level as a result of the existing institutional controls in place at the Plant 1 Pad to limit exposure to these materials.

To verify that the build-over criteria (35 pCi/g total uranium) is attained prior to backfill or build-over activities, the following field sampling activities will be conducted:

- * Performance of real time radiological measurements during the excavation process.
- * Collection of statistically representative certification samples from the base of the excavation.

A walk-over survey will be performed with a large volume scintillation detector in the newly excavated area to provide a preliminary indication to the construction force that the build-over criteria has been obtained. The probe will be moved in a serpentine pattern over the entire affected area with the detector as close as practical to the ground surface. The survey will detect and identify areas which have elevated concentrations of gamma-emitting radionuclides such as uranium and thorium daughters. Identified "hotspots" will be excavated until the cleanup criteria (as determined by the hand held instrument) is attained. It is anticipated that the background radiation fields in the Plant 1 Pad area will be sufficiently low to permit the use of the probe to detect activity concentrations in excess of the build-over criteria.

As identified in Section 4.0, the extensive sampling performed in the proposed excavation area has not identified significant concentrations of target inorganics or organic constituents. During excavation operations, realtime measurement of the presence of organic vapors will be conducted using calibrated HNu, or OVA equipment. In the event that significant vapors are detected (following the implementation of appropriate Health and Safety adjustments) excavation operations will continue to remove all visible (stained, etc.) contamination. In the event organics are detected final certification soil samples will be analyzed for HSL's. HSL analysis will be performed by a laboratory defined in the RI/FS QAPP.

Following completion of excavation activities, a recoverable grid will be established over the affected area. Statistically representative surface

soil samples will be collected from within each grid. The grid interval and sampling frequency will be dependent on the size of the excavation, but will not, in any event, be less than four samples in a 100 square meter area.

Six-inch core samples will be collected as required in a manner consistent with the procedures defined within the RI/FS Sampling Plan and Quality Assurance Project Plan.

Collected samples will be analyzed for the following parameters:

- * Total uranium
- Isotopic uranium
- Total thorium
- * Isotopic thorium
- * Total metals (eight primary metals)

Sample analysis will be completed in the FMPC Analytical Laboratory in accordance with the FMPC Analytical Laboratories Quality Assurance Plan, October, 1987. Analytical results will be transferred to the RI/FS database.

Construction Rubble Sampling

Excavated soils exhibiting an in-situ activity concentration in excess of 100 pCi/g of total uranium, removed concrete and collected sweepings are planned to be containerized for storage and/or off-site shipment. Exhumed soils exhibiting activity concentrations between 35 and 100 pCi/g of total uranium are planned to be stockpiled in a controlled manner pending the completion of a hazardous waste determination.

Statistically representative samples are proposed to be removed from the containers and the stockpile to characterize the stored waste materials for purposes of determining the radiological properties of the materials and to complete a hazardous waste determination. Samples shall be collected and analyzed in strict accordance with the guidance provided by SW-846, 3rd Edition, Test Methods for Evaluating Solid Waste.

Collected samples shall be analyzed for the following constituents:

- Total uranium
- Isotopic uranium
- * Total thorium
- * Isotopic thorium
- Full TCLP
- * Hazardous Substance List

Radiochemical analysis will be completed at the FMPC Laboratory in accordance with the Analytical Laboratories Quality Assurance Plan, October 1987. TCLP analysis will be performed at an appropriate off-site analytical laboratory in accordance with the protocols defined in SW-846

3rd Edition. Hazardous Substance List analysis will be performed in a manner consistent with the protocols defined within the RI/FS QAPP.

Environmental Monitoring

To ensure the continued protection of human health and the environment, a long term environmental monitoring program will continue in the vicinity of the Plant 1 Pad. This program will be enhanced to focus more appropriately on the environmental conditions present at the Plant 1 Pad. The program will essentially have two key components, surface water and groundwater monitoring.

Surface Water Monitoring Program

During construction water samples will be taken of the stormwater run-off at the entrance to the storm sewer system (MH 200) on a monthly basis¹.

Following the construction activities and during operations on the pad, water samples will be taken of the stormwater run-off on a quarterly basis¹ at the following areas:

- at the inlet to the storm sewer system (MH 200)
- at the storm sewer MH 11

All samples of the stormwater run-off will be analyzed at the FMPC laboratory for total uranium and total thorium. Samples will be collected in a manner consistent with the RI/FS QAPP. Collected samples will be transferred to the FMPC Laboratory for analysis in accordance with the Analytical Laboratories Quality Assurance Plan, October 1987.

Groundwater Monitoring Program

The existing groundwater monitoring program will be enhanced to provide additional monitoring in the vicinity of the Plant 1 Pad to identify any changes in groundwater quality so as to ensure the continued protection of human health and the environment. Groundwater monitoring will be performed in both the perched water and the regional aquifer underlying the Plant 1 Pad.

Groundwater quality sampling and water level data collected from the following wells will provide a comprehensive monitoring program for the continued operation of the Plant 1 Pad.

¹All water samples will need to be taken consistent with the weather conditions. If there has not been a storm event during the given time frame, no sample will be taken due to the lack of stormwater runoff.

Well

- 1342
- 1343
- 1345
- 1339
- 1055
- 2055
- 3055

The listed 1000 series wells provide a monitoring network within the glacial till to identify and evaluate any changes in groundwater quality. Wells 2055 and 3055 provide monitoring capabilities hydraulically downgradient of the Plant 1 Pad within the regional sand and gravel aquifer.

As previously indicated, extensive sampling has been performed to date in these wells. To augment this baseline data, one round of samples will be withdrawn from the listed wells prior to construction activities for full Hazardous Substance List (HSL) analysis. These samples will be analyzed in a manner consistent with the FMPC RI/FS Quality Assurance Project Plan (QAPP).

Following the initiation of the construction phase of the Removal Action, samples will be withdrawn from the listed 1000 series wells/piezometers on a semi-annual basis. These samples will be analyzed for the parameters listed in Table 8-1. Constituents detected in significant concentrations in the HSL analysis will be added to the list in Table 8-1.

Ongoing throughout the Removal Action and until final actions are implemented, samples will be withdrawn quarterly from Wells 2055 and 3055. These samples will be analyzed for the constituents identified in Table 8-1. Additionally, constituents detected in significant concentrations in the HSL analysis will be added to the list in Table 8-1.

All groundwater samples will be collected in a manner consistent with the protocols and procedures defined in the RI/FS QAPP.

Analysis of semi-annual and quarterly samples will be completed in the FMPC Analytical Laboratory in accordance with the Analytical Laboratory Quality Assurance Plan, October 1987. In the event organic compounds are added to Table 8-1 as a result of the HSL sampling event, these analyses will be performed at a laboratory as defined in the RI/FS QAPP.

**TABLE 8-1
GROUNDWATER ANALYTICAL PARAMETERS**

Total Uranium	Nitrate
Isotopic Uranium	Selenium
Total Thorium	Silver
Isotopic Thorium	Arsenic
Barium	Cadmium
pH	Chromium (total)
Specific Conductance	Fluoride
TOX	Lead
TOC	Sulfide

This monitoring and sampling program will be performed in conjunction with sampling and analysis activities under Operable Unit 3 of the ongoing RI/FS and resultant final remedial actions. The scope of this monitoring and sampling program will not interfere with any activity in this area.

As stated in the Consent Agreement, if the DOE determines that any activities or work being implemented under this Consent Agreement may create an imminent threat to human health or the environment from the release or threat of release of a hazardous substance, pollutant, contaminant, or hazardous constituent, it may stop any work or activities for such period of time as needed to respond and take whatever action is necessary to abate the danger.

9.0 HEALTH & SAFETY PLAN

The work will be performed consistent with the Health and Safety Plan prepared for the removal actions. A copy of the plan for the continuing release is provided as Attachment 5 of this work plan. The plan identifies, evaluates, and controls all safety and health hazards. In addition, it provides for emergency response for hazardous operations. The plan is consistent with 29 CFR 1910.120 and the FMPC Site Health and Safety Plan.

Additional safety documentation will be prepared as necessary according to FMPC-2116 Topical Manual "Implementing FMPC Policies and Procedures for System Safety Analysis." FMPC-2116 has been prepared to implement DOE Order 5481.1B - Safety Analysis and Review System and DOE/OR-901 - Guidance for Preparation of Safety Analysis Reports.

10.0 QUALITY ASSURANCE PLAN

This Removal Action will be conducted according to the overall quality assurance program at the FMPC as described in the site Quality Assurance Plan, FMPC 2139. The Quality Assurance Plan is based on the criteria specified in ASME NQA-1, Federal EPA Guideline QAMS-005/80 and DOE Orders 5700.6 and 5400.1. Detailed requirements are implemented by the WMCO Site Policies and Procedures Manual, FMPC-2054, by WMCO Departmental procedures, and Topical Manuals. Specific quality assurance requirements will be incorporated into written and approved procedures and during personnel training. The Quality Department will conduct periodic surveillances to verify compliance.

ATTACHMENT 1

Plant 1 Pad

Continuing Release

REMOVAL SITE EVALUATION

REMOVAL SITE EVALUATION

PLANT 1 PAD CONTINUING RELEASE

Feed Materials Production Center

U. S. Department of Energy

November 1990

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REMOVAL SITE EVALUATION

PLANT 1 PAD CONTINUING RELEASE

INTRODUCTION

The Feed Materials Production Center (FMPC) is a uranium processing complex owned by the U.S. Department of Energy (DOE). The location of the 1050 acre site is shown in Figure 1. The FMPC was placed on the National Priorities List (NPL) in 1989. The DOE is conducting a Remedial Investigation and Feasibility Study (RI/FS) together with other response actions under a 1990 CERCLA Consent Agreement with the U.S. Environmental Protection Agency (EPA).

Since the early 1950's various chemical and metallurgical processes have been used to manufacture uranium products for the defense complex. The FMPC suspended these operations in July, 1989. A substantial quantity and variety of waste materials were generated during production operations, and more will be generated during the remedial phase. Some of the current waste inventory contains radioactive materials, and some contains both radioactive and hazardous constituents, as defined under the Resource Conservation and Recovery Act (RCRA), as amended. It is expected that part of the waste materials generated during the remedial phase will also contain similar constituents.

The Plant 1 Pad and adjacent area comprises approximately 12 acres on the northwest side of the process area as shown in Figure 2. Plant 1 is the "sampling plant" for the FMPC and is therefore the location for sampling of large amounts of uranium metal process residues and waste materials. The concrete storage pad associated with Plant 1 has been used as a drum storage location to support these operations since 1952.

The current inventory of the pad is approximately 45,000 drums. A waste characterization study is underway to complete a hazardous waste determination on the contents of these individual drums. Drums known to contain hazardous wastes are being moved to more appropriate storage facilities.

As detailed later in this document, above background concentrations of uranium and thorium have been found in the Plant 1 Pad area, and surrounding soils. In addition, various hazardous constituents have also been detected. Some of the data included in this document is undergoing a quality review. The data package will be updated with the results of this review as appropriate.

This Removal Site Evaluation (RSE) was initiated by the DOE under authorities delegated to it under Section 104 of CERCLA, through Executive Order 12580. It is being conducted to determine whether the conditions present at the Plant 1 Pad warrant a removal action under CERCLA, consistent with Section 300.410 of the National Contingency Plan (NCP). Any response action taken will incorporate the substantive requirements of CERCLA, RCRA, and NEPA.

If a removal action is appropriate, the evaluation of response alternatives will take into consideration the long-term remedial action objectives for the Plant 1 Pad, which is part of Operable Unit 3 under the RI/FS. The removal action alternative chosen will contribute to the efficient performance of any anticipated long-term remedial action, to the extent practicable.

At present, the DOE is also taking actions on Plant 1 Pad area that are designed to comply with a Proposed Amended Consent Decree for RCRA, negotiated between the DOE and the State of Ohio. These activities include waste/material characterization, drum movements to achieve adequate aisle spacing, and daily/weekly drum inspections.

SOURCE TERM

General

There are existing areas of contamination on and around the Plant 1 Pad. The origin of this contamination includes the potential historical release of material from drums stored on the pad. Most of the carbon steel drums used to store materials on the pad have deteriorated as a result of exposure to the weather. There is a risk for continued releases from materials stored on the pad to the surrounding environment.

Materials containing varying amounts of uranium metal (ingots and scrap), UO_2 (reactor recycle tails), UF_4 , U_3O_8 and thorium (ThF_4 and ThO_2 high fluoride), as well as drums of barium salts, waste oils contaminated with 1,1,1 trichloroethane, and lead have been stored on the pad.

Presently, there are several ways contaminants can enter the environment from releases from the Plant 1 Pad: rain water runoff penetrating cracks in the pad and entering the soils below; runoff that flows directly into the storm sewer system; and runoff which flows from the northwest side of the pad onto the adjacent soils. In addition, airborne releases of dried material can reach the environment.

The assumptions for exposure pathways include, but are not limited to, resuspension of radionuclides in the soils (inhalation), surface water runoff (the receptor could be wildlife) and

infiltration to an underlying aquifer. This "buried valley" aquifer has been designated to be a "sole source aquifer" by the U.S.EPA under Section 1424(e) of the Safe Drinking Water Act. Migration/transportation of contaminants (from the Plant 1 Pad) into the aquifer has not been established, however, the possibility for vertical migration exists. Exposure to contaminants would occur only if the ground water reaches the surface and is used by individuals and/or wildlife (ingestion or irrigation).

Source Specific

Sampling on, through, and around the pad area is on-going. Available data indicate that elevated levels of thorium and uranium isotopes exist under the pad and in the surrounding soils, as well as above background levels of barium and lead. Discrete samples have also indicated the presence of target organics such as acetone, methylene chloride, carbon disulfide, and xylene in soils adjacent to the pad.

A) Runoff from the Pad

Limited sampling of the rainwater runoff from the Plant 1 Pad has been performed in the past. These data demonstrate that the Plant 1 Pad runoff contains elevated levels of uranium.

B) Contamination on the Pad

There has also been sampling of the pad materials in association with expedited repairs made to the pad (discussed under Controls in Place to Address Potential Threats). Complete analytical results of this sampling are not yet available. It is anticipated that the analytical results of these samples will be consistent with other sampling done in the area.

C) Surrounding Environment

Sampling of the soils and perched water both around and under the pad also shows contamination. These results are presented in Appendix A.

Near the pad, the average radionuclide concentrations from Table A-4 at and near the soil surface are 298 ppm uranium and 27 ppm thorium. The average barium concentration from Table A-1 found in this area was 79 ppm. Above background concentrations of lead were also detected. Analysis for targeted organics found up to isolated incidences of 40 ppb for methylene chloride, 18 ppb for xylene, 12 ppb for carbon disulfide. The concentrations of acetone were unclear due to its presence in the blanks and the extreme ranges at the same sample locations.

The concentrations of radionuclides just under the pad are an average of 410 ppm uranium and 30 ppm thorium. The sampling effort also found elevated levels of barium and lead. The results from the analysis for targeted organics are not available.

The results from the perched water samples near the pad showed a maximum of 689 ppm total U and the results from under the pad showed a maximum of 441 ppm total U.

D) Groundwater

A cluster of groundwater monitoring wells is located just east of the Plant 1 Pad, at Location 055. Wells 1055, 2055, and 3055 have been placed in the till, the upper portion of the sand and gravel aquifer, and in the mid-portion of the aquifer, respectively. The groundwater flow in the regional aquifer in this area is to the east. Wells 2055 and 3055 are hydraulically downgradient of the Plant 1 Pad.

Results from sampling and analysis of these wells are presented in Tables 9 and 10. The groundwater in this area contains relatively low levels of metals and radionuclides and no target organics have been detected. Some of these data are undergoing quality review, as stated in the introduction to this document.

EVALUATION OF THE MAGNITUDE OF THE THREAT

Controls in Place to Address Potential Threats

Several programs are in place that will provide a reduction in the risk of further releases and contamination from the pad. These programs are described below.

A) Drum Management Plan

The FMPC drum management plan is a comprehensive, phased plan designed to facilitate the proper management of waste drums stored at the FMPC. This plan includes:

- 0 Characterization of waste materials in the drums;
- 0 Prioritization of leaking containers, with overpacking of the most severely deteriorated drums first;
- 0 Movement of drums containing hazardous waste to indoor storage (as space is available);
- 0 Daily leak inspections on the Pad.

B) Drum Transport

There are safety and spill concerns associated with the movement of drums on the pad due to the poor condition of the surface of the pad in some places. Expedited repairs of the concrete surface, a maintenance operation, has been completed. This project involved the resurfacing (with removal of broken surface) of severely damaged concrete, and patching of less severely deteriorated areas. The broken concrete and cutting water has been drummed and sampled. This material is being stored on the Plant 1 Pad until analytical results are received.

These expedited repairs were initiated before the preparation of this RSE. Any additional (updated) data will be maintained with this record.

C) Temporary Cover

Another action taken was the erection of a temporary cover over a portion of the Plant 1 Pad. This project involved the installation of a 5,226 square foot tension support structure as a demonstration project at the FMPC. The purpose of the project is to evaluate the viability of using similar additional structures for covered storage of drums and other materials, and to demonstrate the ease of construction and mobility of these types of structures.

The demonstration will last six months to one year. During this period, approximately 1500 to 2500 drums will be stored under the cover.

Remaining Threat

The above programs will facilitate more controlled operation and management of the pad area, but will not abate the current contamination levels of the pad nor eliminate the potential for additional releases. These remaining threats are discussed below.

A) Continuing Release

In the past, drums in various states of deterioration were stored on the pad. Material leaking or seeping from these containers was washed off onto the pad during periods of rainfall. This material, along with contaminants present on the pad from previous releases, may be carried by runoff to the grassy area on the west side of the pad and to the storm sewer system (and ultimately to the Great Miami River).

While it is recognized that the pad will be included within the Record of Decision for Operable Unit 3, current and near term plans require its use as a staging and enhanced storage area. Therefore, the potential for a continuing release exists.

B) Soils Around the Pad

The potential threat posed by the above background levels of uranium and thorium found in the surface soils near the Plant 1 Pad is the potential for human and environmental exposure to the contaminants as a result of suspension of the soil particles in the atmosphere and/or the potential migration of the contaminants through wind and water erosion. The average concentration of the contaminants in the soil are 298 ppm total uranium and 27 ppm total thorium. It is very likely that these concentrations will exceed clean-up levels for remediation of the FMPC soils. Several recent remedial projects have adopted residual soil activity concentrations for final cleanup actions consistent with the 1981 NRC Branch Technical Position Paper (BTP) on the disposal or on site storage of uranium and thorium materials. Concentrations discussed in this BTP included 35 pCi/g (approx. 50 ppm) for depleted uranium in soils (Aerojet 1984; Colonie, NY 1986) and 10 pCi/g for natural thorium (Th-232 plus Th-228 and other daughters in equilibrium).

Also, the migration of the contaminated soil to previously clean areas could result in more extensive soils cleanup as part of final remedial action.

ASSESSMENT OF THE NEED FOR AN INTERIM RESPONSE

Consistent with section 40 CFR 310.410 of the National Contingency Plan (NCP), the DOE shall determine the appropriateness of a removal action (interim response). Section 40 CFR 300.415 (b)(2) of the NCP defines eight factors that should be considered in determining the appropriateness of a removal action. Five of these factors, listed below, are specifically applicable to this assessment.

40 CFR 300.415 (b)(2)(i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

40 CFR 300.415 (b)(2)(ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems.

40 CFR 300.415 (b)(2)(iii) Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release.

40 CFR 300.415 (b)(2)(v) Weather conditions that may cause hazardous substance or pollutants or contaminants to migrate or be released.

40 CFR 300.415 (b)(2)(vi) Threat of fire or explosion

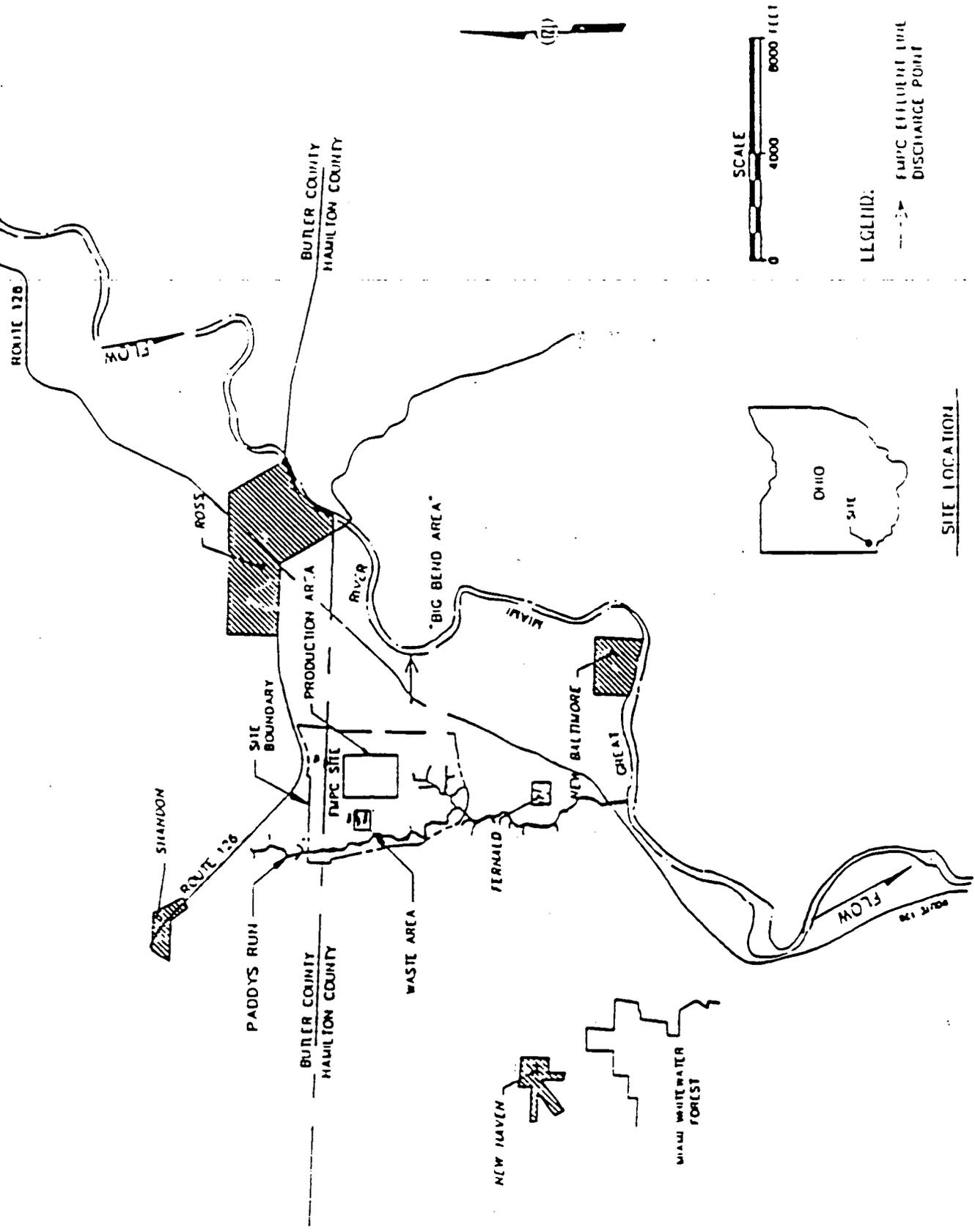
APPROPRIATENESS OF A RESPONSE

If a planning period of less than six months exists prior to initiation of a response, DOE will prepare an EA-FONSI, Interim Response Action Memorandum. The Action Memorandum will describe the selected response and supporting documentation for the decision. This will serve as the decision document for the RI/FS Administrative Record.

If it is determined that there will be planning period greater than six months before an action is initiated, DOE will prepare an EA-FONSI, Interim Response, Engineering Evaluation/ Cost Analysis (EE/CA) Approval Memorandum. This memorandum is to be used to document the threat to public health and the environment. It would then serve as the decision document for the Administrative Record File.

The DOE has determined that a time critical removal action is appropriate, due to the current and on going potential for release of contaminants from the Plant 1 Pad area. The released contamination has the potential to migrate into the environment, where it may result in human exposure or contamination of drinking water supplies. A removal action to control stormwater runoff from this area and deter the further releases of contaminants from leaking drums should be undertaken.

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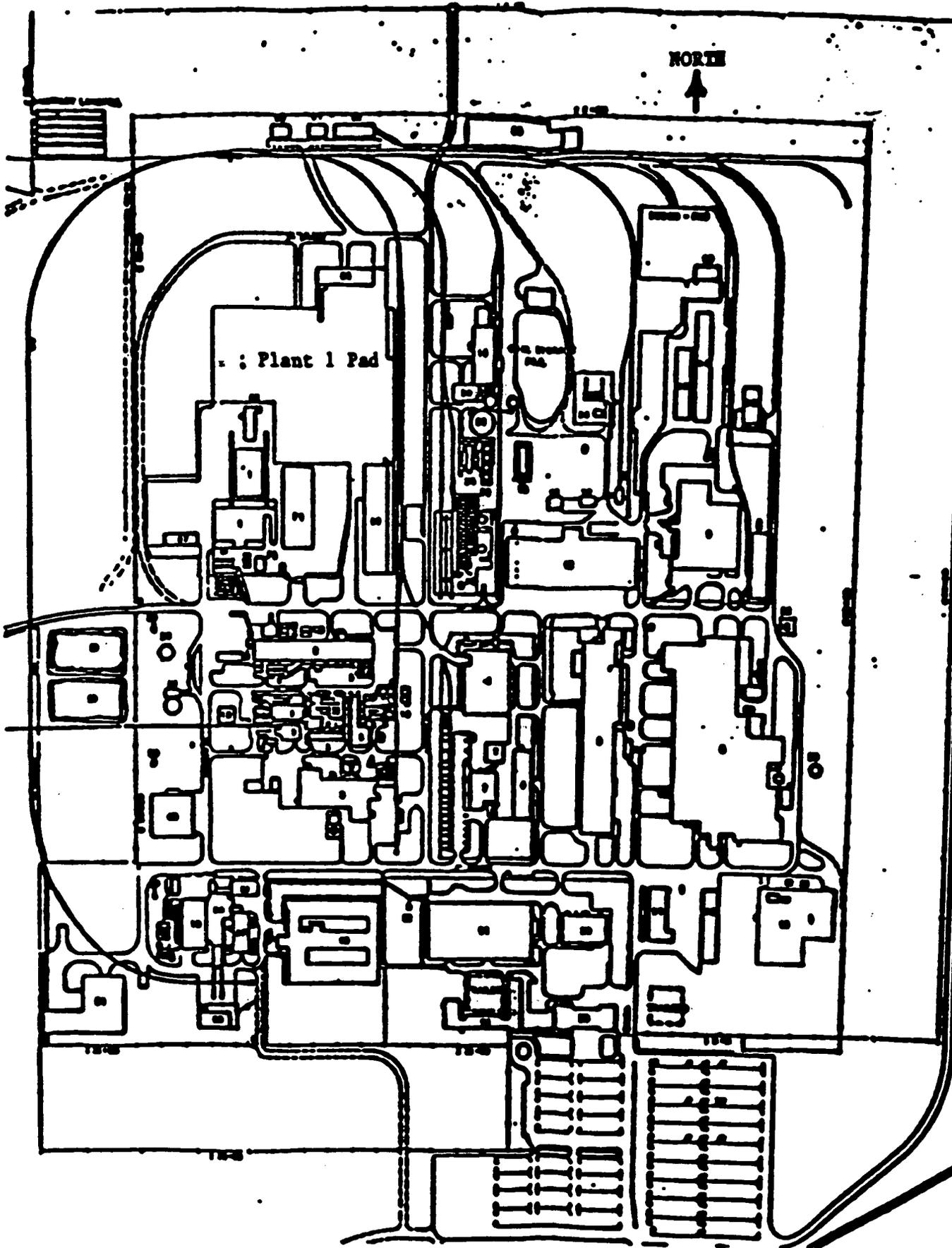
LEGEND:
 ---> FMPC EFFLUENT LINE
 ---> DISCHARGE POINT



SITE LOCATION

FIGURE 1
 FMPC SITE AND VICINITY

FIGURE 2
FPC SITE



APPENDIX A
SAMPLING AND ANALYSES

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APPENDIX A

PLANT 1 PAD SAMPLING AND ANALYSIS

INTRODUCTION

The Plant 1 Pad area is illustrated in Figure 1. In order to characterize conditions at the Plant 1 Pad, surface and subsurface soil and groundwater samples were collected and analyzed for radioactive and chemical constituents. This information was obtained through three programs of sampling. Some of these data are undergoing quality review as stated in the introduction to the RSE document.

1) Simple Core Soil Sampling

Initial Samples

Surface soil samples were collected at 21 locations just off the western edge of the pad. Soil samples beneath the concrete, at the western edge were also collected at 7 locations. (These locations can be seen in Figure 2). The samples were collected from three distinct increments within each location, as indicated in Table A-1: Surface (0 ft), 1 ft, and 2 ft depths. The samples were collected by FMPC personnel in accordance with FMPC Environmental Monitoring sampling protocols. Analysis of the samples included Primary Total Metals (Table A-1), E.P. Toxicity Metals (Table A-2), Target Volatile Organic (Table A-3), and Radiochemical Metals (Table A-4). The Primary Total Metals, E.P. Toxicity Metals, and radiochemical metals analysis were completed in the FMPC laboratory. The Target Volatile Organic analysis was completed at off-site laboratories.

Secondary Samples

The soil sampling program was supplemented with the collection of additional soil samples at an 47 locations in the grassy area west of the pad and 23 locations (Figure 4) beneath the pad.

The 47 soil samples taken in the grassy area, shown in Figure 3, were take from two types of sampling locations. One type of sample location had two samples taken from it: one at the surface and one at a depth of 1 ft. The other type of sample location had only surface soil samples taken. These differences are also reflected in Figure 3. All samples were taken by FMPC personnel, utilizing FMPC Environmental Monitoring sampling protocols. The samples taken from this area were only tested for radionuclides, as reflected in Table A-5. The analysis for these samples were performed at the FMPC laboratory.

Under Pad Samples

Finally, another 23 locations were sampled beneath the pad with the distribution noted in Figure 4. Samples were taken from the surface soil directly beneath the pad and at a depth of one foot.

The samples were taken by FMPC personnel in accordance with FMPC Environmental Monitoring sampling protocols. The fraction of samples immediately beneath the pad were sent to the International Technologies (IT) Laboratory in Oak Ridge, Tennessee. Analytical results are expected by the end of November, 1990. The samples, sent to IT, are being analyzed for:

Tot U	Tot Th	U-234	U-235	U-238
Tot Pu	Pu-238	Pu-239	Ru-106	TCLP Metals
Np-237	Tc-99	Sr-90	Total Metals	

Isotopic U if Tot U > 45 ppm
Isotopic Th if Tot Th > 15 ppm

The samples from one foot below the pad were analyzed at the FMPC for total thorium and total uranium only. No measurable thorium was noted and the 16 of 20 samples with measurable uranium averaged 25 ± 22 ppm; analytical sensitivity was 11 ppm. Table A-6 shows the radiological results.

2) Boring Core Soil Sampling

The samples identified below were collected during the Remedial Investigation/Feasibility Study (RI/FS), by Pennsylvania Drilling and Advanced Sciences Inc. contract personnel in accordance with the protocols set forth in RI/FS work plan. The samples were analyzed in the IT laboratory in Oak Ridge, Tennessee, in accordance with Certified Laboratory Protocols. The identified boring locations can be found on Figure 5, and all of the boring data can be found in Table A-7 and A-8.

The information presented on the borings is all that is currently available. Some of the water samples taken from some of the borings, as with the soil samples taken beneath Plant 1 Pad, are being analyzed for additional parameters, including TCLP Metals, Isotopic U, Isotopic Th, etc. These results have not been received yet.

Borings through the Pad

Borings through the concrete pad permitted collection of soil and liquid at six sampling locations, as shown in Figure 5. The crosssectional diagrams and relative locations of the seven borings are as follows:

	<u>Boring No.</u>	<u>Location</u>
Fig. 6	1339	NE quadrant
Fig. 7	1342	Center toward west (NNE of Plant 1)
Fig. 8	1343	Center toward east (ENE of Plant 1)
Fig. 9	1345	Center toward west (West of 1342)
Fig. 10	1346	Near shot blaster (N of Plant 1)
Fig. 11	1348	South central (East of Building)
Fig. 12	1361	Under Plant 1 (smaller building)

Locations 1345 and 1346 were more extensively analyzed for potentially hazardous substances than for radioactivity. A brief rundown of the analysis performed at these two locations is given below.

Non-radiological Analyses

The following analyses were performed for non-radiological concentrations:

<u>Analysis</u>	<u>Results</u>
Volatile organic by GCMS	One positive result. No other compounds detected (10 ug/kg trichloroethane in 1346)
Semi-volatile organic by GCMS	None detected
Pesticides and PCBs	None detected
Total Cyanide	None detected
ICP Metals	See Table A-8
Furnace AA Metals	See Table A-8
Cold Vapor AA Hg	See Table A-8
Flame AA for K	See Table A-8

Table A-8 shows the values for those non-radioactive potentially hazardous substances with concentrations in excess of the analytical sensitivity.

Radiological Analyses

Samples from Location 1345 were also analyzed for additional radioactive materials. The following table summarizes the values where results exceeded analytical sensitivity:

Radionuclides at Boring 1345 (pCi/g)

Sr-90	0.8	U-234	4.6
Tc-99	1.4 (single value)	U-238	5.5
		Tot U	13.3 ug/g
Ra-228	0.8		
Th-228	0.8		
Th-232	0.7		
Ra-226	0.8		
Th-230	1.2		

Borings immediately adjacent to the Pad

Three borings were made into soil just off the pad surface (Figure 5). The cross-sectional diagrams for the three drawings are as follows:

	<u>Boring No.</u>	<u>Location</u>
Fig. 13	1338	North central
Fig. 14	1347	West toward south
Fig. 15	1349	South toward east

Borings in the vicinity of the Pad

Seventeen borings permitted sampling in a ring around the pad at a distance of roughly 100 feet in various directions (Figure 5). These borings were also completed as part of the "Production and Additional Suspect Areas Investigation" section of the Remedial Investigation/Feasibility Study. The borings numbers are as follows:

1333	1334	1335	1336	1337	1340
1341	1344	1350	1351	1352	1353
1354	1356	1357	1358	1359	

Cross-sectional diagrams for these borings were not prepared because they are outside the area of direct concern, and information gained in boring geology would not add value to the findings presented.

3) Monitor Wells

Monitor well location 55 is located approximately 30 feet east of the pad (Figure 5). Soil and liquid samples were analyzed from wells 1055, 2055, and 3055. The soils samples were taken as part of the RI/FS, as with the other borings, indicated above. The water samples were taken by FMPC personnel in accordance with FMPC Environmental Monitoring Protocols. Laboratory analysis for radionuclides was done at the FMPC Laboratory. Analysis for volatile and non-volatile organic, metals, etc. was done at off-site laboratories. Tables A-9 and A-10 present the most recent data from these monitoring wells.

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ATTACHMENT 1
to
APPENDIX A
Tables and Figures

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FIGURE 1

PLANT 1 STORAGE PAD

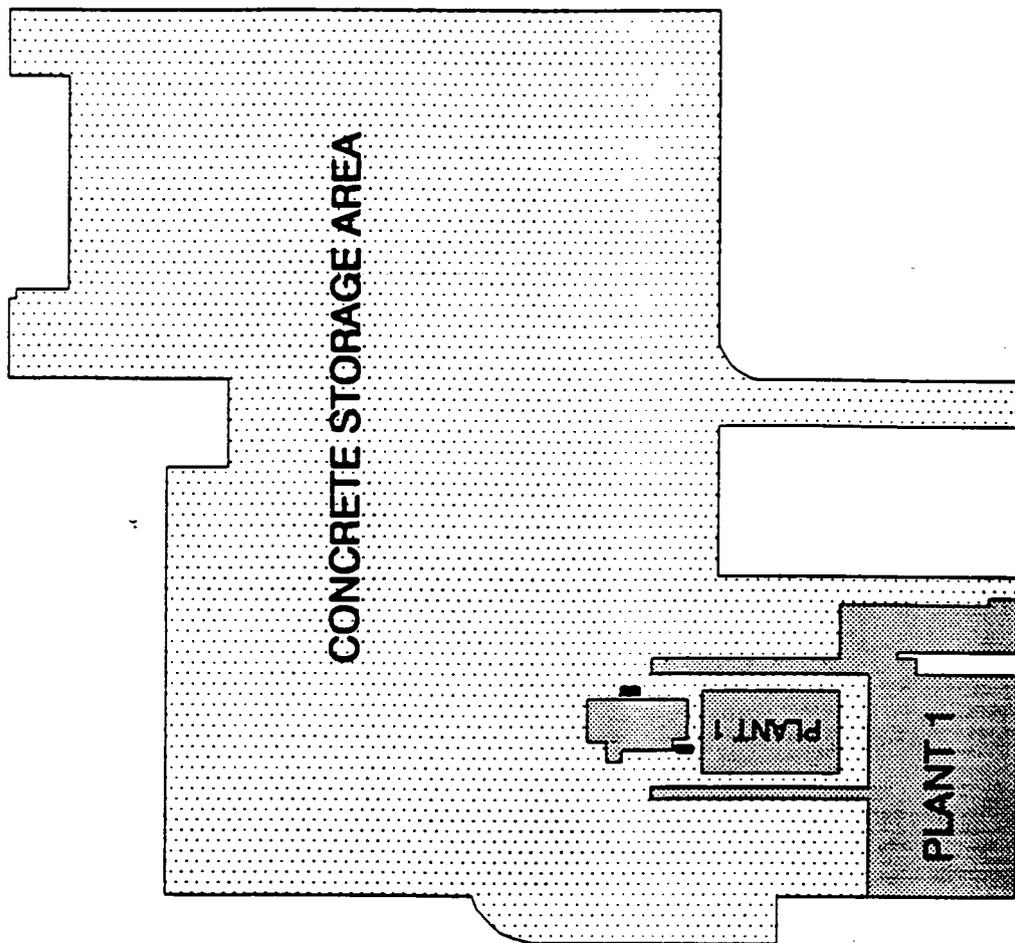


FIGURE 2

PLANT 1 STORAGE PAD

SOIL SAMPLING

**ADDITIONAL SOIL SAMPLING
PERFORMED IN THIS AREA
(SEE FIGURE 3)**

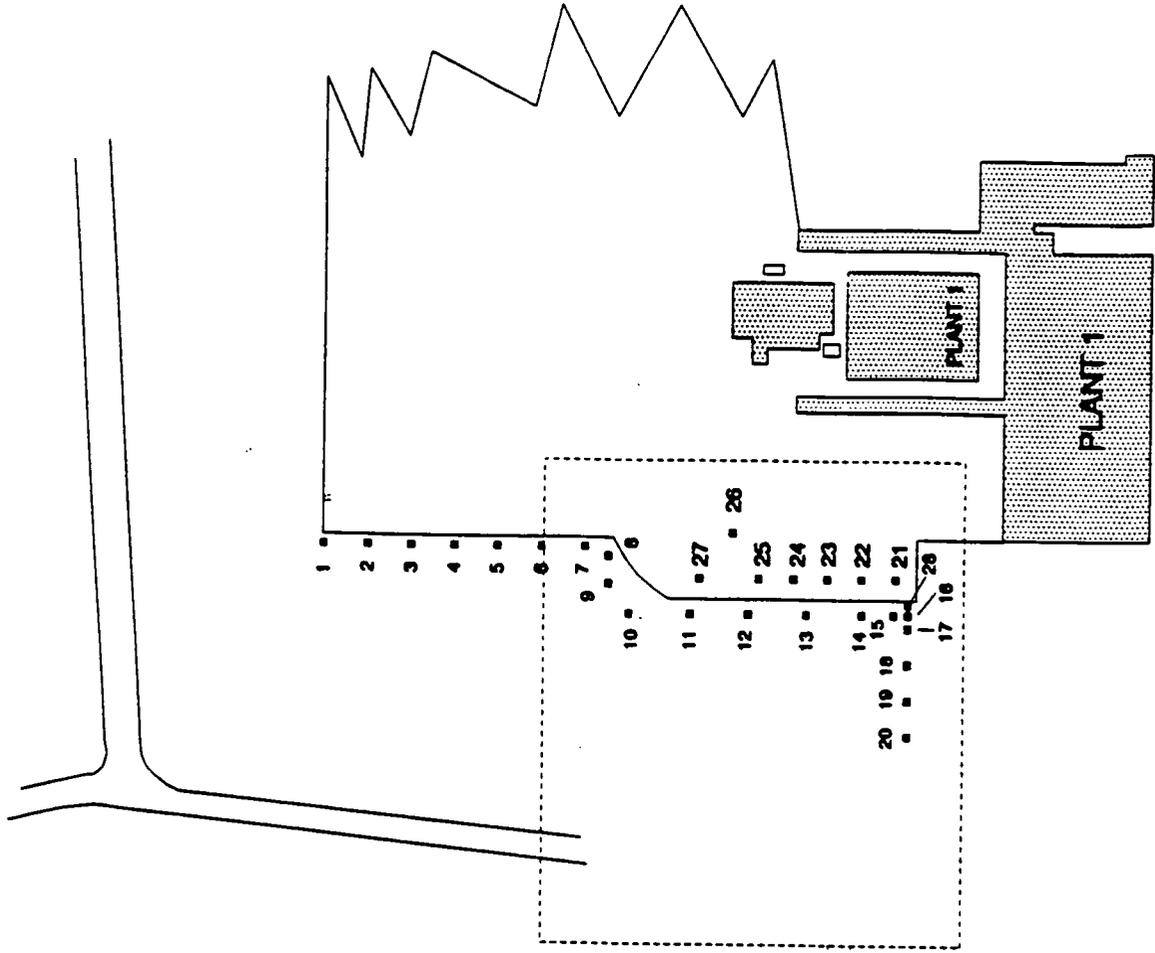


TABLE A-1
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

RCRA METALS

Sample Location	Depth	Total Ag (ug/g)	Total As (ug/g)	Total Ba (ug/g)	Total Cd (ug/g)	Total Cr (ug/g)	Total Hg (ug/g)	Total Pb (ug/g)	Total Se (ug/g)
1	0	I	I	I	I	I	I	22.80	I
	1	I	I	I	I	I	I	22.10	I
	2	I	I	I	I	I	I	57.00	I
2	0	< 1	5.00	55.00	< 0.2	7.20	< 0.1	61.30	< 0.1
	1	< 1	4.50	55.50	< 0.2	7.30	< 0.1	39.30	< 0.1
	2	< 1	4.50	75.50	< 0.2	7.70	< 0.1	120.00	< 0.1
3	0	< 1	6.20	69.50	< 0.2	12.30	< 0.1	55.40	< 0.1
	1	< 1	6.50	79.50	< 0.2	9.30	< 0.1	49.60	< 0.1
	2	< 1	4.40	59.00	< 0.2	7.20	< 0.1	8.85	< 0.1
4	0	< 1	4.84	88.10	0.75	11.90	< 0.1	41.80	R
	1	< 1	1.94	84.80	0.30	8.73	< 0.1	15.30	R
	2	< 1	5.72	58.40	< 0.2	8.74	< 0.1	11.50	R
5	0	< 1	5.11	80.00	0.20	8.70	< 0.1	21.40	R
	1	< 1	4.66	55.70	0.20	7.17	< 0.1	10.50	R
	2	< 1	4.36	59.40	< 0.2	7.83	< 0.1	9.90	R
6	0	< 1	6.15	102.00	0.25	11.20	< 0.1	109.70	< 0.1
	1	< 1	7.02	70.40	1.15	7.94	< 0.1	16.10	R
	2	< 1	4.51	117.90	0.80	11.70	< 0.1	12.00	R
7	0	< 1	7.19	104.50	0.55	10.00	< 0.1	22.60	R
	1	< 1	8.09	84.90	0.45	9.39	< 0.1	12.30	R
	2	< 1	6.23	78.20	0.30	6.38	< 0.1	11.50	R
8	0	< 1	8.46	127.60	0.35	6.83	< 0.1	32.50	R
	1	< 1	6.88	115.60	< 0.2	5.53	< 0.1	16.60	R
	2	< 1	4.65	94.20	0.25	6.18	< 0.1	13.80	R
9	0	< 1	6.78	42.90	0.20	2.75	< 0.1	20.90	R
	1	< 1	5.81	93.60	0.30	5.68	< 0.1	14.60	R
	2	< 1	5.58	67.40	< 0.20	4.54	< 0.1	126.70	< 0.1
10	0	< 1	4.41	51.30	0.25	3.29	< 0.1	7.97	R
	1	< 1	6.79	82.90	0.20	6.40	< 0.1	12.70	R
	2	< 1	0.76	39.00	< 0.20	1.45	< 0.1	6.69	R
11	0	< 1	4.04	87.40	1.10	9.64	< 0.1	22.20	< 0.10
	1	< 1	5.55	124.30	0.25	12.00	< 0.1	26.00	< 0.10
	2	< 1	4.14	82.80	0.30	10.70	< 0.1	18.00	< 0.10
12	0	< 1	3.38	46.10	0.40	7.49	< 0.1	21.00	< 0.10
	1	< 1	5.39	85.00	0.20	10.40	0.10	21.90	< 0.10
	2	< 1	4.78	174.60	0.60	12.20	< 0.1	16.90	< 0.10
13	0	< 1	4.35	68.90	0.45	9.59	< 0.1	31.90	< 0.10
	1	< 1	4.14	98.10	0.25	10.90	< 0.1	15.50	< 0.10
	2	< 1	4.84	85.40	< 0.20	10.30	< 0.1	17.30	< 0.10
14	0	< 1	3.04	73.90	< 0.20	6.05	< 0.1	33.30	< 0.10
	1	< 1	5.96	170.30	0.50	11.20	< 0.1	18.40	< 0.10
	2	< 1	5.44	102.20	0.75	12.60	< 0.1	21.20	< 0.10
15	0	< 1	6.75	136.00	0.45	8.55	< 0.1	24.80	< 0.10
	1	< 1	8.12	120.00	0.20	10.00	< 0.1	15.80	< 0.10
	2	< 1	4.84	98.00	0.20	8.25	< 0.1	13.70	< 0.10

TABLE A-1
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

RCRA METALS

----- Sample ----- Location Depth	Total Ag (ug/g)	Total As (ug/g)	Total Ba (ug/g)	Total Cd (ug/g)	Total Cr (ug/g)	Total Hg (ug/g)	Total Pb (ug/g)	Total Se (ug/g)	
16	0	< 1	5.82	67.50	< 0.20	6.95	< 0.1	18.80	< 0.10
	1	< 1	7.00	73.50	2.40	9.30	< 0.1	15.40	0.16
	2	< 1	7.20	84.00	2.20	11.20	< 0.1	14.40	0.10
17	0	< 1	6.20	81.00	1.55	14.30	< 0.1	72.00	0.25
	1	< 1	7.02	73.00	1.10	9.95	< 0.1	16.20	< 0.10
	2	5.80	6.96	100.50	0.95	10.30	< 0.1	13.40	0.10
18	0	< 1	6.49	87.50	1.25	10.60	< 0.1	71.50	0.19
	1	I	I	I	I	I	I	I	I
	2	I	I	I	I	I	I	I	I
19	0	< 1	4.72	71.50	0.60	7.00	< 0.1	43.60	< 0.10
	1	< 1	5.46	75.50	0.45	7.35	< 0.1	42.60	< 0.10
	2	< 1	3.42	130.00	0.20	9.40	< 0.1	14.40	< 0.10
20	0	< 1	3.20	52.00	0.30	8.05	< 0.1	42.00	< 0.10
	1	< 1	3.89	57.50	0.40	9.00	< 0.1	41.60	< 0.10
	2	< 1	8.93	43.60	0.30	6.35	< 0.1	25.60	< 0.10
21	0	< 1	6.46	74.50	0.35	5.75	< 0.1	53.50	0.29
	1	< 1	6.37	101.00	0.25	8.40	< 0.1	53.50	0.10
	2	< 1	4.34	71.00	0.20	7.30	< 0.1	9.45	< 0.10
22	0	< 1	6.26	236.00	0.20	6.65	< 0.1	14.40	< 0.10
	1	< 1	4.99	108.00	0.20	7.50	< 0.1	11.60	0.13
	2	< 1	3.25	75.00	0.25	7.95	< 0.1	13.80	0.16
23	0	< 1	4.32	1080.00	0.30	6.70	< 0.1	9.30	< 0.10
	1	< 1	4.95	186.00	0.20	7.40	< 0.1	17.80	0.14
	2	< 1	4.49	74.00	<.20	7.20	< 0.1	14.40	< 0.10
24	0	< 1	3.65	114.50	<.20	8.60	< 0.1	11.20	< 0.10
	1	< 1	4.34	61.50	0.35	9.55	< 0.1	9.90	< 0.10
	2	< 1	3.76	45.80	<.20	8.10	< 0.1	9.15	< 0.10
25	0	< 1	4.19	83.00	<.20	11.30	< 0.1	9.25	< 0.10
	1	< 1	7.64	92.50	0.20	12.10	< 0.1	15.00	< 0.10
	2	< 1	4.80	32.40	<.20	7.70	< 0.1	12.20	< 0.10
26	0	< 1	4.92	103.50	<.20	8.45	< 0.1	11.50	< 0.10
	1	< 1	5.40	67.50	<.20	9.70	< 0.1	11.10	< 0.10
	2	< 1	4.82	74.00	<.20	11.40	< 0.1	11.10	< 0.10
27	0	< 1	3.62	124.50	<.20	20.00	< 0.1	32.00	< 0.10
	1	< 1	5.68	101.00	<.20	14.10	< 0.1	15.10	< 0.10
	2	< 1	5.20	97.00	<.20	12.10	< 0.1	13.40	< 0.10
28	0	< 1	< 1	91.50	0.90	14.70	< 0.1	83.00	< 0.10
	1	< 1	< 1	103.00	0.40	12.00	< 0.1	69.80	0.14
	2	< 1	5.86	76.50	0.20	8.60	0.10	10.13	0.10

I = Analysis Incomplete

N = Not Analyzed

R = Instrumentation problem - will have to be resampled and reanalyzed.

TABLE A-2
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

E. P. TOXICITY

Sample Location Depth		E.P. Tox. Ag (mg/l)	E.P. Tox. As (mg/l)	E.P. Tox. Ba (mg/l)	E.P. Tox. Cd (mg/l)	E.P. Tox. Cr (mg/l)	E.P. Tox. Hg (mg/l)	E.P. Tox. Pb (mg/l)	E.P. Tox. Se (mg/l)
1	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
2	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
3	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
6	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
11	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
12	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
13	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
14	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
15	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
16	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
17	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
18	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
19	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
20	0	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	1	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1
	2	<1	<1	<25	<0.2	<1	<0.1	<1	<0.1

TABLE A-3
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

ORGANICS											
SAMPLE	Loctn	Depth	Acetone		Methylene Chloride		Xylene		Carbon Disulfide		UNKNOWN
			(ug/Kg)	Qual	(ug/Kg)	Qual	(ug/Kg)	Qual	(ug/Kg)	Qual	
1	0 --		A		A		A		A		
	1 --		A		A		A		A		
	2 --		A		A		A		A		
4	0 --		13	U	7	U	7	U	7	U	
	1 --		4	J	38		6	U	6	U	
	2 --		12	U	20		6	U	6	U	
5	0 --		8	J	26		7	U	7	U	
	1 --		36	B	5	U	1	J	5	U	2 ? 7J, 9J
	2 --		54	B	5	U	2	J	5	U	4 ? 15J, 8J, 8J, 7J
6	0 --		57	B	5	U	4	J	5	U	
	1 --		24	B	5	U	0.9	J	5	U	2 ? 10J, 13J
	2 --		29	B	5	U	1	J	5	U	
7	0 --		28	B	5	U	2	J	2	J	2 ? 12J, 15J
	1 --		95	B	5	U	2	J	5	U	2 ? 8J, 38J
	2 --		27	B	5	U	2	J	5	U	
8	0 --		57	B	5	U	1	J	5	U	
	1 --		12	B	2	JB	5	U	5	U	
	2 --		14	B	5	U	5	U	5	U	
9	0 --		21	B	3	JB	5	U	5	U	
	1 --		16	B	3	JB	5	U	5	U	
	2 --		18	B	3	JB	5	U	5	U	3 ? 5J, 14J, 23J
10	0 --		32	B	4	JB	5	U	12		
	1 --		31	B	7	B	5	U	5	U	
	2 --		20	B	7	B	5	U	5	U	
11	0 --		41	B	3	JB	1	JB	5	U	
	1 --		160	B	3	JB	12	B	5	U	
	2 --		52	B	3	JB	20	B	5	U	
12	0 --		5	JB	3	JB	55	B	5	U	
	1 --		140	B	3	JB	7	B	5	U	
	2 --		950	BE	4	JB	27	B	5	U	
13	0 --		22	B	4	JB	7	B	5	U	ETHANOL 15J
	1 --		150	B	3	JB	5	U	5	U	
	2 --		49	B	2	JB	3	JB	5	U	
14	0 --		62	B	1	JB	7	B	5	U	
	1 --		12	B	2	JB	5	U	5	U	
	2 --		8	JB	3	JB	8		5	U	
15	0 --		40	B	3	JB	15		5	U	
	1 --		19	B	5	U	18		5	U	
	2 --		22	B	3	JB	10		5	U	
16	0 --		120	B	3	JB	6		5	U	
	1 --		7	JB	3	JB	3	J	5	U	
	2 --		18	B	26		4	JB	5	U	
17	0 --		57	B	4	JB	2	JB	5	U	4 ? 12J, 4J, 10J, 10J
	1 --		24	B	9		3	JB	5	U	
	2 --		22	B	40		5	JB	5	U	
18	0 --		26	B	15		3	JB	5	U	1? 17J
	1 --		22	B	9		3	JB	11		2 ? 120J, 18J
	2 --		7	JB	7		3	JB	5	J	1 ? 10J
19	0 --		8	JB	2	JB	5	U	5	U	
	1 --		18	B	2	JB	5	U	5	U	
	2 --		14	B	5	U	5	U	5	U	

TABLE A-3
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

ORGANICS

SAMPLE		Acetone (ug/Kg) Qual		Methylene Chloride (ug/Kg) Qual		Xylene (ug/Kg) Qual		Carbon Disulfide (ug/Kg) Qual		UNKNOWN
Locn	Depth									
20	0 --	13	B	2	B	18		5	U	
	1 --	28	B	2	JB	5	U	5	U	
	2 --	14	B	2	JB	10		5	U	
21	0 --	R		R		R		R		
	1 --	R		R		R		R		
	2 --	R		R		R		R		
22	0 --	R		R		R		R		
	1 --	R		R		R		R		
	2 --	R		R		R		R		
23	0 --	R		R		R		R		
	1 --	R		R		R		R		
	2 --	R		R		R		R		
24	0 --									
	1 --									
	2 --									
25	0 --									
	1 --									
	2 --									
26	0 --									
	1 --									
	2 --									
27	0 --									
	1 --									
	2 --									
28	0 --									
	1 --									
	2 --									

U = Not detected. Quantitation limit is listed.

J = Estimated value below quantitation limit.

B = Compound was detected in both the sample and it's associated blank

E = Concentration of the compound exceeded the calibration range of of the instrument.

R = Has been resampled. Original samples analyzed by Enwright Labs reported low limits 125x

A = Has been resampled. Initial samples analyzed by Oak Ridge National Labs reported low

TABLE A-4
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

		RADIONUCLIDES									
Sample Location	Depth	Pu-238	Pu-239	Re-226	Re-228	Total Th	Calc. Th	Th-228	Total U	Calc. U	U-235
		(pCi/g)	(pCi/g)	(pCi/g)	(pCi/g)	(ppm)	(pCi/g)	(pCi/g)	(ppm)	(pCi/g)	(wt. %)
1	0	N	N	N	N	1	1	1	1	1	1
	1	N	N	N	N	1	1	1	1	1	1
	2	N	N	N	N	1	1	1	1	1	1
2	0	N	N	N	N	<18	9.9	3.8	138	83	0.53
	1	N	N	N	N	<18	13.0	6.9	66	38	0.47
	2	N	N	N	N	<18	6.0	3.3	36	21	0.50
3	0	N	N	N	N	<18	23.0	7.0	1220	920	0.92
	1	N	N	N	N	<18	18.0	5.3	338	220	0.64
	2	N	N	N	N	<18	12.0	6.2	61	37	0.56
4	0	<.3	<.2	3.7	<.92	<18	17.0	3.3	364	200	0.39
	1	1	1	N	N	<18	25.0	6.5	157	87	0.41
	2	1	1	N	N	<18	9.4	5.4	28	15	0.38
5	0	N	N	N	N	21	49.0	6.6	435	250	0.47
	1	N	N	N	N	<23	7.3	2.3	25	15	0.56
	2	N	N	N	N	<23	3.4	1.3	<11	<7.0	0.62
6	0	N	N	N	N	44	100.0	7.3	606	410	0.71
	1	N	N	N	N	<23	<9.5	<2.4	39	16	0.70
	2	N	N	N	N	<23	<9.0	<2.3	15	10	0.69
7	0	N	N	N	N	26	<9.4	<2.3	164	110	0.70
	1	N	N	N	N	<23	11.0	2.2	118	79	0.70
	2	N	N	N	N	<23	<9.4	<2.4	11	7.1	0.65
8	0	0.66	<0.20	3.3	1.9	<23	7.9	2.8	70	45	0.63
	1	0.61	<0.20	N	N	<23	7.9	4.1	26	16	0.57
	2	<0.30	<0.20	N	N	<23	9.5	5.1	<11	<7.0	0.61
9	0	N	N	N	N	<23	16.0	6.4	40	26	0.64
	1	N	N	N	N	<23	9.9	5.3	34	23	0.73
	2	N	N	N	N	<23	8.4	3.5	13	8.8	0.73
10	0	N	N	N	N	29	17.0	4.8	184	120	0.68
	1	N	N	N	N	<23	12.0	7.2	24	17	0.75
	2	N	N	N	N	<23	9.4	6.2	<11	<7.4	0.72
11	0	N	N	N	N	<23	18.0	7.4	274	180	0.64
	1	N	N	N	N	<18	12.0	6.4	23	15	0.68
	2	N	N	N	N	<18	5.0	2.3	<11	7.3	0.69
12	0	<0.30	0.35	3.0	2.4	<18	15.0	4.1	133	88	0.68
	1	<0.30	<0.20	N	N	<18	5.2	2.5	58	40	0.74
	2	<0.30	<0.20	N	N	<18	5.4	2.8	37	25	0.71
13	0	N	N	N	N	<18	20.0	5.5	323	190	0.51
	1	N	N	N	N	<18	10.0	3.7	132	83	0.60
	2	N	N	N	N	<18	5.9	2.8	44	27	0.57
14	0	N	N	N	N	27	20.0	6.5	419	270	0.63
	1	N	N	N	N	<18	14.0	3.3	110	74	0.71
	2	N	N	N	N	<18	9.3	4.6	26	17	0.67
15	0	N	N	N	N	94	18.0	5.4	345	210	0.54
	1	N	N	N	N	25	19.0	7.4	122	81	0.69
	2	N	N	N	N	<18	10.0	4.6	24	16	0.71
16	0	0.48	0.23	1.1	1.7	<18	9.3	3.8	34	34	0.74
	1	0.76	0.33	N	N	<18	14.0	6.0	70	49	0.78
	2	<.3	<.2	N	N	<18	9.5	5.1	25	18	0.79
17	0	N	N	N	N	37	240.0	9.7	375	270	0.85
	1	N	N	N	N	<18	17.0	7.4	86	59	0.74
	2	N	N	N	N	<18	7.6	3.5	12	8.2	0.75
18	0	N	N	N	N	31	75.0	6.0	414	310	0.90
	1	N	N	N	N	<18	14.0	4.0	123	91	0.88
	2	N	N	N	N	<18	11.0	4.1	32	24	0.88
19	0	N	N	N	N	18	48.0	4.8	294	230	0.96
	1	N	N	N	N	<18	21.0	4.2	122	89	0.87
	2	N	N	N	N	<18	8.6	4.2	16	12	0.85
20	0	<.3	<.2	16	2.2	<18	40.0	4.4	152	120	0.99
	1	<.3	<.2	N	N	<18	28.0	4.5	115	88	0.95
	2	<.3	<.2	N	N	<18	12.0	5.6	19	14	0.85
21	0	N	N	N	N	<18	23.0	3.2	553	380	0.73
	1	N	N	N	N	<18	8.1	3.8	68	46	0.72
	2	N	N	N	N	<18	8.0	4.6	11	7.4	0.72

TABLE A-4
SUMMARY OF ANALYSES
PLANT 1 PAD PHASE A/B CONSTRUCTION AREA

		RADIONUCLIDES									
Sample Location Depth		Pu-238	Pu-239	Ra-226	Ra-228	Total Th	Calc. Th	Th-228	Total U	Calc. U	U-235
		(pCi/g)	(pCi/g)	(pCi/g)	(pCi/g)	(ppm)	(pCi/g)	(pCi/g)	(ppm)	(pCi/g)	(wt. %)
22	0	N	N	N	N	18	8.2	4.4	187	130	0.83
	1	N	N	N	N	<18	11.0	5.0	18	11	0.58
	2	N	N	N	N	<18	5.6	3.2	<11	<7.5	0.73
23	0	N	N	N	N	<18	8.3	4.0	91	57	0.58
	1	N	N	N	N	<18	9.7	5.0	20	14	0.72
	2	N	N	N	N	<18	10.0	5.2	<11	<7.6	0.76
24	0	<.3	<.2	0.39	3.1	<18	6.5	1.6	318	210	0.67
	1	<0.14	0.11	N	N	<18	6.2	2.3	<11	<7.6	0.76
	2	<0.14	<0.10	N	N	<18	5.1	1.9	<11	<7.3	0.70
25	0	N	N	N	N	<18	9.2	5.2	209	140	0.66
	1	N	N	N	N	<18	7.8	3.9	29	19	0.66
	2	N	N	N	N	<18	9.9	5.3	11	7.3	0.69
26	0	N	N	N	N	18	16.0	6.2	152	100	0.67
	1	N	N	N	N	<18	8.8	4.0	15	10	0.72
	2	N	N	N	N	<18	12.0	5.8	<11	<7.4	0.71
27	0	N	N	N	N	<18	9.9	5.1	959	630	0.66
	1	N	N	N	N	<18	12.0	6.7	25	17	0.69
	2	N	N	N	N	<18	7.4	2.6	<11	<8.4	0.94
28	0	1.5	0.49	75	11	113	160.0	15.0	813	560	0.76
	1	0.28	<0.14	N	N	27	37.0	6.3	210	140	0.69
	2	<0.23	<0.14	N	N	<18	6.6	3.4	11	7.3	0.73

FIGURE 3

ADDITIONAL SOIL SAMPLING

● SURFACE SAMPLE + 18 DEPTH SAMPLE

XXX / YYY - SURFACE SAMPLE NO / 18 DEPTH SAMPLE NO.

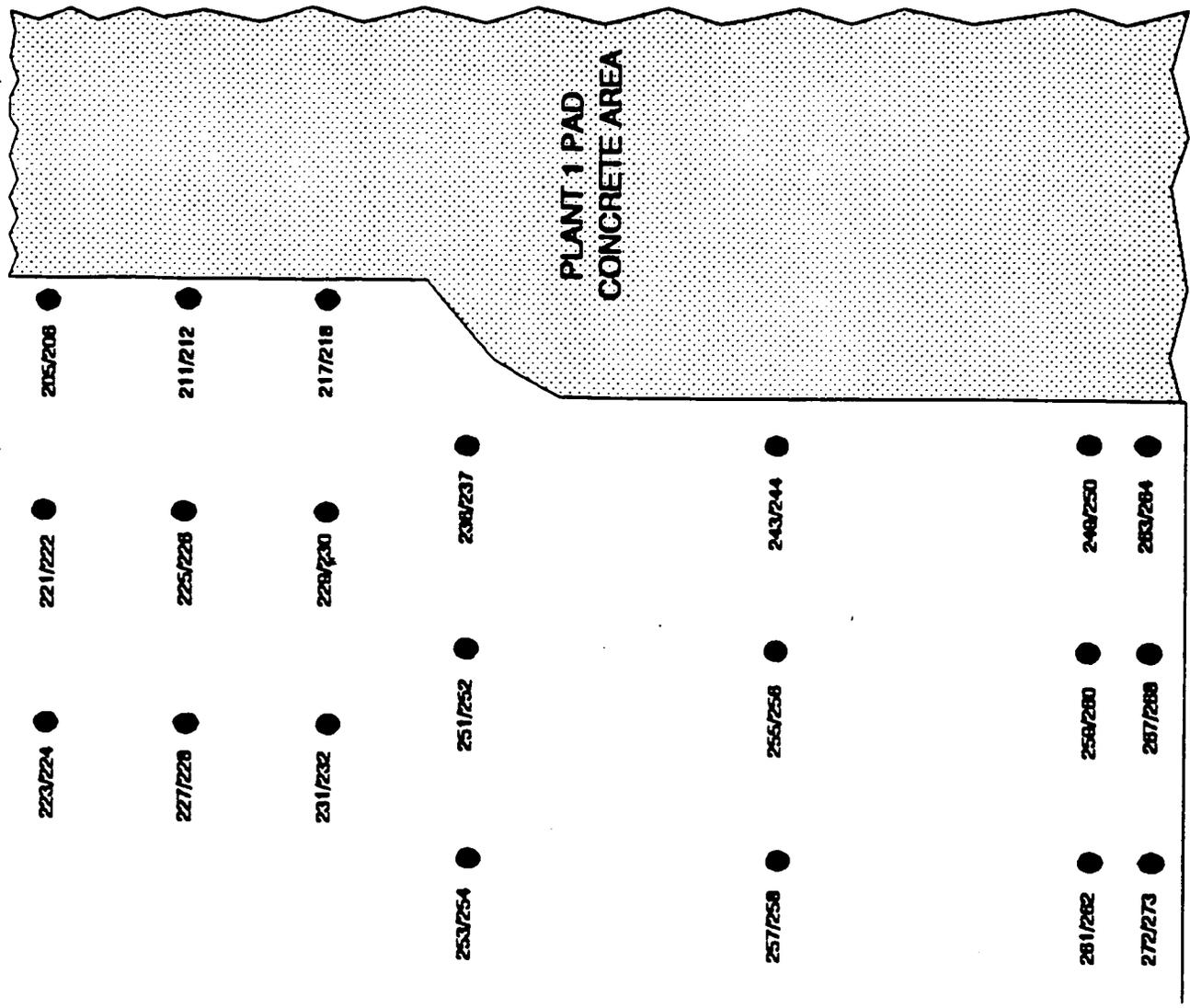


TABLE A-5
 CONTROLLED STORAGE PAD, PLANT 1
 ANALYTICAL RESULTS

SAMPLE NUMBER	TOTAL U(ppm)	TOTAL Th(ppm)	U pCi/g	Th pCi/g	Th-228 pCi/g	WEIGHT % (U)			
						U-234	U-235	U-236	U-238
205	46	<23	28.0	<3.5	1.0	0.004	0.52	0.005	99.47
206	30	<23							
207	51	<23	31.0	<4.5	2.0	0.002	0.55	0.001	99.45
208	115	<23	69.0	<6.4	3.9	0.001	0.52	0.005	99.47
209	278	29	160.0	4.9	1.8	0.002	0.45	0.005	99.54
210	751	32	530.0	5.7	2.3	0.005	0.80	0.014	99.18
211	751	26	380.0	6.3	3.5	0.005	0.29	0.005	99.70
212	305	<45							
213	2460	25	1400.0	<7.9	3.1	0.007	0.45	0.005	99.54
214	238	28	140.0	6.5	3.8	0.004	0.48	0.008	99.51
215	245	28	160.0	7.2	4.2	0.001	0.60	0.001	99.40
216	216	45	140.0	5.7	2.7	0.007	0.68	0.006	99.31
217	649	<23	440.0	8.2	3.4	0.002	0.72	0.004	99.27
218	83	29							
219	326	32	220.0	6.1	3.0	0.005	0.70	0.004	99.29
220	471	40	300.0	5.9	2.5	0.004	0.62	0.004	99.37
221	596	<23	430.0	7.2	2.9	0.005	0.82	0.005	99.17
222	39	<23							
223	49	<23	33.0	<3.8	1.3	0.008	0.70	0.013	99.28
224	45	<23							
225	57	<23	35.0	<4.1	1.6	0.004	0.55	0.007	99.44
226	20	<23							
227	60	<23	41.0	<4.3	1.8	0.008	0.59	0.010	99.39
228	31	<23							
229	86	<23	50.0	<3.9	1.4	0.002	0.47	0.005	99.52
230	19	<23							
231	40	<23	26.0	<3.4	0.9	0.008	0.65	0.009	99.33
232	15	<23							
233	71	<23	44.0	<3.7	1.2	0.001	0.59	0.005	99.40
234	133	23	87.0	4.4	1.9	0.004	0.66	0.005	99.33
235	101	<23	66.0	<4.1	1.6	0.004	0.65	0.008	99.34
236	150	39	98.0	8.6	4.4	0.008	0.66	0.011	99.32
237	35	<23							
238									
239	3840	<45	2500.0	<7.9	3.1	0.005	0.65	0.007	99.34
240	72	<23	48.0	3.9	0.9	0.010	0.71	0.010	99.27
241	39	<23	25.0	4.4	0.9	0.002	0.63	0.005	99.36
242	204	24	150.0	7.0	2.1	0.005	0.87	0.007	99.12
243	130	24	86.0	10.2	1.4	0.003	0.69	0.003	99.30
244	106	<23							
245	83	<23	58.0	7.3	1.5	0.001	0.68	0.003	99.32
246	250	35	150.0	11.7	3.4	0.002	0.49	0.007	99.50
247	404	325	240.0	90.3	30.4	0.002	0.52	0.006	99.47
248	278	184	170.0	36.3	14.2	0.007	0.60	0.011	99.38
249	316	42	230.0	14.6	2.8	0.006	0.86	0.007	99.13
250	63	24							
251	88	24	53.0	9.8	1.1	0.005	0.54	0.005	99.45
252	16	<23							
253	87	<23	55.0	8.0	1.1	0.005	0.61	0.005	99.38
254	41	<23							
255	43	<23	28.0	5.1	1.1	0.005	0.68	0.007	99.31
256	16	<23							
257	65	<23	43.0	<2.1	<.7	2.000	0.70	0.007	97.29
258	29	<23							
259	182	26	130.0	16.1	1.4	0.007	0.85	0.008	99.14
260	48	<23							
261	133	<23	100.0	15.5	1.7	0.005	0.92	0.007	99.07
262	24	<23							
263	358	41	260.0	33.1	3.2	0.005	0.82	0.006	99.17
264	107	24							
265	347	35	260.0	30.3	2.8	0.008	0.91	0.004	99.08
266	467	39	350.0	49.1	2.9	0.007	0.91	0.007	99.08
267									
268	365	30	270.0	26.5	1.9	0.005	0.92	0.005	99.07
269	102	<23							
270	266	<23	210.0	29.9	1.4	0.009	0.99	0.006	99.00
271	89	<23	67.0	<4.0	1.5	0.002	0.93	0.003	99.06
272	219	25	170.0	5.1	2.4	0.008	0.93	0.006	99.06
273	53	<23							

PLANT 1 STORAGE PAD

FIGURE 4

UNDER-PAD SAMPLING LOCATIONS

PT.	FT. - IN EAST	FT. - IN NORTH
1	234	25-8
2	245-8	25-8
3	257-4	25-8
4	270	25-8
5	281-8	25-8
6	308-3	25-8
7	331-3	25-8
8	200	54-7
9	200	31-8
10	200	23-8
11	331-3	5-8

PT.	FT. - IN EAST	FT. - IN SOUTH
12	175	7
13	151	12-5
14	140	30-5
15	116	33
16	118	18-8
17	80	24
18	77	22
19	80	13-8
20	80	18-4
21	50	36-7
22	35	34-8
23	36	54-8

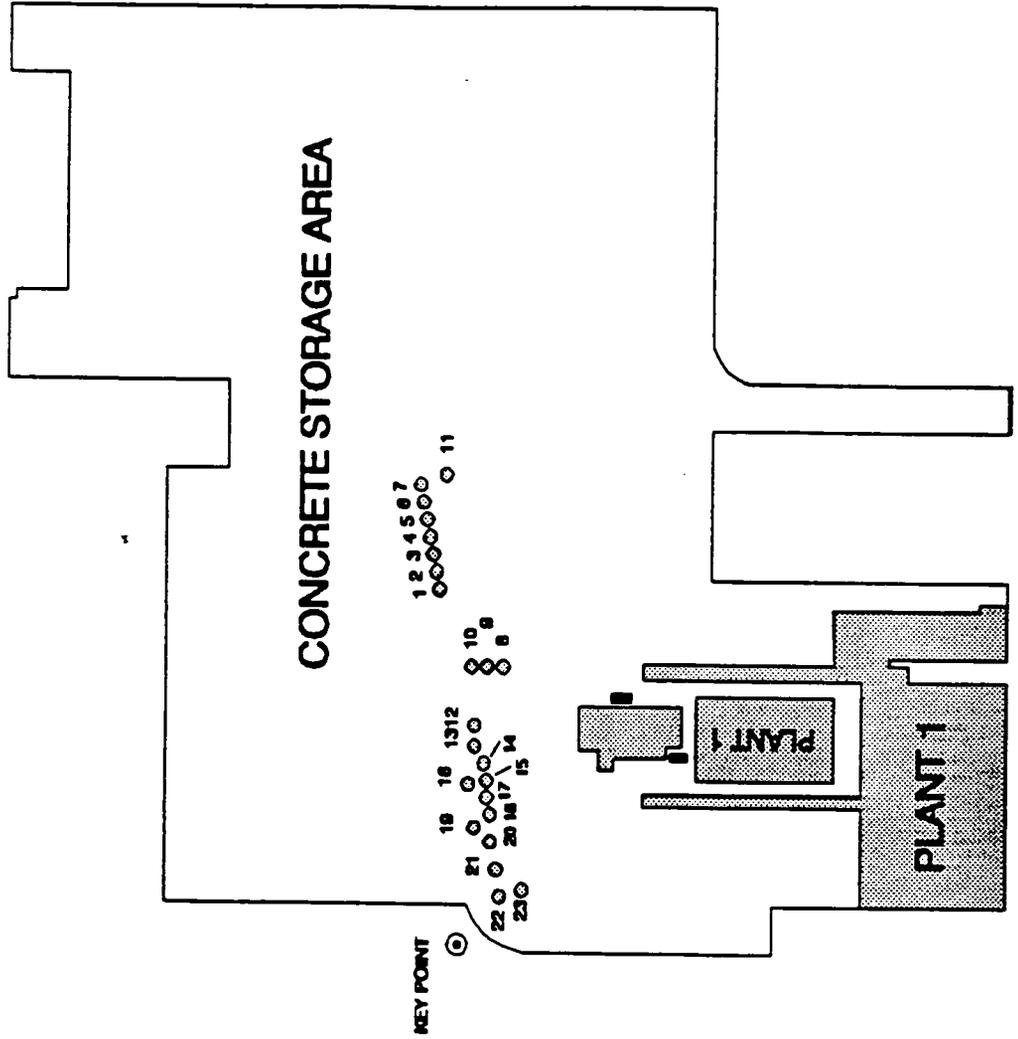
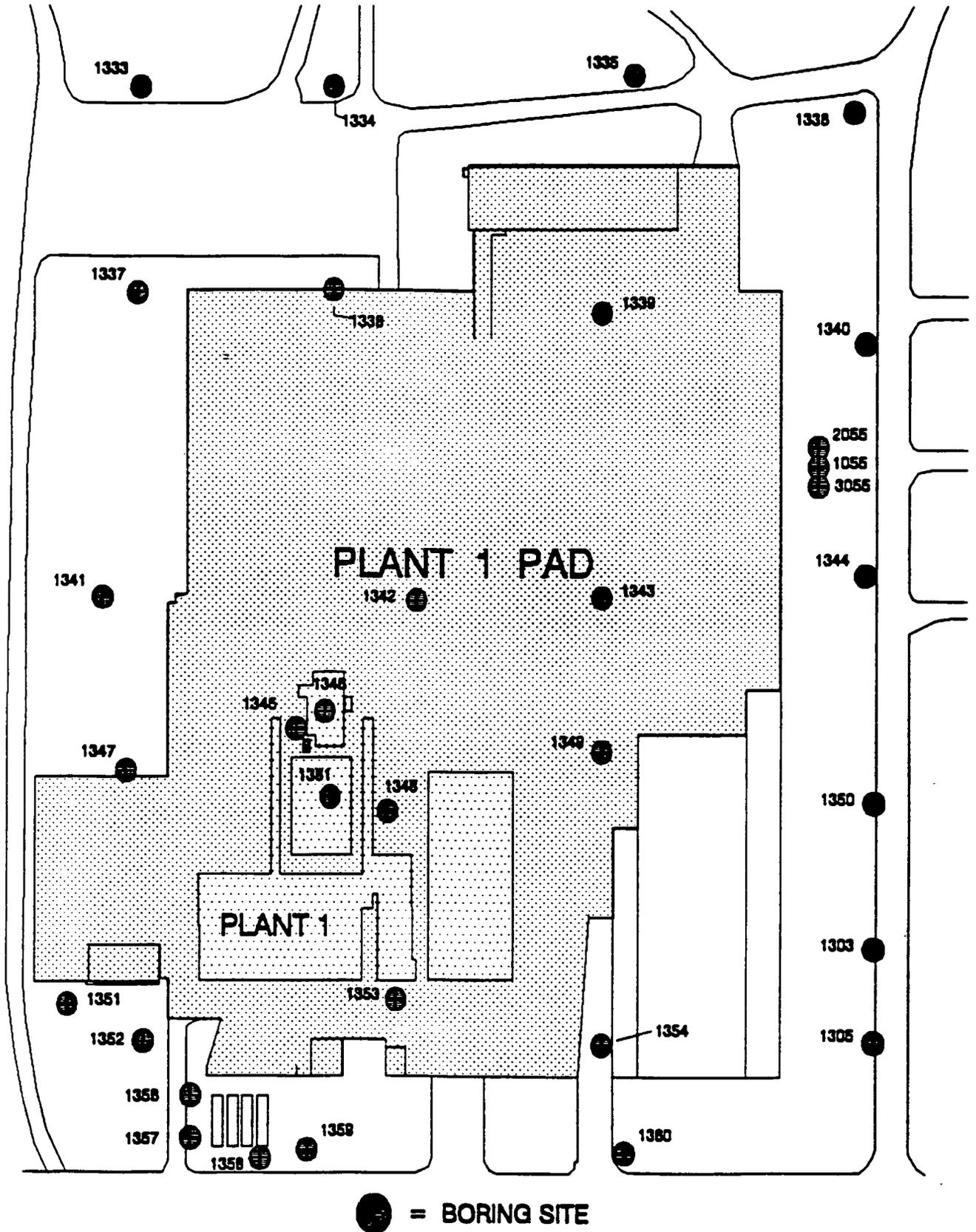


Table A-6

Thorium and Uranium Measurements
at 23 Additional Sampling Locations
Directly Under Plant 1 Pad

Fig. 4 Sample Location	Beneath Pad Surface Soil		Soil at 1 ft. Depth Beneath Surface	
	Th (ppm)	U (ppm)	Th (ppm)	U (ppm)
1			< 18	16
2			< 18	13
3			< 18	15
4			< 18	13
5			< 18	11
6			< 18	25
7			< 18	< 11
8			< 18	18
9			< 18	< 11
10				
11			< 18	97
12			< 18	< 11
13			< 18	18
14			< 18	11
15			< 18	14
16				
17				
18			< 18	30
19			< 18	17
20			< 18	19
21			< 18	31
22			< 18	47
23			< 18	11

FIGURE 5
BORINGS AT PLANT 1 PAD



PLANT 1 PAD BORING DATA

BORINGS THROUGH PLANT 1 PAD				BORINGS OFF THE PAD'S EDGE				BORINGS IN THE VICINITY OF THE PAD			
BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)	BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)	BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)
1339	1.0 TO 1.5	26.2	5.0	1338	0.0 TO 0.5	211.0	25.0	1344	0.0 TO 0.5	28.0	<23.0
	2.0 TO 2.5	< 3.1	8.6		3.0 TO 3.5	49.0	23.0		3.0 TO 3.5	< 11.0	<23.0
	4.5 TO 5.0	6.6	< 4.4		5.0 TO 5.5	73.0	<23.0		5.0 TO 5.5	< 11.0	<23.0
	10.5 TO 11.0	2.4	< 4.0		10.0 TO 10.5	< 11.0	<23.0		5.0 TO 5.5	5.0	9.9
	GROUNDWATER	441.0 ug/l @ 5 ft			GROUNDWATER	40.0 ug/l @ 6.5 ft			10.0 TO 10.5	3.7	11.8
	NITRATES	0.1 @ 0.12 mg/l			NITRATES	0.1 mg/l			GROUNDWATER	28.0 ug/l	
1342	1.0 TO 1.5	15.0	7.8	1347	RESULTS NOT RECEIVED			1350	0.0 TO 0.5	15.0	<23.0
	4.0 TO 4.5	4.0	< 4.0						3.0 TO 3.5	< 11.0	<23.0
	5.0 TO 5.5	3.0	12.0						5.0 TO 5.5	< 11.0	<23.0
	10.5 TO 11.0	4.0	7.4						GROUNDWATER	40.9 ug/l	
	16.5 TO 17.0	4.0	< 4.1	1349	0.0 TO 0.5	7.0	7.0	1351	0.0 TO 0.5	25.0	<23.0
	GROUNDWATER	26.0 ug/l @ 13.5 ft			2.0 TO 2.5	5.0	14.0		2.0 TO 2.5	< 11.0	<23.0
	NITRATES	< 0.1 mg/l			5.0 TO 5.5	4.0	14.0		5.0 TO 5.5	< 11.0	<23.0
1343	1.0 TO 1.5	75.1	< 4.6		10.0 TO 10.5	3.0	4.0		10.5 TO 11.0	< 11.0	<23.0
	3.0 TO 3.5	2.6	< 5.4		15.0 TO 15.5	5.0	< 8.0		15.0 TO 15.5	< 11.0	<23.0
	6.0 TO 6.5	2.8	< 3.0		GROUNDWATER	NONE			GROUNDWATER	11.0 ug/l	
	10.0 TO 10.5	2.3	3.7								
	GROUNDWATER	40.6 ug/l @ 8.0 ft									
	NITRATES	< 0.1 mg/l									
1345	1.0 TO 1.5	27.5	10.3								
	2.0 TO 2.5	3.7	--								
	3.5 TO 4.0	2.9	< 3.5								
	5.0 TO 5.5	4.5	10.8								
	10.5 TO 11.0	13.7	8.3								
	GROUNDWATER	2.0 ug/l @ 13.5 ft									
1346	0.0 TO 0.5	28.9	7.0								
	3.0 TO 3.5	10.2	6.7								
	5.0 TO 5.5	4.5	8.7								
	10.0 TO 10.5	5.2	4.2								
	15.0 TO 15.5	6.1	6.6								
	GROUNDWATER	ug/l @ 15.0 ft									
1352	0.0 TO 0.5	29.0	<23.0	1333	0.0 TO 0.5	82.0	<23.0	1333	0.0 TO 0.5	82.0	<23.0
	3.0 TO 3.5	13.0	<23.0		2.0 TO 2.5	< 11.0	<23.0		2.0 TO 2.5	< 11.0	<23.0
	6.0 TO 6.5	< 11.0	<23.0		5.0 TO 5.5	< 11.0	<23.0		5.0 TO 5.5	< 11.0	<23.0
	10.0 TO 10.5	< 11.0	<23.0		10.0 TO 10.5	< 11.0	<23.0		10.0 TO 10.5	20.0	<23.0
	15.0 TO 15.5	12.0	<23.0		15.0 TO 15.5	< 11.0	<23.0		15.0 TO 15.5	< 11.0	<23.0
	GROUNDWATER	226.0 ug/l			GROUNDWATER	689.0 ug/l			GROUNDWATER	32.0 ug/l	
1353	1.0 TO 1.5	< 11.0	--	1340	0.0 TO 0.5	98.0	24.0	1334	0.0 TO 0.5	< 11.0	<23.0
	2.0 TO 2.5	< 11.0	--		3.0 TO 3.5	< 11.0	<23.0		1.5 TO 2.0	< 11.0	<23.0
	5.0 TO 5.5	< 11.0	--		5.0 TO 5.5	< 11.0	<23.0		5.0 TO 5.5	11.0	<23.0
	10.5 TO 11.0	< 11.0	--		10.0 TO 10.5	16.0	<23.0				
	15.0 TO 15.5	< 11.0	--		GROUNDWATER	689.0 ug/l					
	GROUNDWATER	24.0 ug/l									
1354	1.0 TO 1.5	< 11.0	--	1341	0.0 TO 0.5	30.8	7.6	1335	0.0 TO 0.5	27.0	<23.0
	3.0 TO 3.5	21.0	--		3.0 TO 3.5	6.9	8.0		2.0 TO 2.5	< 11.0	<23.0
	5.0 TO 5.5	< 11.0	--		5.0 TO 5.5	5.0	9.9		5.0 TO 5.5	< 11.0	<23.0
	10.0 TO 10.5	12.0	--		10.0 TO 10.5	3.7	11.8		10.0 TO 10.5	< 11.0	<23.0
	15.0 TO 15.5	< 11.0	--		GROUNDWATER	28.0 ug/l			GROUNDWATER	93.0 ug/l	
	GROUNDWATER	93.0 ug/l									

TABLE A-7 (cont'd)
PLANT 1 PAD BORING DATA

BORINGS THROUGH PLANT 1 PAD				BORINGS OFF THE PAD'S EDGE				BORINGS IN THE VICINITY OF THE PAD			
BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)	BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)	BORING NUMBER	DEPTH (ft)	TOTAL u (ppm)	TOTAL Th (ppm)
1348	0.0 TO 0.5	28.0	4.0	1356	0.0 TO 0.5	46.0	<23.0	1358	0.0 TO 0.5	78.0	<23.0
----	1.5 TO 2.0	11.0	6.0	----	2.0 TO 2.5	<11.0	<23.0	----	2.0 TO 2.5	<11.0	<23.0
	4.5 TO 5.0	3.0	12.0		5.0 TO 5.5	<11.0	<23.0		5.0 TO 5.5	13.0	<23.0
	10.0 TO 10.5	6.0	9.0		10.5 TO 11.0	119.0	30.0		10.0 TO 10.5	<11.0	<23.0
	14.5 TO 15.0	3.0	7.0		15.0 TO 15.5	14.0	<23.0				
	GROUNDWATER NITRATES	20.5 ug/l @ 16.0 ft < 0.1 mg/l			GROUNDWATER	240.0 ug/l			GROUNDWATER	205.0 ug/l	
1361	1.0 TO 1.5	22.7	2.9	1357	0.0 TO 0.5	41.0	<23.0	1359	0.0 TO 0.5	57.0	<23.0
----	2.0 TO 2.5	49.4	1.9	----	3.0 TO 3.5	20.0	<23.0	----	2.0 TO 2.5	<11.0	<23.0
	3.0 TO 3.5	6.8	7.6		5.0 TO 5.5	22.0	<23.0		5.0 TO 5.5	<11.0	<23.0
	6.0 TO 6.5	3.1	8.8		10.5 TO 11.0	29.0	<23.0		10.0 TO 10.5	<11.0	<23.0
	7.0 TO 7.5	3.1	4.9		15.0 TO 15.5	17.0	<23.0		14.5 TO 15.0	<11.0	<23.0
	GROUNDWATER NITRATES	38.6 ug/l @ 13.5 ft < 0.1 mg/l			GROUNDWATER	748.0 ug/l			GROUNDWATER	405.0 ug/l	

FIGURE 6

CROSSECTIONAL OF BORING NUMBER 1339 ON PLANT 1 PAD

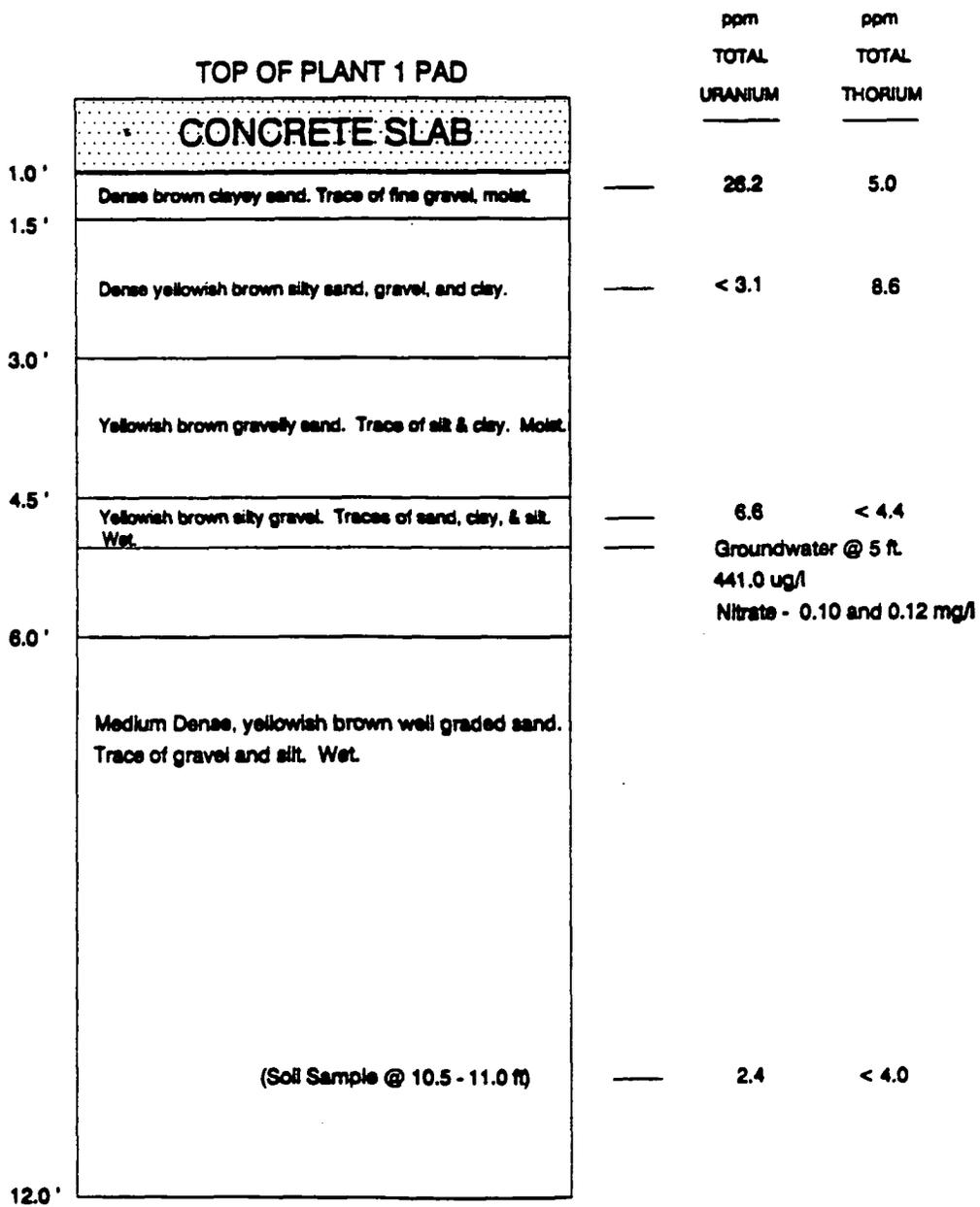


FIGURE 7

CROSSECTIONAL OF BORING NUMBER 1342 ON PLANT 1 PAD

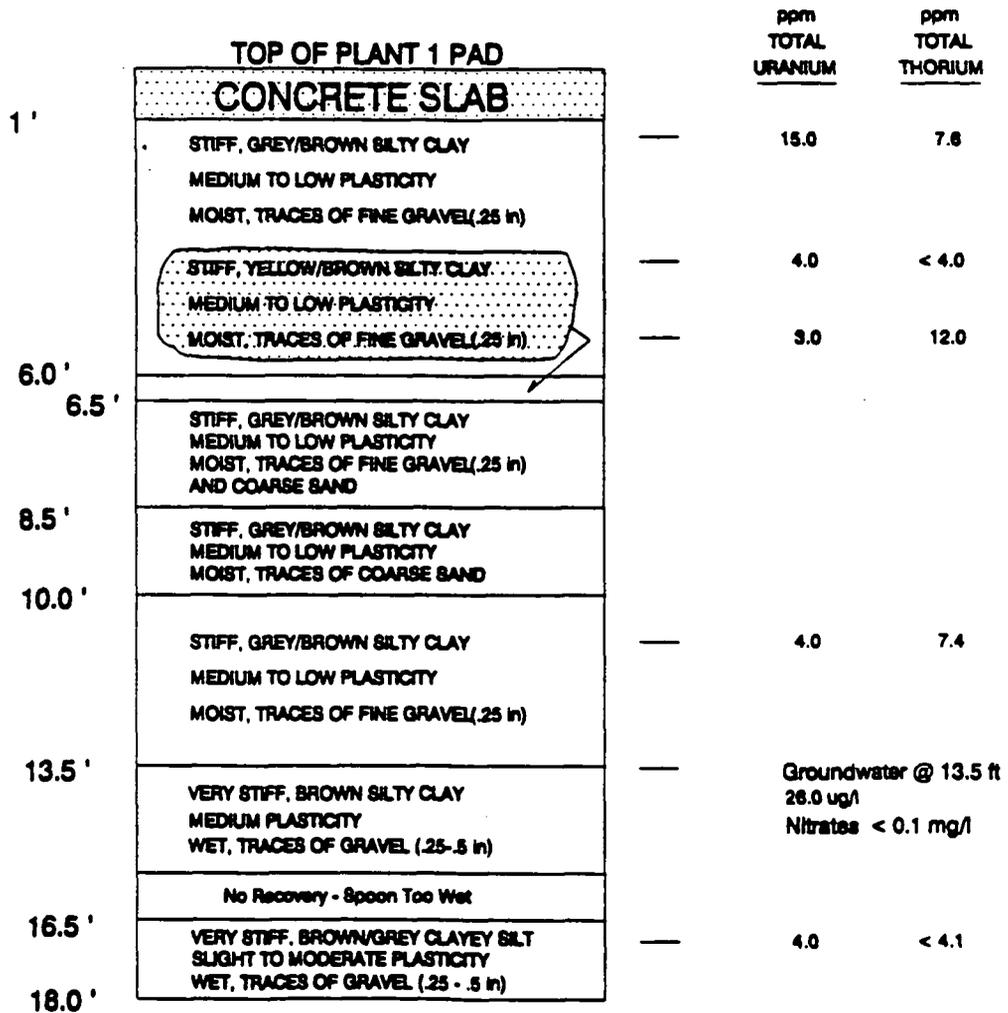


FIGURE 8

CROSSECTIONAL OF BORING NUMBER 1343 ON PLANT 1 PAD

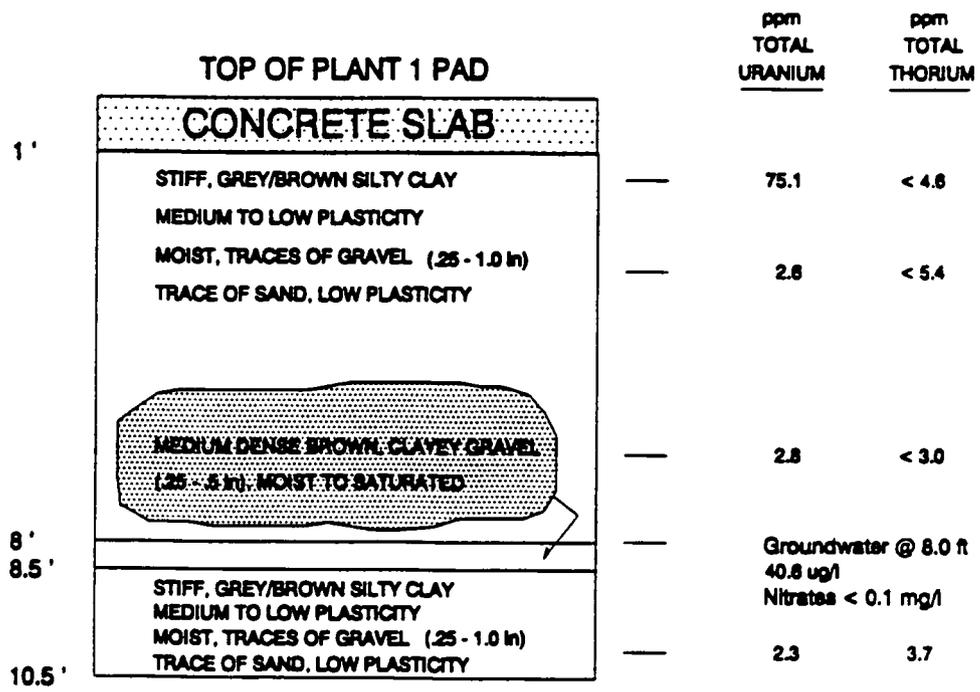


FIGURE 9
CROSSECTIONAL OF BORING NUMBER 1345 ON PLANT 1 PAD

TOP OF PLANT 1 PAD		ppm TOTAL URANIUM	ppm TOTAL THORIUM
CONCRETE SLAB			
1.0'	Stiff, yellow/brown silty clay, with sand and trace of fine gravel. Plastic & moist.	27.5	10.3
1.5'	Stiff dark gray clay. Some silt, low plasticity, moist.	3.7	—
3.0'	Soft olive gray silty clay. Medium plasticity, moist.	2.9	< 3.5
4.5'	Dark olive to black clay. Some silt and sand. Fine to medium gravel, medium plasticity, moist.	4.5	10.8
6.0'	Very soft yellowish brown silty clay. Medium plasticity, moist.		
6.5'	Stiff black clay, some silt. Medium plasticity, moist.		
7.5'	Very soft, olive brown sandy clay. Traces of fine gravel. Low plasticity, very moist.		
9.0'	Very soft dark grayish brown sandy clay. Traces of fine gravel, medium plasticity, very moist.		
10.5'	Very soft yellowish brown sandy clay, very moist.	13.7	8.3
11.0'	Dark gray clay, trace of silt, medium plasticity, moist.		
12.0'	Stiff light gray clay, trace of silt and sand. Medium plasticity, moist.		
13.5'	Light olive brown clayey silt with sand and gravel. Moist	Groundwater @ 13.5 ft.	
14.0'	Light gray silty clay. Trace of fine gravel. Medium plasticity, moist.	2.0 ug/l	
16.0'			

** Average of two samples plus one duplicate

**FIGURE 10
CROSSSECTIONAL OF BORING NUMBER 1346 ON PLANT 1 PAD**

TOP OF PLANT 1 PAD		ppm TOTAL <u>URANIUM</u>	ppm TOTAL <u>THORIUM</u>
	CONCRETE SLAB		
1.0'	Stiff olive brown clay, with trace of sand & fine gravel. Low Plasticity, moist.	— 28.9	7.0
1.5'	NO RECOVERY		
3.0'	Stiff olive gray silty clay with a trace of sand Low plasticity, moist.	— 10.2	8.7
4.0'	Soft to stiff olive brown silty clay with trace of sand. Medium plasticity, moist.		
5.0'	Med. stiff olive silty clay/trace sand. Med Plas. moist.	— 4.5	8.7
5.5'	NO RECOVERY		
6.0'	Med. stiff olive silty clay/trace sand. Med Plas. moist.		
6.5'	NO RECOVERY		
7.5'	Stiff light olive brown silty clay, trace sand/fine gravel. Medium Plasticity, moist.		
8.5'	NO RECOVERY		
9.0'	Med stiff yellow brown silty clay, trace sand/fine gravel. Medium plasticity, moist.		
10.0'	Stiff dark gray silty clay, trace sand. Low plasticity, moist.	— 5.2	4.2
10.5'	Stiff dark gray silty clay, trace sand. Low plasticity, moist.		
12.5'	Med stiff yellow brown silty clay, trace sand/fine gravel. Medium plasticity, moist.		
14.5'	Very soft olive gray clay, trace silt, med. plast., moist.		
15.0'	Groundwater @ 15.00 ft.	— 6.1	8.8
	Dense light brown silt and sand. Very wet.		
18.5'	Medium dense olive gray sandy silt. Moist.		
20.0'			

FIGURE 11

CROSSECTIONAL OF BORING NUMBER 1348 OFF PLANT 1 PAD

		u/m	ppm
		TOTAL	TOTAL
		URANIUM	THORIUM
TOP OF PLANT 1 PAD			
	CONCRETE SLAB		
1.0'	Stiff gray gravelly clay. Low Plasticity. Moist	28.0	4.0
1.5'	Stiff dark gray clay. Low plasticity. Moist	11.0	6.0
3.0'	Medium stiff brown gray silty clay. Trace of sand. Moist.		
4.5'	Stiff dark brown silty clay. Low plasticity. Moist.	3.0	12.0
6.0'	Stiff grayish brown silty clay. Low plasticity. Moist.		
7.5'	Medium stiff gray silty clay. Low plasticity. Moist.		
9.5'	Stiff dark gray clay. Trace of sand. Low plasticity. Moist.	6.0	9.0
12.0'	Stiff gray clay. Trace of gravel. Medium plasticity. Moist.		
14.5'	Grayish brown clay. Trace of gravel. Medium plasticity. Moist.	3.0	7.0
16.0'	Gray clayey silt. Trace of gravel. Wet	Groundwater @ 16 ft. 20.5 ug/l Nitrate < 0.1 mg/l	
	Gray brown clayey sand. Non Cohesive. Wet		
19.0'	Gray clay. Medium Plasticity. Moist.		
20.0'			

FIGURE 12

CROSSECTIONAL OF BORING NUMBER 1361 ON PLANT 1 PAD

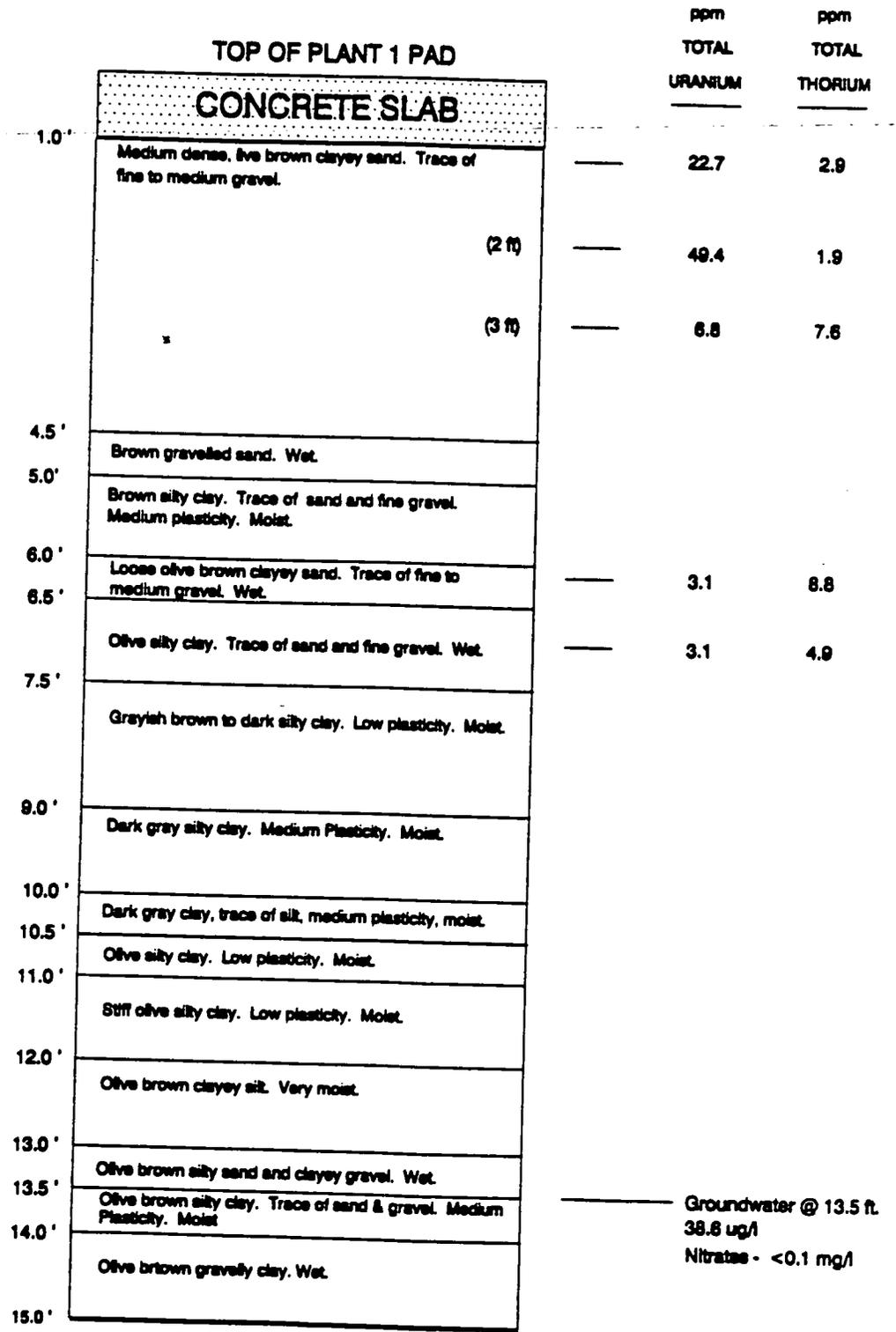


Table A-8

Metals Concentrations

<u>Constituent</u>	<u>1345</u> mg/kg	<u>1346</u> mg/kg
Aluminum	13300	9730
Arsenic	5.6	3.9 (single value)
Barium	115	96
Beryllium	1.1	1.4
Cadmium	4.0	4.4
Calcium	35115	67170
Chromium	20.0	23.2
Cobalt	15.9	17.4
Copper	18.3	20.6
Iron	25375	26940
Lead	16.3	16.2
Magnesium	8860	18060
Manganese	683	984
Mercury	<0.062	1.5
Nickel	37.3	48.1
Potassium	1390	870
Silver	2.8	<2.4
Sodium	108	340
Vanadium	22.1	23.5
Zinc	61.9	58.9

FIGURE 13

CROSSECTIONAL OF BORING NUMBER 1338 AT THE EDGE OF PLANT 1 PAD (OFF-PAD)

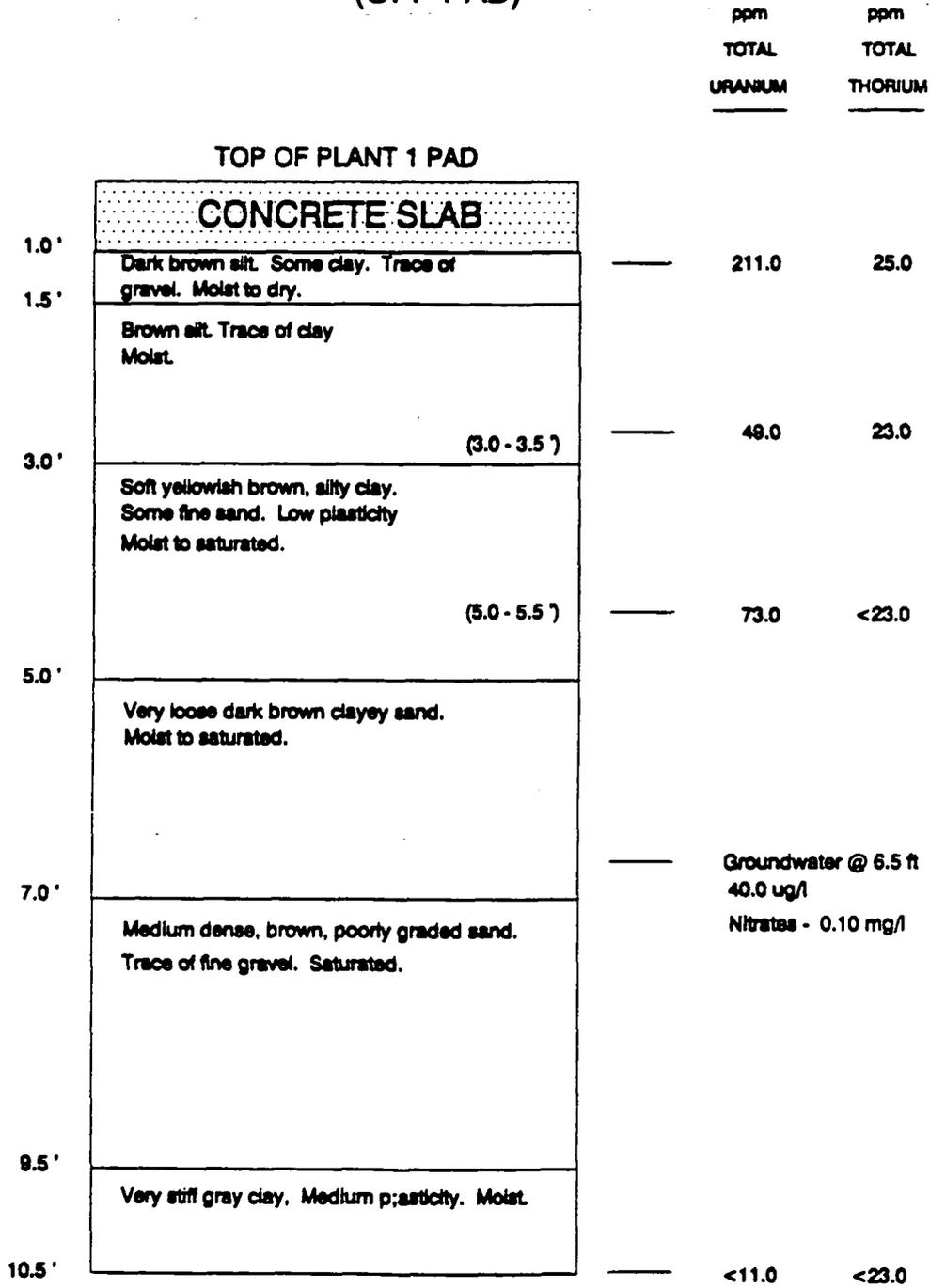


FIGURE 14
CROSSECTIONAL OF BORING NUMBER 1347 OFF PLANT 1 PAD

		ppm TOTAL URANIUM	ppm TOTAL THORIUM
1.0'	Very stiff, brown silty clay, with trace of .25 - .50 in gravel & some rootlets. Damp.		
1.5'	NO RECOVERY		
2.5'	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
3.0'	NO RECOVERY		
4.0'	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
4.5'	NO RECOVERY		
5.5'	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
	NO RECOVERY		
7.5'	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
8.0'	NO RECOVERY		
9.0'	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
10.0'	NO RECOVERY		
10.5'	Very stiff, brown silty clay, with trace of .25 - .50 in gravel. Damp.		
12.0'	Very stiff, gray silty clay, with trace of .25 - .50 in gravel. Damp.		
13.0'	NO RECOVERY		
13.5'	Very stiff, gray silty clay, with trace of .25 - .50 in gravel. Damp.		
14.5'	NO RECOVERY		
15.0'	Very stiff, gray silty clay, with trace of .25 - .50 in gravel. Damp.		
16.0'	NO RECOVERY		
16.5'	Very stiff, gray sand-clay mixture, with trace of .25 - .50 in gravel. WET.		Groundwater @ 16.25 ft.
20.0'			Piezometer installed @ 20 ft.

FIGURE 15

CROSSECTIONAL OF BORING NUMBER 1349 AT THE EDGE OF PLANT 1 PAD (OFF-PAD)

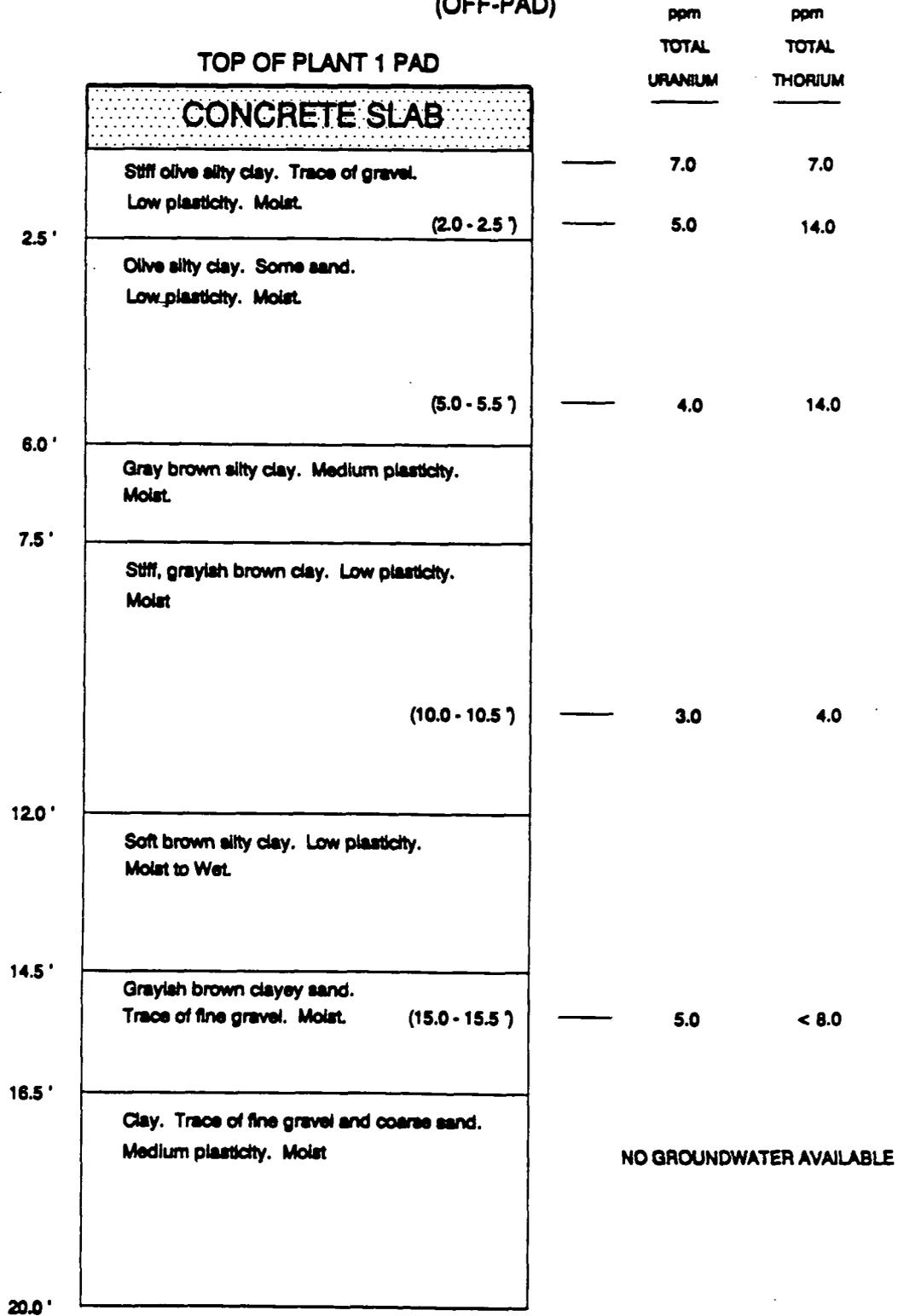


Table A-9

NON-ORGANICS & METALS in Groundwater from Monitor Wells 1055, 2055, and 3055

Concentrations (mg/l)

Analyte	1055 (5/18/88)	1055 (2/26/89)	2055 (6/1/89)	2055 (6/28/89)	3055 (5/18/88)	3055 (8/3/88)	3055 (11/2/88)	3055 (3/1/89)
Aluminum			0.227	0.132				
Ammonia	0.01	0.01	1.48	0.48	<0.05	4.80	5.06	4.70
Arsenic	<0.002	<0.003	<0.002	<0.002	<0.002	<0.010	<0.002	<0.003
Barium	0.043	0.040	0.969	0.098	0.067	0.200	0.076	0.087
Cadmium	<0.002	<0.005	0.045	0.004	<0.002	<0.005	<0.002	<0.005
Calcium	118.000	130.000	110.000	123.000	104.000	160.000	197.000	200.000
Chloride	9.60	5.10	32.00	26.70	51.50	58.00	54.80	56.00
Chromium	<0.020	0.030	0.038	0.040	<0.020	<0.010	<0.020	0.030
Copper	<0.010	<0.010	<0.010	<0.010	<0.010	<0.030	<0.010	<0.010
Fluoride	0.65	0.30	0.20	0.17	0.53	<0.10	0.11	0.10
Iron	0.083	0.050	2.590	2.630	1.870	5.500	7.730	7.300
Kjeldahl N		0.70	7.18	0.58			5.71	3.90
Lead	0.002	<0.002	0.002	<0.002	0.002	<0.005	<0.002	<0.002
Magnesium	36.200	38.000	27.500	29.400	29.600	28.000	34.400	34.000
Manganese	0.079	0.012	0.208	0.259	0.078	0.230	0.325	0.330
Mercury	<0.0002	0.000	0.000	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	0.033	0.010	<0.01	0.010	0.033	<0.050	<0.020	<0.010
Nickel	<0.02	<0.03	<0.02	<0.020	<0.020	<0.040	<0.020	<0.030
Nitrate	0.10	0.42	<0.10	<0.1	0.10	<2.50	<0.10	0.05
Organic Carbon			<1.00	0.45				
Organic Halides			0.02	<0.01			<0.05	
Organic N		0.60	5.70	0.10	5.95	1.80	0.65	
Phenol	0.01	0.01	0.02	<0.01	0.02	<0.01	<0.01	0.17
Phosphorous	7.40	0.13	18.90	0.09	0.13	0.03	<0.02	0.08
Potassium	1.360	1.700	4.270	3.300	53.200	3.500	17.800	24.000
Selenium	0.019	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005
Silicon			4.853	4.950				
Silver	<0.01	<0.001	0.013	0.011	<0.010	<0.010	<0.001	<0.010
Sodium	15.100	30.000	13.600	13.400	56.800	53.000	38.700	43.000
SulfateS	259.00	250.00	123.00	133.00	159.00	340.00	217.00	360.00
Sulfides			30.20	<0.5				
Vanadium			0.019	0.018				

Table A-10

Radionuclides in Water & Core Samples
at Well Monitoring Station 55

Analyte	1055	2055		3055
	Water (pCi/L)	Water (pCi/L)	Core (pCi/g)	Water (pCi/L)
Strontium-90	<5.00	<5.00	<0.50	<5.00
Technetium-99	<30.00	<30.00	<0.90	<30.00
Radium-228	<3.00	<3.00	<0.80	<3.00
Thorium-228	3.70 1.20 1.90	<1.00	0.70	<1.00
Thorium-232	1.80 1.00 1.50	<1.00	<0.60	1.00
Radium-226	1.50	<1.00	0.60	1.30
Thorium-230	3.10	<1.00	1.30 0.70	1.10 1.60
Uranium-234	9.20 5.90 4.70 4.80 4.70	1.10 1.50 0.79 0.71	0.70	<1.00
Uranium-235	<1.00 0.32	<1.00	<0.60	<1.00
Uranium-235	4.90 3.70 3.50 8.60 4.60	1.20 1.40 0.46	0.90	<1.00
	----- ug/l	----- ug/l	----- ug/l	----- ug/l
Total Uranium	13.00 22.00 9.00 9.00 13.80	5.00 2.00 4.00 3.00 3.00 2.60		<1.00
Total Thorium	7.00 1.40 9.00	<5.00		<5.00

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ATTACHMENT 2
to
APPENDIX A
Analytical Sensitivities

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ATTACHMENT 2
APPENDIX A

Analytical Sensitivities for Analyses Performed on Boring Samples

1,1,1 - Trichloroethane	<0.006 mg/kg
1,1,2,2 - Tetrachloroethane	<0.006 mg/kg
1,1,2 - Trichloroethane	<0.006 mg/kg
1,1 - Dichloroethane	<0.006 mg/kg
	<0.005 mg/L
1,2,4 - Trichlorobenzene	<0.42 mg/kg
1,2 - Dichlorobenzene	<0.42 mg/kg
1,2 - Dichloroethylene	<0.006 mg/kg
1,2 - Dichloroethane	<0.006 mg/kg
1,2 - Dichloroethylene	<0.006 mg/kg
1,2 - Dichloropropane	<0.006 mg/kg
1,3 - Dichlorobenzene	<0.41 mg/kg
1,4 - Dichlorobenzene	<0.42 mg/kg
2,4,6 - Trichlorophenol	<2.0 mg/kg
2,4 - Dichlorophenol	<0.42 mg/kg
2,4 - Dimethylphenol	<0.37 mg/kg
2,4 - Dinitrophenyl	<2.0 mg/kg
2,4 - Dinitrotoluene	<0.41 mg/kg
2,6 - Dinitrotoluene	<0.42 mg/kg
2 - Butanone	<0.01 mg/kg
2 - Chloronaphthalene	<0.42 mg/kg
2 - Chlorophenol	<0.42 mg/kg
2 - Hexanone	<0.013 mg/kg
2 - Methylnaphthalene	<0.42 mg/kg
2 - Nitroaniline	<2.0 mg/kg
2 - Nitrophenol	<2.0 mg/kg
2 - Propanone	<0.017 mg/kg
	<0.035 mg/L
3,3' - Dichlorobenzidine	<0.84 mg/kg
3 - Nitroaniline	<2.0 mg/kg
4,4' - DDD	<0.09 mg/kg
4,4' - DDE	<0.09 mg/kg
4,4' - DDT	<0.09 mg/kg

ATTACHMENT 2
APPENDIX A (cont.)

4 - Bromophenyl phenyl ether	<0.42 mg/kg
4 - Chloro-3-methylphenol	<0.42 mg/kg
4 - Chlorophenyl phenyl ether	<0.42 mg/kg
4 - Methyl-2-pentanone	0.013 mg/kg
4 - Nitrophenol	<2.0 mg/kg
Acenaphthalene	<0.42 mg/kg
Aldrin	<0.045 mg/kg
Anthracene	<0.42 mg/kg
Antimony	<7.3 mg/kg
Benzamine, 4-chloro-	<0.42 mg/kg
Benzene	<0.006 mg/kg
Benzo(a)anthracene	<0.42 mg/kg
Benzo(a)pyrene	<0.42 mg/kg
Benzo(b)fluoranthene	<0.42 mg/kg
Benzo(ghi)perylene	<0.42 mg/kg
Benzo(k)fluoranthene	<0.42 mg/kg
Benzoic Acid	<2.0 mg/kg
Benzyl Alcohol	<0.42 mg/kg
Bromodichloromethane	<0.006 mg/kg
Bromomethane	<0.013 mg/kg
Butyl benzyl phthalate	<0.42 mg/kg
Carbon Disulfide	<0.006 mg/kg
Chlorobenzene	<0.006 mg/kg
Chloroethane	<0.013 mg/kg
Chloroform	<0.006 mg/kg
Chloromethane	<0.013 mg/kg
Chrysene	<0.042 mg/kg
Cyanides	<0.32 mg/kg
Di-n-butyl phthalate/dibutyl	<0.042 mg/kg
Di-n-octyl phthalate	<0.042 mg/kg
Di-n-propylnitrosamine	<0.42 mg/kg
Dibenzo (a,h) anthracene	<0.42 mg/kg
Dibenzofuran	<0.42 mg/kg
Dibromochloromethane	<0.006 mg/kg
Dieldrin	<0.04 mg/kg

ATTACHMENT 2
APPENDIX A (cont.)

900

Diethylphthalate	<0.42 mg/kg
Dimethyl phthalate	<0.42 mg/kg
Endosulfan sulfate	<0.09 mg/kg
Endosulfan-I	<0.05 mg/kg
Eudosulfan-II	<0.09 mg/kg
Endrin	<0.09 mg/kg
Endrin ketone	<0.09 mg/kg
Ethylbenzene	<0.006 mg/kg
Fluoranthene	<0.42 mg/kg
Fluorene	<0.42 mg/kg
Heptachlor	<0.05 mg/kg
Heptachlor epoxide	<0.05 mg/kg
Hexachlorobutadiene	<0.42 mg/kg
Hexachlorocyclopentadiene/HC	<0.42 mg/kg
Hexachloroethane	<0.42 mg/kg
Indeno (1,2,3-cd) pyrene	<0.42 mg/kg
Isophorne	<0.42 mg/kg
Lindane\gamma-BttC\Hexachlo	<0.045 mg/kg
Methoxychlor	<0.45 mg/kg
Methylene Chloride	<0.05 mg/kg
	<0.01 mg/L
N-nitrosodiphenylamine	<0.42 mg/kg
Naphthalane	<0.42 mg/kg
Nitrobenzene	<0.42 mg/kg
PCB-1016	<0.45 mg/kg
PCB-1221	<0.45 mg/kg
PCB-1232	<0.45 mg/kg
PCB-1242	<0.45 mg/kg
PCB-1248	<0.45 mg/kg
PCB-1254	<0.90 mg/kg
PCB-1260	<0.90 mg/kg
Pentachlorophenol	<2.0 mg/kg
Phenanthrene	<0.42 mg/kg
Phenol	<0.42 mg/kg
Phenol, 2-methyl-4,6 dinitro	<2.0 mg/kg

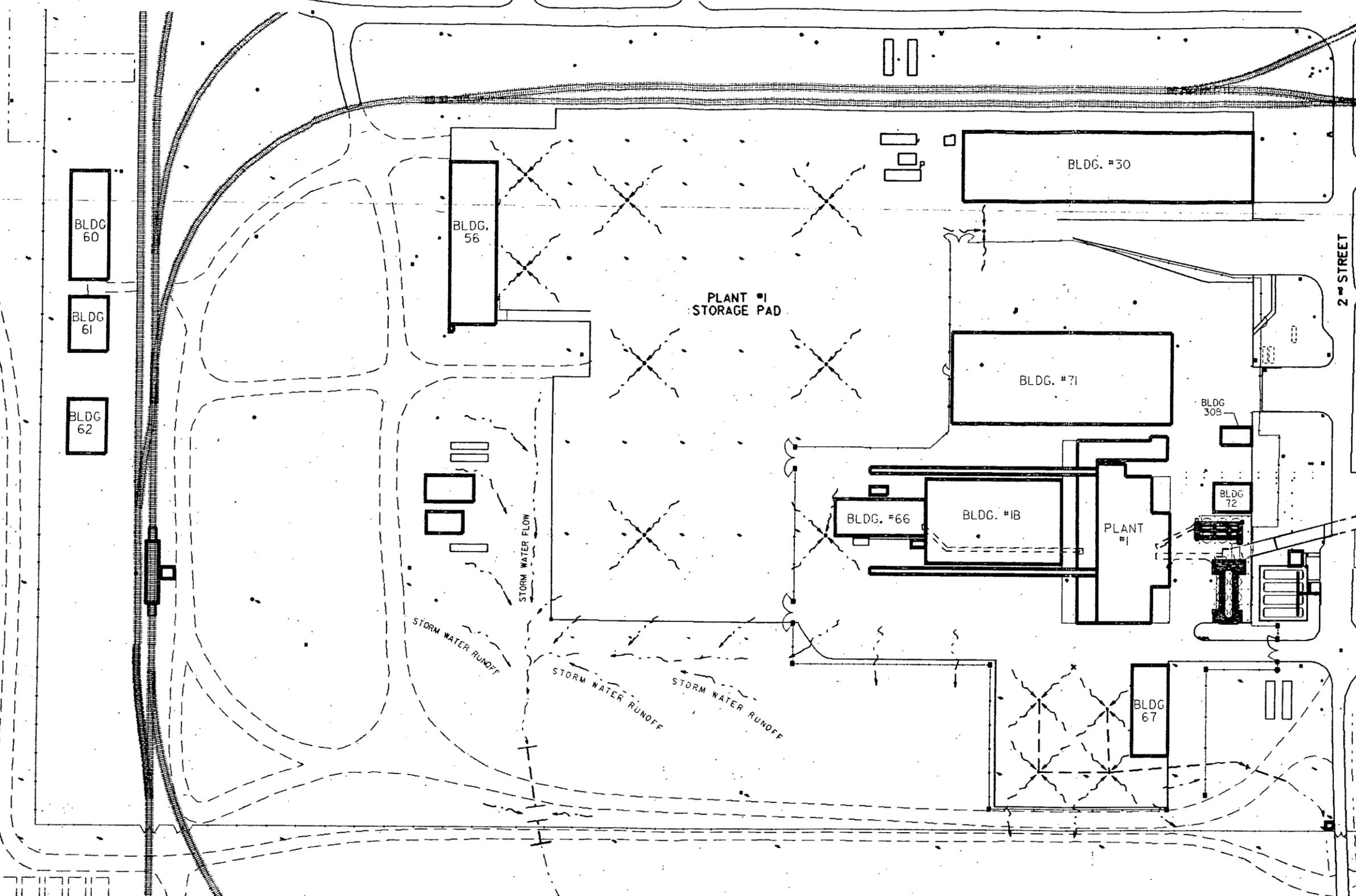
ATTACHMENT 2
APPENDIX A (cont.)

Pyrene	<0.42 mg/kg
Styrene	<0.006 mg/kg
Tetrachloroethane	<0.006 mg/kg
	<0.005 mg/L
Tetrachloromethane	<0.006 mg/kg
Thallium	<0.84 mg/kg
Toluene	<0.007 mg/kg
	<0.005 mg/L
Total Xylenes	<0.006 mg/kg
Toxaphene	<0.9 mg/kg
Tribromomethane	<0.006 mg/kg
Vinyl Acetate	<0.013 mg/kg
Vinyl Chloride	<0.013 mg/kg
Alpha - BHC	<0.045 mg/kg
Alpha - Chlordane	<0.45 mg/kg
Beta - BHC	<0.02 mg/kg
bis (2-Chloroethyl) ether	<0.42 mg/kg
bis (2-Chloroethoxy) methane	<0.42 mg/kg
bis (2-Chloroisopropyl) ether	<0.42 mg/kg
bis (2-ethylhexyl) phthalate	<0.42 mg/kg
cis - 1,3 - dichloropropene	<0.006 mg/kg
delta - BHC	<0.018 mg/kg
gamma chlordane	<0.45 mg/kg
o-cresol	<0.42 mg/kg
p-cresol	<0.42 mg/kg
p-nitroaniline	<2.0 mg/kg
trans-1,3-dichloropropene	<0.006 mg/kg

ATTACHMENT 2

FIGURES

FIGURE 3-1



NO.	REVISIONS	DATE	OWN.	BY	APPD.	NO.	REVISIONS	DATE	OWN.	BY	APPD.	NO.	REF. DWG. NO.

NOTE:
 WMCO C.A.D.
 DRAWING NOT
 TO BE REVISED
 MANUALLY

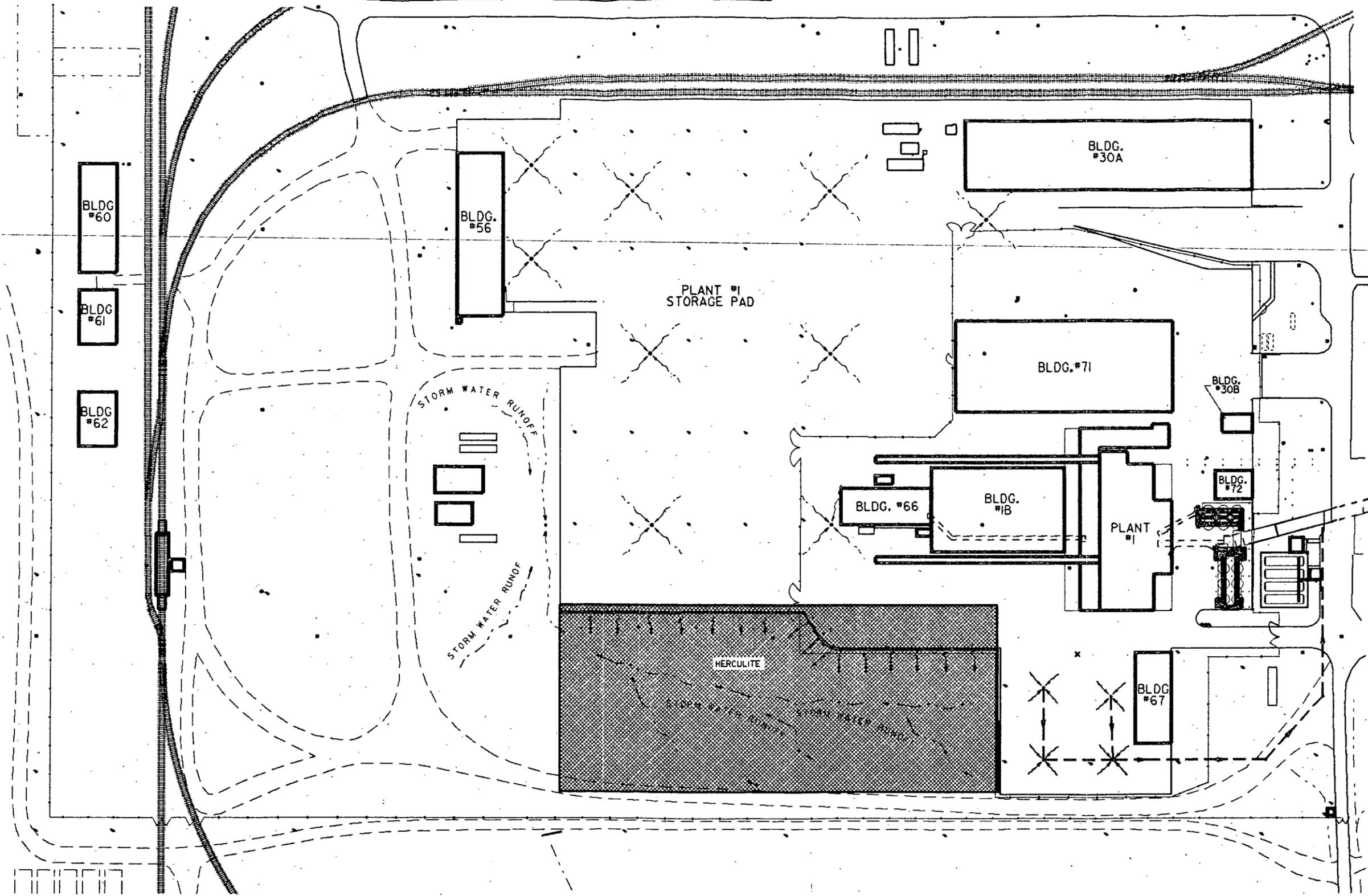
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	APPROVALS
CHEMICAL CIVIL & STR. ELECTRICAL ENGINEER INSTRUMENT MECHANICAL CHECKED APPROVED	LR, S. & Y. MAINTENANCE NUJ. SAFETY G.A. PRODUCTION FIRE & SAFETY WASTE MANAGE D.O.E. SECURITY

WESTINGHOUSE MAT'L.S. CO. OF OHIO
 FERNALD, OHIO
 FEED MATERIALS PRODUCTION CENTER
 U.S. DEPARTMENT OF ENERGY

PLANT #1 STORAGE AREA
 STORAGE PAD LAYOUT
 STORM WATER FLOW, PAST
 SCALE - 1" = 50'-0"

RES. NAME: []
 DATE: 8-27-90
 DRAWN: MFE/LODR

01X-5500-G-01331 0



NO.	REVISIONS	DATE	BY	APPD.	NO.	REVISIONS	DATE	BY	APPD.	REF. DWG. NO.
					1	REVISED AREA COVERED BY HERCULITE	08-08	J. W. [Signature]		

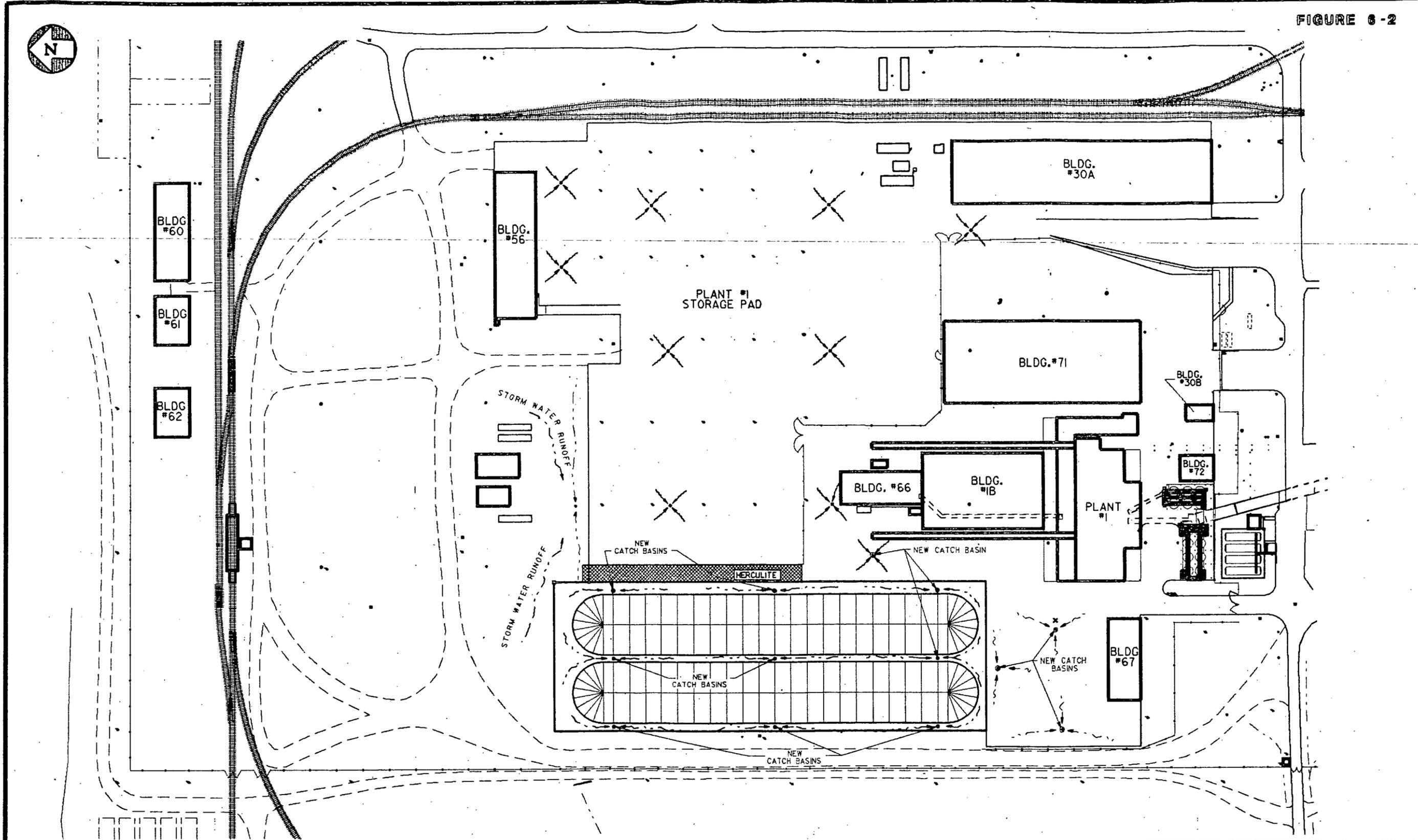
NOTE:
 WMCO C.A.D.
 DRAWING NOT
 TO BE REVISED
 MANUALLY

DESIGNER		CHECKED		APPROVED	
DESIGNER	DATE	CHECKED	DATE	APPROVED	DATE

WESTINGHOUSE MAT'L.S. CO. OF OHIO
 FERNALD, OHIO
 FEED MATERIALS PRODUCTION CENTER
 U.S. DEPARTMENT OF ENERGY

PLANT #1 STORAGE AREA
 STORAGE PAD LAYOUT
 STORMWATER FLOW DURING A/B
 SCALE - 1" = 50'-0"

FILE NO. OIX-5500-G-01333



NO.	REVISIONS	DATE	DWN. BY	APPD. NO.	REVISIONS	DATE	DWN. BY	APPD. NO.	REF. DWG. NO.

NOTE:
WMCO C.A.D.
DRAWING NOT
TO BE REVISED
MANUALLY

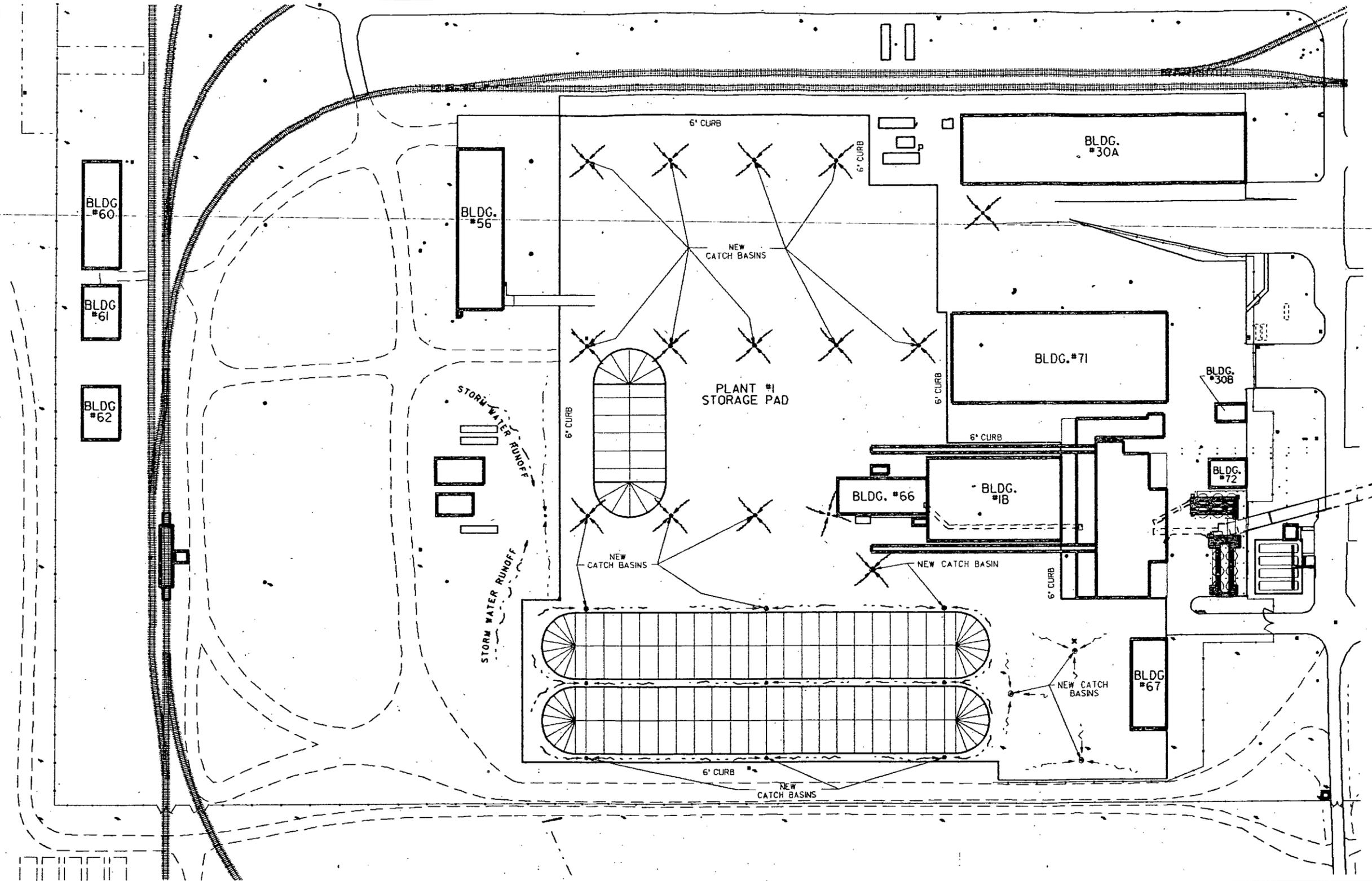
CHECKS		APPROVALS	
CHEMICAL		U.S. & T.	
CIVIL & STR.		MAINTENANCE	
ELECTRICAL		IND. SAFETY	
ENGINEER		O.A.	
INSTRUMENT		PRODUCTION	
MECHANICAL		FIRE & SAFETY	
		WASTE MGMT.	
		D.O.E.	
		SECURITY	
CHECKED			
APPROVED			

WESTINGHOUSE MAT'L.S. CO. OF OHIO
 FERNALD, OHIO
 FEED MATERIALS PRODUCTION CENTER
 U.S. DEPARTMENT OF ENERGY

PLANT #1 STORAGE AREA
 STORAGE PAD AREA LAYOUT
 STORMWATER FLOW AFTER A/B
 SCALE - 1" = 50'-0"

DES. 4990
 DATE 8-28-90
 DRAWN BY LK00E

OIX-5500-G-01334 0



<p>NO. REVISIONS</p>		<p>DATE DOWN BY APPD. NO.</p>		<p>NO. REVISIONS</p>		<p>DATE DOWN BY APPD. REF. DWG. NO.</p>		<p>NOTES: WMCO C.A.D. DRAWING NOT TO BE REVISED MANUALLY</p>		<p>DESIGN ENGINEER: [Signature] DATE: [Date]</p>		<p>CHEMICAL [] CIVIL & STR. [] ELECTRICAL [] ENGINEER [] INSTRUMENT [] MECHANICAL [] CHECKED: [Signature] APPROVED: [Signature]</p>		<p>APPROVALS: U.S. & T. [] MAINTENANCE [] ENV. SAFETY [] O.A. [] PRODUCTION [] FIRE & SAFETY [] WASTE MGMT. [] D.O.E. [] SECURITY []</p>		<p>WESTINGHOUSE MAT'L.S. CO. OF OHIO FERNALD, OHIO FEED MATERIALS PRODUCTION CENTER U.S. DEPARTMENT OF ENERGY</p>		<p>PLANT #1 STORAGE AREA STORAGE PAD AREA LAYOUT STORM WATER FLOW, AFTER C, D, & E SCALE - 1" = 50'-0"</p>		<p>DATE: 2-29-90 OIX-5500-G-01335</p>	
<p>NO. REVISIONS</p>		<p>DATE DOWN BY APPD. NO.</p>		<p>NO. REVISIONS</p>		<p>DATE DOWN BY APPD. REF. DWG. NO.</p>		<p>NOTES: WMCO C.A.D. DRAWING NOT TO BE REVISED MANUALLY</p>		<p>DESIGN ENGINEER: [Signature] DATE: [Date]</p>		<p>CHEMICAL [] CIVIL & STR. [] ELECTRICAL [] ENGINEER [] INSTRUMENT [] MECHANICAL [] CHECKED: [Signature] APPROVED: [Signature]</p>		<p>APPROVALS: U.S. & T. [] MAINTENANCE [] ENV. SAFETY [] O.A. [] PRODUCTION [] FIRE & SAFETY [] WASTE MGMT. [] D.O.E. [] SECURITY []</p>		<p>WESTINGHOUSE MAT'L.S. CO. OF OHIO FERNALD, OHIO FEED MATERIALS PRODUCTION CENTER U.S. DEPARTMENT OF ENERGY</p>		<p>PLANT #1 STORAGE AREA STORAGE PAD AREA LAYOUT STORM WATER FLOW, AFTER C, D, & E SCALE - 1" = 50'-0"</p>		<p>DATE: 2-29-90 OIX-5500-G-01335</p>	

ATTACHMENT 3

Plant 1 Pad

Removal Action

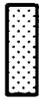
WORK PLAN SCHEDULE

Plant 1 Pad / Master Schedule

Time 0

● Work Plan Approval by EPA

Aug 90



● Stage 1. Installation of Membrane
& Partial Perimeter Curb

Start 1 month after T=0



+ 120 Days

● Stage 2. Phase A/B Construction

Start 1 month after T=0



+ 15 Months

● Stage 3. Phase C, D, & E Construction

Start 2 months after

End Stage 2

+ 24 Months



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ATTACHMENT 4

CONSTRUCTION SPECIFICATIONS

**COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASES A & B**

**COMMENTS
TO
CONSTRUCTION SPECIFICATIONS**

The following constructions plans and specifications are provided for information only and are subject to change without EPA approval. The deletions and additions listed below do not alter the design criteria of the Plant 1 Pad modifications. These construction changes were driven by economic and schedule enhancements.

Deletions and Additions

- Phase A/B -
 - Delete scabbling
 - Delete road relocation
 - Delete formed storm drains
 - Replace with reinforced concrete pipe and area drain inlets

- Phase C, D, E -
 - Delete scabbling
 - Delete demolition of conveyor galleries

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SPECIFICATION NO. 02892-4301
CERTIFIED FOR CONSTRUCTION
SPECIFICATIONS FOR
CONSTRUCTION OF
COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASES A AND B
(WBS 1.1.2.1.01)

Prepared for:
Westinghouse Materials Company of Ohio
Feed Materials Production Center
Fernald, Ohio

Contract No. N-77207
July 14, 1989

Prepared by
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

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SPECIFICATION NO. 02892-4301

A. M. KINNEY, INC.

PREPARED BY *L. M. Pockras*
L. M. Pockras - Project Engineer

DATE 7-14-89

CHECKED BY *J. F. Bartley*
J. F. Bartley - Specifications

DATE 7-14-89

APPROVED BY *John H. K. Yuan*
J. H. K. Yuan - Project Manager

DATE 7-14-89

WESTINGHOUSE MATERIALS COMPANY OF OHIO

APPROVED BY *R. Skalka*
R. J. Skalka - Project Engineer

DATE 7/18/89

APPROVED BY *R. Skalka*
R. J. Skalka - Project Manager

DATE 7/18/89

APPROVED BY *J. E. King*
J. E. King - Manager/Environmental
Project Engineering

DATE 7/18/89

DEPARTMENT OF ENERGY

APPROVED BY *Wayne E. Pasko*
W. E. Pasko - Project Manager

DATE 7/18/89

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SPECIFICATION NO. 02892-4301
CERTIFIED FOR CONSTRUCTION
SPECIFICATIONS FOR
CONSTRUCTION OF
COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASES A AND B
(WBS 1.1.2.1.01)

<u>SECTION NUMBER</u>	<u>SECTION TITLE</u>	<u>NUMBER OF PAGES</u>
01100	GENERAL REQUIREMENTS	10
ATTACHMENT NO. 1	CONSTRUCTION SUBMITTAL LISTING	2
ATTACHMENT NO. 2	COST BREAKDOWN	1
01101	SCHEDULE OF DRAWINGS	1
02050	DEMOLITION	2
02100	SITE PREPARATION, EARTHWORK AND APPURTENANT WORK	9
02400	STORM DRAINAGE	5
03300	CONCRETE WORK	13
05500	MISCELLANEOUS METAL	4
09701	POLYURETHANE ELASTOMER/WEARING SURFACE	5
09702	EPOXY FLOOR COATING	5
09870	EPOXY COATING - METAL SURFACES	4
09900	PAINTING	6
10400	SIGNS	2
13120	FRAME SUPPORTED FABRIC STRUCTURES	9
16010	ELECTRICAL WORK - GENERAL	8
16020	SCOPE OF ELECTRICAL WORK	3
16307	ELECTRICAL SWITCHING AND CONTROLS - LOW VOLTAGE (1,000 VOLTS AND BELOW)	3
16400	ELECTRICAL WIRING	13
16480	EXTERIOR ELECTRICAL WORK	2
16500	LUMINAIRES AND LIGHTING	1

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SPEC. 02892-4301
JULY 14, 1989

DIVISION 1

01100 - GENERAL REQUIREMENTS

01100.01 GENERAL

THESE GENERAL REQUIREMENTS FORM A PART OF ALL THE TECHNICAL DIVISIONS OF THESE SPECIFICATIONS.

A. M. KINNEY, INC. HAS PREPARED THESE SPECIFICATIONS. IN ALL CASES WHERE THE WORD "ENGINEERS" APPEARS IN THESE SPECIFICATIONS, IT SHALL BE UNDERSTOOD TO REFER TO A. M. KINNEY, INC., OR TO SUCH OTHER INDIVIDUALS OR ORGANIZATIONS ACTING WITHIN THE SCOPE OF THE SPECIFIC DUTIES ENTRUSTED TO THEM.

IN ALL CASES WHERE THE WORDS "OPERATING CONTRACTOR" APPEAR, THEY SHALL BE UNDERSTOOD TO REFER TO THE FMPC OPERATING CONTRACTOR, THE WESTINGHOUSE MATERIALS COMPANY OF OHIO.

IN ALL CASES WHERE THE WORDS "CONSTRUCTION MANAGER" APPEAR, THEY SHALL BE UNDERSTOOD TO REFER TO THE FMPC CONSTRUCTION MANAGER, THE RUST ENGINEERING COMPANY.

THE SUBCONTRACTOR SHALL PERFORM ALL CONSTRUCTION ACCEPTANCE TESTS AS COORDINATED AND SUPERVISED BY THE CONSTRUCTION MANAGER AND WITNESSED BY THE OPERATING CONTRACTOR. IN ADDITION, BEFORE THE FINAL ACCEPTANCE OF THE WORK, THE SUBCONTRACTOR SHALL PERFORM AN INTEGRATED SYSTEM CONSTRUCTION ACCEPTANCE TEST AS COORDINATED AND SUPERVISED BY THE CONSTRUCTION MANAGER AND WITNESSED BY THE OPERATING CONTRACTOR.

THE SUBCONTRACTOR SHALL PROVIDE WRITTEN PROCEDURES FOR THE CONSTRUCTION MANAGER'S REVIEW AND APPROVAL OF ALL TESTS TO BE PERFORMED AS IDENTIFIED IN THE DRAWINGS AND SPECIFICATIONS. THESE PROCEDURES SHALL PROVIDE DETAILED STEP BY STEP OPERATIONS WITH SIGN-OFF COLUMNS AND SHALL BE SUBMITTED AND APPROVED AT LEAST 30 DAYS PRIOR TO TESTING.

ALL FIELD TEST INSTRUMENTS SHALL HAVE BEEN CALIBRATED WITHIN THE LAST 12 MONTHS PRIOR TO USE ON THIS SUBCONTRACT BY A CALIBRATION LABORATORY WHOSE CALIBRATION EQUIPMENT AND INSTRUMENTS ARE FULLY TRACEABLE TO NIST STANDARDS. THE SUBCONTRACTOR SHALL PROVIDE INDIVIDUAL CERTIFICATION OF CALIBRATION AND NIST STANDARDS TRACEABILITY FOR ALL FIELD TEST INSTRUMENTS USED ON THIS SUBCONTRACT.

PROVIDE ALL FIELD LABOR AND OTHER ASSISTANCE REQUIRED BY THE ENGINEERS DURING ANY ON-SITE FIELD SERVICES BEING PERFORMED BY THE ENGINEERS.

ALL WORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE REQUIREMENTS OF THE OHIO BASIC BUILDING CODE, THE UNIFORM BUILDING CODE, INCLUDING REQUIREMENTS FOR SEISMIC CONSTRUCTION, ZONE 2, AND IN ACCORDANCE WITH THE REQUIREMENTS OF 29 CFR 1926 (OSHA).

JULY 14, 1989

01100.02 SITE AND SCOPE OF WORK

THE INTENT OF THESE SPECIFICATIONS IS TO PROVIDE ALL WORK REQUIRED AND NECESSARY TO PROVIDE THE CONSTRUCTION OF THE COVERED CONTROLLED STORAGE PAD FOR PLANT 1, PHASES A AND B, AND RELATED SYSTEMS.

THE SUBCONTRACTOR SHALL PROVIDE ALL LABOR, SERVICES, MATERIALS, AND EQUIPMENT, AND SHALL DO ALL WORK NECESSARY TO ACCOMPLISH THIS END WITHIN THE LIMITS OF WORK AS DEFINED IN THE ACCEPTED BID AND/OR CONTRACT.

01100.03 CONSTRUCTION PHASES

CONSTRUCTION OF THE COVERED CONTROLLED STORAGE PAD - PLANT 1 (A/B) SHALL BE ACCOMPLISHED IN 2 PHASES - PHASES A AND B.

PHASE A REFERS TO THE CONSTRUCTION OF A NEW PAD AS INDICATED ON DRAWING C-1, RENOVATING AND OVERLAYING A PORTION OF EXISTING PAD, AND ALL RELATED EXCAVATION, SITE WORK, TRENCH DRAINS, SUMPS, CURBS AND RAMPS, ETC.

PHASE B REFERS TO THE FURNISHING OF THREE FRAME SUPPORTED FABRIC STRUCTURES LOCATED AS SHOWN ON DRAWING C-1.

THE TWO LARGER STRUCTURES SHALL BE ERECTED IN PHASE A, WHILE THE SMALLER STRUCTURE SHALL BE ERECTED IN PHASE D AFTER COMPLETION OF PHASE D WORK UNDER OTHER SPECIFICATIONS.

THE SUBCONTRACTOR SHALL COORDINATE HIS SCHEDULES WITH THE CONSTRUCTION MANAGER FOR PHASES A AND B.

01100.04 CONTAMINATED MATERIALS

ALL CONTAMINATED MATERIALS RESULTING FROM THE DEMOLITION OPERATIONS OR CUTTING AND PATCHING OPERATIONS UNDER THIS SPECIFICATION ARE TO BE CONTAINED AS SPECIFIED IN FMPC-720.

FOR HEAVY WASTE MATERIALS SUCH AS SOIL AND CONCRETE, THE OPERATING CONTRACTOR WILL FURNISH 38 INCH HIGH BY 52 INCH WIDE BY 76 INCH LONG (INSIDE DIMENSION) CONTAINERS AT THE CONSTRUCTION SITE AND WILL REMOVE SUCH CONTAINERS FROM THE CONSTRUCTION SITE AFTER THEY HAVE BEEN FILLED TO A MAXIMUM OF 5,340 POUNDS IN ACCORDANCE WITH OPERATING CONTRACTOR'S STANDARD OPERATING PROCEDURE.

FOR LIGHTER WASTE MATERIALS SUCH AS WOOD AND SCRAP METAL, THE OPERATING CONTRACTOR WILL FURNISH "LAND/SEA CONTAINERS," AT THE CONSTRUCTION SITE WITH NOMINAL INSIDE DIMENSION OF 7-1/2 FEET BY 7-1/2 FEET BY 19, AND WILL REMOVE SUCH CONTAINERS FROM THE CONSTRUCTION SITE AFTER THEY HAVE BEEN FILLED BY THE SUBCONTRACTOR TO A MAXIMUM OF 37,000 POUNDS IN ACCORDANCE WITH OPERATING CONTRACTOR'S STANDARD OPERATING PROCEDURE.

THE SUBCONTRACTOR SHALL SIZE REDUCE WASTE MATERIALS AS REQUIRED TO FIT IN SUCH CONTAINERS.

01100.05 ASBESTOS ABATEMENT

REMOVAL AND ABATEMENT OF ASBESTOS TO CONFORM TO FMPC STANDARDS AND TO THE FOLLOWING STANDARDS:

- AMERICAN INDUSTRIAL HYGIENE ASSOCIATION - RECOMMENDATIONS FOR ASBESTOS ABATEMENT PROJECTS
- OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION STANDARDS 1926.58
- ENVIRONMENTAL PROTECTION AGENCY - NATIONAL EMISSION STANDARDS FOR ASBESTOS

SUB-SUBCONTRACTORS, TESTING LABORATORIES AND INDUSTRIAL HYGIENISTS FOR ASBESTOS REMOVAL WORK SHALL BE LICENSED FOR ASBESTOS REMOVAL IN ACCORDANCE WITH THE LAWS OF THE STATE OF OHIO.

THE OPERATING CONTRACTOR WILL OBTAIN ALL LICENSES, PERMITS AND INSPECTIONS, AND PAY ALL FEES THEREFOR, FROM ALL FEDERAL, STATE OR LOCAL AGENCIES INVOLVED WITH THE CONTROL OF ASBESTOS MATERIALS. THE SUBCONTRACTOR SHALL OBTAIN ALL REQUIRED ASBESTOS WORK PERMITS FROM THE FMPC OPERATING CONTRACTOR.

PRIOR TO COMMENCING ANY ASBESTOS ABATEMENT WORK, THE SUBCONTRACTOR SHALL SUBMIT FOR APPROVAL A PROPOSED ASBESTOS WORK PLAN. INCLUDED IN THIS WORK PLAN SHALL BE THE SCOPE OF THE ASBESTOS WORK, THE SUBCONTRACTOR'S ABATEMENT METHODS; AIR MONITORING PROCEDURES, PROTECTION EQUIPMENT INCLUDING RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING, DOCUMENTATION OF EMPLOYEE TRAINING FOR ASBESTOS AND RESPIRATORS, AND ASBESTOS AND RESPIRATOR MEDICAL CERTIFICATION.

THE TYPE OF CONTAINMENT REQUIRED FOR THE WORK AREA SHALL BE DETERMINED BY THE SUBCONTRACTOR AND APPROVED BY THE OPERATING CONTRACTOR. CONTAINMENTS MAY REQUIRE A NEGATIVE PRESSURE VENTILATION SYSTEM WITH HEPA FILTRATION. ALL POWER TOOLS WHICH MAY RELEASE ASBESTOS FIBERS IN EXCESS OF THE PERMISSIBLE EXPOSURE CONCENTRATION SHALL BE USED IN CONJUNCTION WITH AN ASBESTOS APPROVED HEPA FILTERED EXHAUST SYSTEM TO CAPTURE GENERATED DUST.

TRANSITE REMOVAL WORK PRACTICES AND REQUIRED PROTECTIVE CLOTHING WILL BE DETERMINED ON A CASE BY CASE BASIS BY THE OPERATING CONTRACTOR. THE TRANSITE WILL BE REMOVED IN WHOLE SECTIONS (I.E. NOT BROKEN) BY UNSCREWING EACH PANEL. BEFORE REMOVING EACH SCREW, THE SCREW AREA WILL BE WET WITH WATER. EACH PANEL SHALL BE DOUBLE WRAPPED WITH 6 MIL PLASTIC AND LABELED APPROPRIATELY. PANELS MAY REQUIRE TO BE BROKEN TO FIT INTO THE WOODEN BOXES; THE BREAKING PROCEDURE SHALL TAKE PLACE ONLY AFTER THE PANEL HAS BEEN DOUBLE WRAPPED WITH 6 MIL PLASTIC.

THE OPERATING CONTRACTOR'S INDUSTRIAL HYGIENE PERSONNEL WILL PERIODICALLY MONITOR THE JOBSITE DURING THE ASBESTOS ABATEMENT WORK.

ASBESTOS REMOVED DURING CONSTRUCTION WORK TO BE ENCAPSULATED IN PLASTIC BAGS AND PLACED IN WHITE BARRELS AND BOXES FURNISHED BY THE OPERATING CONTRACTOR. THE OPERATING CONTRACTOR WILL REMOVE SUCH BARRELS AND BOXES FROM THE CONSTRUCTION SITE TO AN APPROVED ON-SITE DISPOSAL AREA.

01100.06 RESPIRATORY PROTECTION

ALL SUBCONTRACTOR PERSONNEL UTILIZING ANY FORM OF RESPIRATORY PROTECTION EQUIPMENT AT THE FMPC MUST BE PROPERLY MEDICALLY CERTIFIED, TRAINED AND FIT-TESTED BEFORE THEY MAY USE SUCH EQUIPMENT AT THE FMPC.

DOCUMENTATION OF THE RESPIRATOR TRAINING, RESPIRATOR MEDICAL CERTIFICATION, SIZE, TYPE AND MANUFACTURER OF THE RESPIRATOR FIT-TESTED MUST BE SUBMITTED BY THE SUBCONTRACTOR AND APPROVED PRIOR TO THE USE OF SUCH RESPIRATORY EQUIPMENT. THE SUBCONTRACTOR SHALL MAKE ALL ARRANGEMENTS, AND PAY ALL COSTS, TO HAVE HIS PERSONNEL EVALUATED, TRAINED, CERTIFIED AND FIT TESTED AT AN OFF-FMPC FACILITY. PERSONNEL MUST BE CERTIFIED FOR AND FIT-TESTED WITH THE SAME EQUIPMENT THEY WILL BE UTILIZING AT FMPC.

ALL RESPIRATORY EQUIPMENT USED ON THE PROJECT MUST BE NIOSH APPROVED, PROPERLY MAINTAINED, AND ADEQUATE SUPPLIES OF THE EQUIPMENT AND ALL NECESSARY SPARE PARTS MUST BE KEPT AT THE FMPC SITE.

01100.07 UTILITY OUTAGES

ALL DEMOLITION WORK OR NEW INSTALLATION WORK REQUIRING UTILITY OUTAGES OR SYSTEM SHUTDOWNS SHALL BE PERFORMED ON WEEKENDS.

01100.08 SUBMITTALS - SHOP DRAWINGS, SAMPLES AND OTHER DATA

A. GENERAL

ARTICLE SC-24 OF THE RUST SPECIAL TERMS AND CONDITIONS SHALL BE SUPPLEMENTED BY THE FOLLOWING (ANY SUBMITTALS NOT IN CONFORMANCE WITH THESE REQUIREMENTS WILL BE RETURNED WITHOUT DETAILED REVIEW FOR CORRECTION AND RESUBMITTAL):

SUBMITTALS FOR UNRELATED ITEMS SHALL NOT BE INCLUDED IN THE SAME TRANSMITTAL AND EACH SEPARATE SUBMITTAL SHALL BE COORDINATED AND SHALL INCLUDE ALL DRAWINGS AND DATA REQUIRED FOR THE ITEM OR SYSTEM COVERED.

115

SUBMITTALS SHALL INDICATE PROJECT NAME AND ENGINEERS' SPECIFICATION NUMBER (IF PAGES ARE SECURELY BOUND IN A BROCHURE, THIS IS NEEDED ON THE COVER ONLY) AND IDENTIFICATION BY SPECIFICATION DIVISION, SECTION, SUBSECTION, AND ARTICLE UNDER WHICH EQUIPMENT OR MATERIAL IS DESCRIBED, AND BY NAME, NUMBER AND INTENDED USE AS DESIGNATED BY CONTRACT DRAWINGS AND SPECIFICATIONS.

WHEN MORE THAN ONE ITEM OF EQUIPMENT IS INCLUDED ON A SINGLE DRAWING OR CATALOG CUT, EACH PROJECT EQUIPMENT ITEM MUST BE SEPARATELY IDENTIFIED THEREON, WITH CLEAR DELINEATION AS TO WHICH MODEL OR CATALOG NUMBER OR PERFORMANCE DATA APPLIES TO EACH PROJECT ITEM.

ASSEMBLE AND SUBMIT, IN LOGICALLY ARRANGED FOLDERS, ALL INSTRUCTION BULLETINS, DIAGRAMS, LUBRICATION SCHEDULES, OPERATING INSTRUCTIONS, PARTS LISTS AND PAMPHLETS FOR EQUIPMENT AND APPARATUS FURNISHED, INCLUDING VENDOR'S OR MANUFACTURER'S RECOMMENDED PROCEDURE FOR LIFTING, HANDLING AND INSTALLING EQUIPMENT.

SUBMITTALS FOR EQUIPMENT TO INCLUDE MANUFACTURER'S MODEL NUMBER OR CATALOG NUMBER, RATINGS, SIZE, AND PERFORMANCE CURVES AND DATA. INDICATE OPERATING POINT ON CURVES AND TABULAR DATA FOR EACH PIECE OF EQUIPMENT THAT CURVES OR DATA REPRESENT.

SUBMIT WIRING DIAGRAMS OR CONNECTION DIAGRAMS FOR EQUIPMENT ITEMS, ACCOMPANIED BY ADEQUATELY DEFINED SYMBOLS LIST. SCHEMATIC AND WIRING DIAGRAMS MUST BE PREPARED IN ACCORDANCE WITH ANSI/IEEE PUBLICATION Y32E, "ELECTRICAL AND ELECTRONICS GRAPHIC SYMBOLS AND REFERENCE DESIGNATIONS." INDIVIDUAL 8-1/2 INCH BY 11 INCH ELEMENTARY AND WIRING DRAWINGS ARE NOT ACCEPTABLE.

INDICATE ALL PERFORMANCE DATA, CONSTRUCTION MATERIAL FINISHES AND MODIFICATIONS TO MANUFACTURER'S STANDARD DESIGN SPECIFIED.

LOCATE TERMINATION POINTS FOR ALL REQUIRED EXTERNAL WIRING.

INDICATE ROUGHING-IN, FOUNDATION AND SUPPORT POINT DIMENSIONS.

THE ENGINEERS' REVIEW OF SUCH SUBMITTALS SHALL NOT RELIEVE THE SUBCONTRACTOR FROM ANY RESPONSIBILITY FOR DEVIATIONS FROM CONTRACT DOCUMENTS, UNLESS THE SUBCONTRACTOR HAS IN WRITING CALLED THE ENGINEERS' ATTENTION TO SUCH DEVIATIONS AT THE TIME OF SUBMISSION, NOR SHALL IT RELIEVE THE SUBCONTRACTOR FROM RESPONSIBILITY FOR ERRORS OF ANY SORT IN THE SUBMITTALS NOR FROM RESPONSIBILITY FOR THE PROPER FITTING AND CONSTRUCTION OF THE WORK.

SUBMITTALS WILL BE REVIEWED WITH RESPECT TO SUCH FACTORS AS QUALITY OF DRAFTSMANSHIP, LEGIBILITY, AND EVIDENCE THAT THE SUBCONTRACTOR IS AWARE OF THE NECESSITY AND IMPORTANCE OF ADEQUATELY DETAILING AND ILLUSTRATING SPECIAL FEATURES AND CONDITIONS RELATING TO THE WORK. IF THE ENGINEERS DETERMINE THAT THE DATA SUBMITTED, IN

PART OR IN WHOLE, IS NOT WITHIN THE PURVIEW OF THEIR REVIEW, SUCH SUBMITTAL, OR PART THEREOF, WILL BE RETURNED UNCHECKED. DIMENSIONS, SIZES, CONSTRUCTION DETAILS, AND DIRECTIVE NOTES SHOWN WILL BE REVIEWED FOR ACCURACY, COMPLIANCE WITH THE SPECIFICATIONS, ADEQUACY, INTERFERENCES, ETC., ON A SPOT CHECK OR INCOMPLETE BASIS TO ESTABLISH THAT THE SUBCONTRACTOR HAS GIVEN SUCH FACTORS CAREFUL ATTENTION.

ANY CHANGES MARKED ON SUBMITTALS DURING REVIEW WILL BE FOR THE PURPOSE OF INDICATING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND NO CHANGE IN THE CONTRACT AMOUNT IS AUTHORIZED BY SUCH MARKINGS.

WHEN SUBMITTALS ARE FOUND TO BE SATISFACTORY WITH RESPECT TO THE ABOVE FACTORS AND WITHIN THE SCOPE OF THE REVIEW OUTLINED ABOVE, THEY WILL BE RETURNED TO THE SUBCONTRACTOR BEARING CERTIFICATE ATTACHMENT PERMITTING THE SUBCONTRACTOR TO EMPLOY THEM IN THE FURTHERANCE OF WORK UNDER THE CONTRACT, BUT ONLY WITH THE EXPRESS UNDERSTANDING THAT SUCH PERMISSION SHALL NOT RELIEVE THE SUBCONTRACTOR OF RESPONSIBILITIES FOR THE FULL PERFORMANCE OF THE WORK REQUIRED UNDER THE CONTRACT IN CONFORMANCE WITH THE CONTRACT DOCUMENTS GOVERNING SUCH PERFORMANCE, NOR FOR ANY OTHER DEFICIENCIES IN THE SUBMITTALS SUCH AS INACCURACIES, DISCREPANCIES, OMISSIONS, INTERFERENCES IN THE WORK ITSELF, OR WITH THE WORK OF OTHER SUBCONTRACTORS WHETHER OR NOT SUCH DEFICIENCIES WERE OBSERVED OR NOTED IN THE COURSE OF THE REVIEW OF THE SHOP DRAWINGS.

THE SUBCONTRACTOR SHALL VERIFY ALL FIELD DIMENSIONS REQUIRED FOR SHOP DRAWINGS.

B. SUBMITTALS REQUIRED

SUBMITTALS REQUIRED INCLUDE DRAWINGS AND/OR DATA FOR ALL ITEMS AS LISTED. REFER TO THE VARIOUS TECHNICAL DIVISIONS FOR ADDITIONAL REQUIREMENTS:

- "A" DESIGNATES SHOP DRAWINGS AND PERTINENT PERFORMANCE DATA AND CURVES ARE REQUIRED.
- "B" DESIGNATES CATALOG DATA AND PERTINENT PERFORMANCE DATA AND CURVES ARE REQUIRED.
- "C" DESIGNATES THAT THESE ITEMS ARE TO BE INCLUDED ON A LISTING GIVING MANUFACTURER AND BRIEF TYPE DESCRIPTION FOR EACH ITEM. SUCH LISTING SHALL BE SUBMITTED NOT LATER THAN 30 DAYS AFTER NOTICE TO PROCEED. NOTE THAT SHOP DRAWINGS OR CATALOG DATA MAY ALSO BE REQUIRED FOR ITEMS INCLUDED ON THIS LIST.
- "D" DESIGNATES SAMPLES OF FINISHES ARE REQUIRED WITH FULL RANGE OF COLOR CHOICES AND/OR PATTERNS SUBMITTED.

- "E" DESIGNATES PHYSICAL SAMPLES OF MATERIALS ARE REQUIRED.
- "F" DESIGNATES INDIVIDUAL CERTIFICATIONS FOR CONFORMITY TO QUALIFICATIONS AND STANDARDS SPECIFIED ARE REQUIRED. FOR EQUIPMENT ITEMS, THIS INDICATES CERTIFIED EQUIPMENT DRAWINGS ARE TO BE SUBMITTED.
- "G" DESIGNATES THAT THE TECHNICAL SPECIFICATIONS CONTAIN SPECIFIC SUBMITTAL REQUIREMENTS.
- "H" DESIGNATES ENGINEERING CALCULATIONS ARE REQUIRED.
- "I" DESIGNATES SPARE PARTS LIST IS REQUIRED.
- "J" DESIGNATES INSTALLATION, OPERATION AND MAINTENANCE MANUAL IS REQUIRED.
- "K" INDICATES THAT MANUFACTURER'S MATERIAL SAFETY DATA SHEETS ARE REQUIRED.
- "L" INDICATES THAT TEST REPORTS ARE REQUIRED FOR TESTS NOTED IN THE TECHNICAL SPECIFICATIONS. SUCH REPORTS MUST BE RECEIVED BY THE CONSTRUCTION MANAGER WITHIN ONE WEEK OF THE TEST.
- "M" INDICATES THAT WIRING DIAGRAMS FOR POWER SIGNAL, AND CONTROL WIRING ARE REQUIRED.
- "N" INDICATES THAT SCHEMATIC PIPING DIAGRAMS, WITH SIZES AND COMPONENTS SHOWN, ARE REQUIRED.

PROVIDE ALL SUBMITTALS TABULATED IN ATTACHMENT NO. 1 TO THIS SECTION.

01100.09 SPECIFICATION EXPLANATION

A. GENERAL

THE TECHNICAL SPECIFICATIONS ARE OF THE ABBREVIATED, SIMPLIFIED OR STREAMLINED TYPE AND INCLUDE INCOMPLETE SENTENCES. OMISSIONS OF WORDS OR PHRASES SUCH AS "THE SUBCONTRACTOR SHALL," "IN CONFORMITY THERewith," "SHALL BE," "AS NOTED ON THE DRAWINGS," "ACCORDING TO THE PLANS," "A," "THE," AND "ALL" ARE INTENTIONAL. OMITTED WORDS OR PHRASES SHALL BE SUPPLIED BY INFERENCE IN THE SAME MANNER AS THEY ARE WHEN A "NOTE" OCCURS ON THE DRAWINGS.

THE SUBCONTRACTOR SHALL PROVIDE ALL ITEMS, ARTICLES, MATERIALS, OPERATIONS OR METHODS LISTED, MENTIONED, OR SCHEDULED EITHER ON THE DRAWINGS, OR SPECIFIED HEREIN, OR BOTH, INCLUDING ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS NECESSARY AND REQUIRED FOR THEIR COMPLETION AND INSTALLATION.

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FOR CONVENIENCE OF REFERENCE AND TO FACILITATE THE LETTING OF CONTRACTS, THE SPECIFICATIONS MAY BE SEPARATED INTO TITLED DIVISIONS. SUCH SEPARATIONS, HOWEVER, SHALL NOT OPERATE TO MAKE THE ENGINEERS ARBITRATORS TO ESTABLISH THE LIMITS OF SUB-SUBCONTRACTS IN ANY MANNER. THE FOLLOWING DEFINES THE SEPARATIONS REFERRED TO IN THE SPECIFICATIONS:

DIVISION	-	SEPARATE NUMBERED DIVISION OF SPECIFICATIONS (E.G., DIVISION 16)
SECTION	-	SEPARATE NUMBERED SECTION OF A DIVISION (E.G., SECTION 16020)
SUBSECTION	-	SEPARATE NUMBERED SUBSECTION OF A SECTION (E.G., SUBSECTION 16020.01)
ARTICLE	-	SEPARATE LETTERED ARTICLE OF A SUBSECTION (E.G., ARTICLE A)

B. DEFINITIONS

CERTAIN TERMS AND WORDS AS USED THROUGHOUT THE SPECIFICATIONS SHALL BE DEFINED AS FOLLOWS, UNLESS OTHERWISE PARTICULARLY SPECIFIED:

"PROVIDE." FURNISH AND INSTALL, COMPLETE, IN PLACE.

"INDICATED." AS SHOWN ON THE DRAWINGS AND/OR SPECIFIED.

"DIRECTED," "AUTHORIZED," "PERMITTED." SHALL BE AS DIRECTED, AUTHORIZED, OR PERMITTED BY THE CONSTRUCTION MANAGER.

"SELECTED." SHALL BE AS SELECTED BY THE CONSTRUCTION MANAGER.

"SATISFACTORY," "ACCEPTABLE." SATISFACTORY OR ACCEPTABLE TO THE CONSTRUCTION MANAGER.

"NECESSARY," "REQUIRED," "SUITABLE." AS NECESSARY, REQUIRED, OR SUITABLE FOR THE INTENDED PURPOSE AS DETERMINED BY THE CONSTRUCTION MANAGER.

"SUBMIT." SUBMIT TO THE CONSTRUCTION MANAGER UNLESS OTHERWISE SPECIFIED.

IN ALL CASES WHERE THE WORDS "OR EQUAL" APPEAR IN THESE SPECIFICATIONS, THEY SHALL BE UNDERSTOOD TO MEAN "OR APPROVED EQUAL."

01100.10 ABBREVIATIONS FOR REFERENCED STANDARDS AND SPECIFICATIONS

THE FOLLOWING LIST DENOTES ABBREVIATIONS USED IN THE TECHNICAL PORTIONS OF THESE SPECIFICATIONS:

ABBREVIATIONS

ACI
ACPA
AISC
AISI
ANSI
ASME

AUTHORITY

AMERICAN CONCRETE INSTITUTE
AMERICAN CONCRETE PIPE ASSOCIATION
AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AMERICAN IRON AND STEEL INSTITUTE
AMERICAN NATIONAL STANDARDS INSTITUTE
AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ABBREVIATIONS

AUTHORITY

ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWS	AMERICAN WELDING SOCIETY
CRSI	CONCRETE REINFORCING STEEL INSTITUTE
FM	FACTORY MUTUAL SYSTEM
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NESC	NATIONAL ELECTRICAL SAFETY CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIST	NATIONAL INSTITUTE FOR STANDARDS AND TECHNOLOGY (FORMERLY NATIONAL BUREAU OF STANDARDS)
OBBC	OHIO BASIC BUILDING CODE
ODOT	STATE OF OHIO, DEPARTMENT OF TRANSPORTATION
OSHA	FEDERAL OCCUPATIONAL SAFETY AND HEALTH ACT STANDARDS
PCA	PORTLAND CEMENT ASSOCIATION
SSPC	STEEL STRUCTURES PAINTING COUNCIL
UL	UNDERWRITERS LABORATORIES INC.

01100.11 MAINTENANCE OF TRAFFIC

ARTICLE SC-19 OF THE RUST "SPECIAL TERMS AND CONDITIONS" SHALL BE SUPPLEMENTED BY THE FOLLOWING:

ANY EXISTING STREETS AND ROADWAYS BEING CUT OR BRIDGED BY THESE CONSTRUCTION OPERATIONS MUST HAVE AT LEAST ONE LANE OF TRAFFIC MAINTAINED AT ALL TIMES DURING REGULAR FIRST-SHIFT WORKING HOURS. FOR SECOND AND THIRD SHIFT HOURS, ANY TRENCHES OR EXCAVATIONS SHALL BE COVERED WITH A SUITABLY SIZED STEEL PLATE(S) TO MAINTAIN TRAFFIC IN BOTH DIRECTIONS.

01100.12 CLEANING UP

ARTICLE A-26 OF THE RUST "GENERAL TERMS AND CONDITIONS" SHALL BE SUPPLEMENTED BY THE FOLLOWING:

THE SUBCONTRACTOR SHALL, UPON COMPLETION AND ACCEPTANCE OF THE WORK, TURN OVER TO THE OPERATING CONTRACTOR ALL PERMANENT WORK FURNISHED AND PREFORMED UNDER THIS SUBCONTRACT IN A THOROUGHLY CLEANED AND WORKMANLIKE CONDITION, FREE FROM ANY DIRT, GRIT, OIL, PAINT, AND OTHER FORMS OF SOILAGE, AND READY FOR THE OPERATING CONTRACTOR'S USE IN EVERY RESPECT.

01100.13 COST BREAKDOWN

AS PART OF THE SUBCONTRACTOR'S RESPONSIBILITIES UNDER ARTICLE A.14 OF THE RUST "GENERAL TERMS AND CONDITIONS," THE SUBCONTRACTOR SHALL, WITHIN 10 DAYS AFTER NOTICE TO PROCEED, SUBMIT A COST BREAKDOWN ALLOCATING THE TOTAL CONTRACT AMOUNT INTO THE VARIOUS CATEGORIES SHOWN ON ATTACHMENT NO. 2 TO THIS SECTION. THIS COST BREAKDOWN IS FOR THE USE OF THE OPERATING CONTRACTOR, AND IS IN ADDITION TO ANY COST BREAKDOWN REQUESTED BY THE CONSTRUCTION MANAGER FOR PAYMENT REQUEST PURPOSES. ATTACHMENT NO. 2 SHALL NOT BE USED FOR INVOICING PURPOSES.

MATERIAL/EQUIP'T/ITEM DESCRIPTION	SHOP DWGS	CAT./CURVES	LIST ONLY	FIN. SMPL	PHYS SMPL	MAT/PER CERTIF.	TECH SPECS	ENG'G CALCS	PARTS LIST	IOM MNLS	M.S. D.S.	TEST REPT	WIRING DIAGRM	PIPING DIAGRM
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
SECTION NO.: 02050							G							
DEMOLITION PLAN														
SECTION NO.: 02100														
CHEMICALS														
FENCING	A													
MATERIALS AND ACCESSORIES TESTS		B										L		
SECTION NO.: 03300														
CONCRETE WORK (COMPLETED)						F								
MATERIALS						F								
MIX DESIGN							G							
REINFORCING STEEL TESTS	A											L		
SECTION NO.: 05500														
BOLLARDS & POSTS	A													
GRATING	A													
SHOP PRIMER						F								
SECTION NO.: 09701														
APPLICATION INSTRUCTIONS														
BASE SLAB MOISTURE CONDITIONS						F	G							
INSTALLATION CONDITIONS						F	G							
INSTALLATION LIST							G							
MANUFACTURER'S SPECIFICATIONS							G							
PRE-INSTAL. INSPECTION REPORT							G							
PRODUCT SAFETY INFORMATION							G							
SAMPLE PANELS							G							
SPECIAL WARRANTY TESTS							G					L		
SECTION NO.: 09702														
APPLICATION INSTRUCTIONS														
BASE SLAB MOISTURE CONDITIONS						F	G							
INSTALLATION CONDITIONS						F	G							
INSTALLATION LIST							G							
MANUFACTURER'S SPECIFICATIONS							G							
PRE-INSTAL. INSPECTION REPORT							G							
PRODUCT SAFETY INFORMATION							G							
SAMPLE PANELS							G							

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ATTACHMENT NO. 2 TO SECTION 01100
COST BREAKDOWN FOR ESTIMATE RECONCILIATION
COVERED CONTROLLED STORAGE PAD, PLANT 1
PHASES A AND B

ITEM NO.	<u>COST/CONTRACT ITEM</u>	<u>LABOR AND MATERIALS, TOTAL PER ITEM</u>
1.	GENERAL - PRIME AND GEN. CONDITIONS	\$ _____
2.	CONCRETE RESTORATION	\$ _____
3.	FRAME SUPPORTED STRUCTURE	\$ _____
4.	ELECTRICAL	\$ _____
TOTAL CONTRACT AMOUNT		\$ _____

1. BREAKDOWN MUST EQUAL THE SUBCONTRACTOR'S TOTAL CONTRACT AMOUNT. CONTINGENCY, ESCALATION, OVERHEAD, PROFIT AND BONDING SHALL BE PROPORTIONATELY SPREAD AMONG THE ITEMS.
2. ITEMS 2 THROUGH 4 ARE CONSIDERED AS SUB-SUBCONTRACTS UNDER ITEM 1. ANY ADDITIONAL SUB-SUBCONTRACTS NOT SHOWN ARE TO BE INCLUDED WITH ITEM 1. ANY ADDITIONAL LEVELS OF SUB-SUBCONTRACTING NOT SHOWN ARE TO BE INCLUDED WITH THE LEVEL IMMEDIATELY ABOVE.

DIVISION 1

01101 - SCHEDULE OF DRAWINGS

01101.01 DRAWINGS

THE FOLLOWING DRAWINGS ARE HEREBY MADE A PART OF THIS CONTRACT:

<u>FMPC DWG. NO.</u>	<u>AMK SHEET NO.</u>	<u>TITLE</u>	<u>REV.</u>	<u>DATE</u>
74B-4445-X-00063	X-1	COVER SHEET	0	7-14-89
74B-4445-C-00064	C-1	CONSTRUCTION PHASING	0	7-14-89
74B-4445-C-00065	C-2	PHASE A - PAD EXTENSION	0	7-14-89
74B-4445-C-00066	C-3	PHASE B - FABRIC STRUCTURES	0	7-14-89
74B-4445-C-00068	C-5	SITE DETAILS	0	7-14-89
74B-4445-E-00069	E-1	ELECTRICAL SITE PLAN	0	7-14-89
74B-4445-E-00070	E-2	ELECTRICAL DEMOLITION PLAN	0	7-14-89
74B-4445-E-00071	E-3	ELECTRICAL DETAILS	0	7-14-89
74B-4445-P-00072	P-1	SITE DRAINAGE	0	7-14-89

DIVISION 2

02050 - DEMOLITION

02050.01 SCOPE OF WORK

A. WORK SPECIFIED UNDER THIS SECTION

PROVIDE ALL NECESSARY LABOR, MATERIALS, TOOLS, DEVICES AND EQUIPMENT, REQUIRED TO COMPLETE THE FOLLOWING DEMOLITION WORK:

- COORDINATE REMOVAL OF EXISTING CONCRETE PAD AND CURBS, REMOVAL OF EXISTING FENCING, AND REMOVAL OF EXISTING UTILITY POLES
- PROVIDE DEMOLITION PLAN AND SCHEDULE GIVING SPECIAL ATTENTION TO RELOCATION OF EXISTING STORED ITEMS BY OPERATING CONTRACTOR

ALL DEMOLITION WORK SHALL BE PERFORMED IN ACCORDANCE WITH CURRENT FMPC OPERATING PROCEDURES, INCLUDING THOSE FOR DEMOLITION OF CONTAMINATED MATERIALS.

A WRITTEN PLAN FOR THE DEMOLITION OF THE EXISTING FACILITIES SHALL BE SUBMITTED TO AND APPROVED BY THE CONSTRUCTION MANAGER PRIOR TO THE INITIATION OF ANY SUCH OPERATIONS. SUCH PLAN SHALL INCLUDE ABATEMENT METHODS, AIR MONITORING PROCEDURES, PROTECTION EQUIPMENT INCLUDING RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING, AND A TRAINING PROGRAM FOR SUBCONTRACTOR'S EMPLOYEES.

B. RELATED WORK INCLUDED UNDER OTHER SECTIONS

- PAINING OF NEW WORK
- REMOVAL OF FENCING AND UTILITY POLES

02050.02 PROTECTION FROM DEMOLITION OPERATIONS

A. FIRE PROTECTION

WHENEVER A CUTTING TORCH OR OTHER EQUIPMENT THAT MIGHT CAUSE A FIRE IS USED, PROVIDE AND MAINTAIN FIRE EXTINGUISHERS AND OTHER FIRE FIGHTING EQUIPMENT AS REQUIRED BY THE CONSTRUCTION MANAGER AND THE FMPC OPERATING CONTRACTOR.

AN FMPC WORK PERMIT IS REQUIRED PRIOR TO ANY FLAME CUTTING OR WELDING OPERATION.

B. BARRIERS

PROVIDE SAFEGUARDS, INCLUDING WARNING SIGNS, BARRICADES AND PROTECTION REQUIRED TO PROTECT EXISTING CONSTRUCTION AND EQUIPMENT, AND TO PROTECT PEDESTRIANS AND VEHICULAR TRAFFIC FROM FALLING MATERIAL. PROTECT FMPC PROPERTY AT ALL TIMES.

02050.03 COORDINATION

A. OTHER SUBCONTRACTORS

COORDINATE WORK WITH OTHER SUBCONTRACTORS AND AFFORD THEM REASONABLE OPPORTUNITY TO COMPLETE THEIR WORK.

B. FMPC OPERATIONS

CONDUCT ALL WORK SO AS NOT TO INTERFERE WITH NORMAL OPERATIONS OF THE FMPC. ACCESS TO THE ENTRANCES OF EXISTING BUILDINGS MUST BE MAINTAINED AT ALL TIMES.

02050.04 WORKMANSHIP

CAREFULLY REMOVE ALL MATERIALS.

PROVIDE ALL REQUIRED BRACING, SHORING AND SUPPORTS. THE SUBCONTRACTOR IS RESPONSIBLE FOR THE STRUCTURAL ADEQUACY OF ALL WORK.

BURNING OF WASTE MATERIALS IS PROHIBITED.

EXERCISE EXTREME CARE IN DEMOLITION AND REMOVAL WORK FOR SAFETY OF PERSONNEL AND SO AS NOT TO DAMAGE ADJACENT CONSTRUCTION. REPAIR ALL DAMAGE TO FMPC PROPERTY, MATERIALS OR EQUIPMENT AS REQUIRED.

THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ANY AUXILIARY STRUCTURAL STEEL REQUIRED TO SUPPORT EXISTING COMPONENTS DURING DEMOLITION OPERATIONS. THE DESIGN OF ENCLOSURES NECESSARY TO CONTROL OR CONTAIN EMISSIONS, OR AFFORD WEATHER PROTECTION, IS ALSO THE RESPONSIBILITY OF THIS SUBCONTRACTOR.

SEGREGATION AND HANDLING OF DEMOLISHED MATERIALS SHALL BE PERFORMED IN ACCORDANCE WITH FMPC-720, CONTROL OF CONSTRUCTION WASTE.

REMOVE AND CAREFULLY LOWER HEAVY ITEMS, IN ACCORDANCE WITH OSHA REQUIREMENTS FOR CRANE AND HOIST OPERATIONS.

02050.05 DISPOSITION OF MATERIALS

ALL MATERIALS AND ITEMS REMOVED SHALL BE DISPOSED OF ON THE FMPC RESERVATION AS DIRECTED BY THE CONSTRUCTION MANAGER.

02050.06 CLEANUP

PROMPTLY REMOVE FROM THE SITE, ON A DAILY BASIS, ALL DEBRIS RESULTING FROM OPERATIONS UNDER THIS SPECIFICATION.

AT THE CONCLUSION OF ALL WRECKING AND REMOVAL WORK, REMOVE FROM THE PREMISES ANY REMAINING DEBRIS AND ALL EQUIPMENT USED FOR WRECKING AND REMOVAL WORK, AND LEAVE THE PREMISES CLEAN.

DIVISION 2

02100 - SITE PREPARATION, EARTHWORK AND APPURTENANT WORK

02100.01 SCOPE OF WORK

A. WORK SPECIFIED UNDER THIS SECTION

PERFORM ALL WORK SPECIFIED HEREIN AS INDICATED. THIS WORK INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING:

- REMOVAL OF EXISTING FENCING
- STRIPPING
- EXCAVATING TO GRADE
- EXCAVATING AND BACKFILLING FOR FOUNDATIONS
- PROVIDING FINISH LOAD-BEARING SUBGRADES FOR FOUNDATIONS, AND PAVEMENTS
- DISPOSAL OF REMOVED MATERIALS
- LABORATORY DENSITY TESTING
- FINISH SITE GRADING
- STONE TOPPING
- GRAVEL PAVEMENT

DRAWINGS INDICATE APPROXIMATE LOCATION OF KNOWN UNDERGROUND UTILITIES AND SERVICES. WHERE ANY INTERFERENCE IS ENCOUNTERED, WHETHER OR NOT SHOWN, REPORT TO CONSTRUCTION MANAGER AND PROCEED AS DIRECTED. WHERE DAMAGED, RESTORE FACILITIES TO THEIR ORIGINAL UNDAMAGED CONDITION.

B. RELATED WORK SPECIFIED UNDER OTHER SECTIONS

EARTHWORK FOR ELECTRICAL AND MECHANICAL WORK

02100.02 DENSITY CONTROL

A. TESTS

WHERE DENSITY OR DEGREE OF COMPACTION OF A SOIL IS HEREINAFTER SPECIFIED AS A PERCENTAGE, IT REFERS TO PERCENTAGE OF MAXIMUM DENSITY OF THAT SOIL, AS DETERMINED BY TESTS THEREON PERFORMED IN THE LABORATORY, IN ACCORDANCE WITH AASHTO STANDARD METHOD T-99 OR ASTM D 698, METHOD A OR D AS APPLICABLE.

TESTS FOR DENSITY AND MOISTURE OF SOIL IN PLACE TO CONFORM TO EITHER ASTM D 2922, ASTM D 3017, AASHTO T-191 OR AASHTO T-205.

THE DENSITIES SPECIFIED ARE TO HAVE MOISTURE CONTENT WITHIN PLUS OR MINUS 3 PERCENTAGE POINTS OF OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE LABORATORY.

B. LABORATORY

THE CONSTRUCTION MANAGER WILL ARRANGE AND PAY FOR SERVICES OF AN INDEPENDENT LABORATORY, HEREINAFTER REFERRED TO AS THE LABORATORY, TO PERFORM NECESSARY QUALITY CONTROL TESTING FOR EARTHWORK.

C. MATERIAL SAMPLES

COOPERATE WITH LABORATORY PERSONNEL IN OBTAINING SAMPLES, AND DURING QUALITY CONTROL TESTING.

02100.03 HAUL AND ACCESS ROADS

MAINTAIN EXISTING ROADS, USED DURING CONSTRUCTION, IN A CLEAN CONDITION, FREE OF MUD AND DEBRIS. LEAVE ALL ROADS IN CONDITION FOUND AT BEGINNING OF CONTRACT.

02100.04 SITE CONDITIONS

A. INTERFERENCES - UNDERGROUND

EXISTING SERVICES ARE OF VITAL IMPORTANCE TO THE EXISTING FACILITY. IN PROVIDING PROTECTION, TAKE EVERY PRECAUTION TO ENSURE AGAINST DAMAGE TO SUCH SERVICES BY OPERATIONS UNDER THIS SECTION.

WHERE WORK IS REQUIRED IN VICINITY OF EXISTING UNDERGROUND SERVICES, THE USE OF POWER EXCAVATING EQUIPMENT BELOW 6 INCHES ABOVE TOP OF SUCH SERVICES WILL NOT BE PERMITTED. PERFORM WORK OF EXCAVATION AND BACKFILL SO AS TO AVOID DAMAGE TO SUCH SERVICES.

B. SPECIAL PRECAUTIONS

PROVIDE ALL BARRICADES AND PROTECTION REQUIRED TO PROTECT EXISTING UTILITIES, CONSTRUCTION, AND EQUIPMENT, AND TO PROTECT PEDESTRIAN AND VEHICULAR TRAFFIC. PROTECT OPERATING CONTRACTOR'S PROPERTY AT ALL TIMES. MAINTAIN VEHICLE ACCESS, WHEN TRENCHING ACROSS PAVEMENT, AS SPECIFIED IN SECTION 01100.

C. PATCHING

REPAIR OR REPLACE ALL EXISTING SERVICES OR OTHER ITEMS OF PROPERTY REMOVED, DISTURBED, OR INJURED DURING OPERATIONS UNDER THIS SECTION AND NOT SPECIFIED OR SHOWN TO BE REMOVED OR OCCUPIED BY NEW STRUCTURES. THESE ARE TO MATCH IN MATERIAL, QUALITY, DIMENSIONS AND APPEARANCE, REMAINING ADJACENT INSTALLATION OR THE ORIGINAL INSTALLATION PRIOR TO DAMAGE.

02100.05 WATER CONTROL

CONDUCT EARTHWORK OPERATIONS UNDER THIS DIVISION TO ENSURE AGAINST RAINWASH AND THE SILTING OF ADJOINING AREA PROPERTY RESULTING THEREFROM. PROVIDE SILT FENCES AROUND INLETS. SHOULD SUCH SILTING OCCUR, RESTORE SUCH AREA TO LINES, GRADES, AND CONDITIONS SHOWN AND SPECIFIED.

PERFORM ALL EARTHWORK IN THE DRY. PRIOR TO INITIATING ANY EXCAVATION, PROVIDE DEWATERING EQUIPMENT AT SITE OF ACCEPTABLE TYPE, CONDITION AND CAPACITY, AND MAINTAIN IN CONDITION FOR IMMEDIATE USE WHEN CONDITIONS WARRANT.

KEEP EXCAVATIONS DRY BY PUMPING OR OTHER ACCEPTABLE MEANS AND METHODS. PLACE DEWATERING FACILITIES IN OPERATION AS SOON AS CONDITIONS WARRANT, OR WHEN DIRECTED. MAINTAIN IN OPERATION ON A 24 HOUR BASIS IF NECESSARY, INCLUDING WEEKENDS AND HOLIDAYS, UNTIL DANGER OF PONDING WATER IN THE AFFECTED AREA IS PAST.

SHOULD THE SUBCONTRACTOR FAIL TO PROMPTLY INITIATE DEWATERING PROCEDURES WHEN DIRECTED, THE RIGHT IS RESERVED TO HAVE THE WORK PERFORMED BY OTHERS AT SUBCONTRACTOR'S EXPENSE.

CONTROL GRADES IN VICINITY OF EXCAVATIONS TO PREVENT SURFACE WATER RUNNING INTO EXCAVATED AREAS.

02100.06 SOIL MATERIALS

A. SUITABLE MATERIALS

SUITABILITY OF MATERIALS FOR PROVIDING SUBGRADES OR FOR USE IN CONSTRUCTING SUBGRADES AND FILL SHALL BE DETERMINED BY THE LABORATORY.

B. UNSUITABLE MATERIALS

DO NOT USE ANY OF THE FOLLOWING MATERIALS FOR LOAD-BEARING SUBGRADES OR FOR CONSTRUCTION OF SUBGRADES, OR FILLS, UNLESS SPECIFICALLY AUTHORIZED:

- ROCK AND/OR CONCRETE PIECES LARGER THAN 2 INCHES IN MAJOR DIMENSIONS
- MATERIALS THAT ARE FROZEN
- MATERIALS CONTAINING MORE MOISTURE THAN WILL PERMIT SPECIFIED DEGREE OF COMPACTION AS DETERMINED BY LABORATORY
- MATERIALS CONTAINING DEBRIS OR UNACCEPTABLE PROPORTIONS OF ORGANIC MATERIALS AS DETERMINED BY LABORATORY
- MATERIALS CLASSIFIED BY ASTM D 2487 AS CH, MH, ML, OH, OL OR PT

C. GRANULAR MATERIALS

WHERE A MATERIAL IS HEREINAFTER REFERRED TO AS "GRANULAR," IT DESIGNATES A MATERIAL CLASSIFIED AS GW, GP, SW, GM, GC OR SP, AS DEFINED IN ASTM D 2487.

D. BANK RUN GRAVEL

WHERE BANK RUN GRAVEL IS HEREINAFTER REFERRED TO, IT MEANS A NATURAL GRAVEL, 100 PERCENT PASSING THE 2 INCH SIEVE, NOT LESS THAN 70 PERCENT RETAINED ON THE NO. 8 SIEVE, AND NOT MORE THAN 5 PERCENT PASSING THE 200 MESH SIEVE.

E. GRANULAR BASE MATERIAL

NATURAL GRAVEL OR CRUSHED STONE CONFORMING TO FOLLOWING GRADATION:

<u>SIEVE SIZE</u>	<u>PERCENT PASSING</u>
1-1/2 INCH	100
3/4 INCH	55-100
NO. 4	20-65
NO. 10	10-40
NO. 40	0-15
NO. 200	0-5

F. TOPSOIL

LOOSE, FRIABLE AND LOAMY MATERIAL WITHOUT ADMIXTURES OF SUBSOIL, REFUSE OR ANY FOREIGN MATERIALS, CONTAINING AT LEAST 5 PERCENT, BUT NOT MORE THAN 20 PERCENT ORGANIC MATTER, FREE FROM STUMPS, ROOTS, HARD DIRT, STIFF CLAY, LARGE ROCKS, WEEDS, BRUSH AND SIMILAR MATERIALS.

02100.07 DISPOSAL OF MATERIAL

A. DEBRIS

REMOVED DEBRIS, VEGETATION, UNSUITABLE SOIL AND TRASH SHALL BE DISPOSED OF AS DIRECTED BY THE CONSTRUCTION MANAGER.

B. TOPSOIL

DEPOSIT REMOVED MATERIALS SUITABLE FOR TOPSOIL IN TEMPORARY STOCKPILES ON SITE IN LOCATIONS AS AUTHORIZED OR DIRECTED.

C. SUITABLE MATERIALS

DEPOSIT REMOVED SUITABLE MATERIALS NOT IN EXCESS OF REQUIREMENTS EITHER DIRECTLY ON SUBGRADES PREPARED TO RECEIVE FILL OR IN TEMPORARY STOCKPILES ON SITE WHERE AUTHORIZED OR DIRECTED.

D. STOCKPILES

DEPOSIT MATERIALS STOCKPILED FOR REUSE IN AUTHORIZED LOCATIONS ON SITE AND NOT ABOVE ELEVATIONS AUTHORIZED. SPREAD MATERIALS IN A MANNER WHICH WILL PERMIT REUSE. SLOPE AND COMPACT AS NECESSARY TO ENSURE AGAINST RAINWASH.

E. UNAUTHORIZED PLACEMENT

WHEN SO DIRECTED, PROMPTLY REMOVE ANY SPOIL OR STOCKPILE MATERIALS PLACED IN UNAUTHORIZED LOCATIONS OR TO UNAUTHORIZED ELEVATIONS. SHOULD THE SUBCONTRACTOR FAIL TO REMOVE SUCH MATERIALS WITH REASONABLE PROMPTNESS, THE CONSTRUCTION MANAGER RESERVES THE RIGHT TO HAVE SUCH MATERIALS REMOVED AT SUBCONTRACTOR'S EXPENSE.

02100.08 CLEARING AND GRUBBING

A. MISCELLANEOUS MATERIAL

REMOVE ALL EXISTING MISCELLANEOUS MATERIALS ENCOUNTERED, INCLUDING, BUT NOT LIMITED TO:

- EXPOSED OR BURIED DEBRIS
- FOUNDATIONS
- SIMILAR MATERIALS NOT OTHERWISE SHOWN OR SPECIFIED TO BE REMOVED OR RETAINED

B. VEGETATION

REMOVE FROM WITHIN THE GRADING AREA ANY EXISTING VEGETATION. GRUB THE AREA, REMOVING STUMPS AND ROOTS LARGER THAN 2 INCHES IN DIAMETER TO A DEPTH OF 2 FEET BELOW FINISH GRADES.

C. PAVEMENTS

REMOVE PAVING MATERIALS FROM AREAS INDICATED, OR ELSEWHERE AS NECESSARY FOR NEW WORK.

WHERE PORTIONS OF EXISTING PAVEMENTS ARE SHOWN TO REMAIN OR TO FORM BASE OF OVERLAYS, CUT LIMIT LINES WITH ACCEPTABLE POWER-DRIVEN SAWS TO A DEPTH NOT LESS THAN 2 INCHES AND IN STRAIGHT LINES BEFORE STARTING DEMOLITION AND/OR REMOVAL.

02100.09 REMOVAL OF EXISTING FENCING

PRIOR TO INITIATING ANY WORK IN VICINITY OF EXISTING FENCING TO BE REMOVED, REMOVE EXISTING FENCING, WIRE FABRIC, CAPS AND ACCESSORIES.

REMOVE POSTS AND FOOTINGS IN THEIR ENTIRETY. ALLOW 15 MINUTES FOR EACH FOOTING TO BE RADIOLOGICALLY MONITORED PRIOR TO DISPOSITION/DISPOSAL. PROVIDE THREE DAYS NOTICE TO THE CONSTRUCTION MANAGER PRIOR TO REMOVING CONCRETE FOOTINGS.

ALL MATERIALS REMAIN THE PROPERTY OF FMPC. STORE AS DIRECTED BY THE CONSTRUCTION MANAGER.

02100.10 STRIPPING

STRIP GROUND SURFACES WITHIN GRADING AREA TO DEPTHS AS NECESSARY TO REMOVE EXISTING TOPSOIL OR STONE TOPPING, AS DETERMINED BY THE CONSTRUCTION MANAGER, BUT IN NO EVENT LESS THAN 8 INCHES.

02100.11 EXCAVATION

A. GENERAL

PERFORM EXCAVATION FOR ROUGH SUBGRADES AND FOR LINE CUTS REMOVING WHATEVER SUBSTANCES ENCOUNTERED WITHIN GRADING AREA.

UNLESS ELSEWHERE SPECIFIED OTHERWISE, OPENCUT METHODS ARE PERMITTED FOR EXCAVATION PROVIDED RESULTING BANKS WILL BE STABLE AT ALL TIMES. SHOULD IT APPEAR THAT EXPOSED SLOPES MAY BECOME UNSTABLE OR WHERE OPEN CUTS SUBJECT TO THE ABOVE RESTRICTION ARE IMPRACTICABLE, BRACE AND SHEET SUCH SLOPES.

B. EXCAVATION FOR LOAD-BEARING SUBGRADES

IN ADDITION TO REQUIREMENTS LISTED ABOVE, EXCAVATE AS FOLLOWS FOR LOAD-BEARING SUBGRADES:

LEAVE AMPLE ROOM WHERE NECESSARY FOR CONSTRUCTION, INSPECTION AND REMOVAL OF FORMS.

WHERE UNSUITABLE MATERIALS INCLUDING EXCESSIVELY WET MATERIALS, ARE ENCOUNTERED WITHIN THE LINES AND BELOW LOAD-BEARING SUBGRADES, EXCAVATE TO DEPTHS AS NECESSARY OR DIRECTED TO REACH SUITABLE MATERIALS. BACKFILL WITH SUITABLE MATERIAL AS SPECIFIED FOR BACKFILL TO THE SUBGRADES INDICATED.

WHERE POWER EQUIPMENT OTHER THAN BLADE GRADER OR SCRAPER IS USED FOR EXCAVATION, STOP EXCAVATION 6 INCHES ABOVE SUBGRADE AND HAND EXCAVATE TO PROPER LEVELS LEAVING BEARING SURFACE SMOOTH AND LEVEL.

WHERE EXCAVATION IS PERFORMED WITH A BLADE GRADER OR SCRAPER, EXCAVATE TO SUBGRADE AND PROOFROLL TO UNCOVER SOFT SPOTS WITH A NONVIBRATING SMOOTH WHEELED ROLLER IMPARTING A MINIMAL 150 POUNDS PER INCH CONTACT PRESSURE, A NONVIBRATING 2,500 POUND PER TIRE PNEUMATIC TIRE ROLLER WITH A TIRE PRESSURE OF 36 POUNDS PER SQUARE INCH, OR OTHER ACCEPTABLE ROLLERS CAPABLE OF A MINIMAL EQUIVALENT CONTACT PRESSURE. WHERE SOFT SPOTS ARE ENCOUNTERED, EITHER SCARIFY AND RECOMPACT AS SPECIFIED FOR FINISH LOAD-BEARING SUBGRADES OR EXCAVATE AS DIRECTED AND REPLACE WITH COMPACTED FILL.

02100.11 FILL AND BACKFILL

A. GENERAL FILL

FILL WITH SUITABLE MATERIALS TO SUBGRADES IN CONFORMANCE WITH REQUIREMENTS FOR FILLING, AS SPECIFIED BELOW, EXISTING DEPRESSIONS AND HOLES, AND THOSE LEFT BY GRUBBING, STRIPPING, OR EXCAVATION.

DO NOT USE UNSUITABLE MATERIALS IN FILL NOR PLACE FILL ON OR AGAINST FROZEN SURFACES, UNSUITABLE MATERIAL OR SUITABLE MATERIAL OF IMPROPER DENSITY. LEAVE WORK AREAS IN CLEAN CONDITION WITH SLOPES AS REQUIRED FOR NATURAL DRAINAGE.

PRIOR TO PLACING FILL ON AREAS TO RECEIVE FILL, ARRANGE FOR LABORATORY TO TEST SURFACES TO DETERMINE IN-PLACE DENSITY AND MOISTURE CONTENT AND WHETHER EXPOSED MATERIALS ARE SUITABLE. WHERE THE DENSITY IS LESS THAN 95 PERCENT, SCARIFY SUBGRADE TO A DEPTH OF 6 INCHES, SEMIPULVERIZE MATERIAL IN PLACE BY DISCING, AND RECOMPACT TO DENSITY OF 95 PERCENT.

ON IN SITU SUBGRADES WHICH ARE OVERCOMPACTED, AS DETERMINED BY THE LABORATORY, SCARIFY SURFACES AS SPECIFIED ABOVE SO THAT FILL MATERIAL WILL BOND WITH EXISTING SURFACES.

ACCOMPLISH COMPACTION EMPLOYING EQUIPMENT SUITABLE AND SATISFACTORY FOR THE COMPACTION OF THE SPECIFIC MATERIAL USED.

PLACE FILL IN 8 INCH LAYERS OF COMPACTED THICKNESS AND COMPACT TO A DENSITY OF 95 PERCENT IN AREAS BELOW STRUCTURES AND PAVEMENT AND TO A DENSITY OF 95 PERCENT, MINIMUM, BELOW AREAS TO BE COVERED WITH STONE TOPPING.

B. BACKFILL

AFTER FOUNDATIONS ARE COMPLETED TO ELEVATIONS ABOVE SUBGRADES FOR FILL, BACKFILL WITH SUITABLE EXCAVATED MATERIAL OR BORROWED GRANULAR MATERIAL. BEFORE BACKFILLING, REMOVE ALL FORMS AND DEBRIS. BACKFILL IN HORIZONTAL LAYERS NOT IN EXCESS OF 4 INCHES IN THICKNESS, LOOSE MEASUREMENT, AND WITH MOISTURE CONTENT SUCH THAT THE REQUIRED DEGREE OF COMPACTION MAY BE OBTAINED. BACKFILL WITHIN CURBS TO SUBGRADE ELEVATIONS. BACKFILL OUTSIDE OF CURBS TO FINISH SITE GRADES AND SO THAT DRAINAGE IS AWAY FROM PAD.

COMPACT EACH LAYER TO DENSITY OF 95 PERCENT BY HAND OR MECHANICAL TAMPERS OR BY OTHER SUITABLE EQUIPMENT. DO NOT COMPACT MATERIAL BY PUDDLING, JETTING OR ANY OTHER COMPACTING PROCESS USING ONLY WATER.

BACKFILL SIMULTANEOUSLY ON BOTH SIDES OF VERTICAL STRUCTURAL ELEMENTS, SO THAT LEVELS OF BACKFILLS ARE AT ALL TIMES EQUAL ON EACH SIDE OF SUCH VERTICAL ELEMENTS. WHERE THIS IS IMPRACTICABLE, OR OTHERWISE INDICATED, MAKE SURE THAT AFFECTED STRUCTURAL ELEMENT IS PROPERLY BRACED AGAINST POSSIBLE LOADS IMPOSED BY WEDGING ACTION OF FILLING OPERATIONS.

02100.12 FINISH LOAD-BEARING SUBGRADES

IMMEDIATELY PRIOR TO PLACING FOUNDATIONS, BASE, OR GRAVEL PAVEMENT ON A SUBGRADE, HAVE SURFACE DENSITY CHECKED BY LABORATORY. WHERE DENSITY IS LESS THAN 95 PERCENT OR WHERE ADDITIONAL FILL IS NECESSARY, SCARIFY AND SEMIPULVERIZE TOP SURFACE OF AREA TO DEPTH OF 12 INCHES AND RECOMPACT TOGETHER WITH NECESSARY FILL TO A DENSITY OF 95 PERCENT. BRING SUBGRADE TO FINISHED SURFACE, REASONABLY SMOOTH AND COMPACTED, FREE FROM IRREGULAR SURFACE CHANGES, AND NOT ABOVE THE REQUIRED FINISH GRADE OR SUBGRADE ELEVATIONS. TEST AGAIN PRIOR TO PLACING BASE OR FOUNDATION.

02100.13 FINISH SITE GRADING

BRING AREAS TO BE FINISH GRADED TO FINISHED SURFACES REASONABLY SMOOTH, COMPACTED, AND FREE FROM IRREGULAR SURFACE CHANGES. THE DEGREE OF FINISH AND COMPACTION IS THAT ORDINARILY OBTAINABLE FROM EITHER BLADE GRADER OR SCRAPER OPERATIONS.

FINISH GRADE THE AREAS TO RECEIVE TOPPING TO FINISHED SURFACES NOT MORE THAN 1.5 INCHES ABOVE OR BELOW THE REQUIRED ELEVATIONS OR ACCEPTABLE CROSS SECTION TO RECEIVE THE TOPPING.

PROVIDE FINISH SURFACES IN DITCHES AND SWALES.

02100.14 STONE TOPPING

A. MATERIALS

STONE TOPPING - CRUSHED LIMESTONE AGGREGATE, ASTM C 33 SIZE NO. 57.

B. GRADE PREPARATION

BRING SUBGRADE TO GRADE AND CROSS SECTION NOT ABOVE THE REQUIRED ELEVATION FOR BASE OF TOPPING AND COMPACTED TO A DENSITY OF 95 PERCENT.

AFTER SUBGRADES HAVE BEEN BROUGHT TO PROPER GRADE, THOROUGHLY TILL TO A DEPTH OF 6 INCHES AND APPLY A SUITABLE PLANT POISON IN QUANTITIES SUFFICIENT TO ENSURE AGAINST GERMINATION AND/OR GROWTH OF ANY PLANTS IN AREAS TREATED. TREAT EARTH IN STRICT ACCORDANCE WITH INSTRUCTIONS OF MANUFACTURER OF THE POISON. USE ONLY UNITED STATES ENVIRONMENTAL PROTECTION AGENCY APPROVED POISONS. SUBMIT MATERIAL SAFETY DATA SHEET. AFTER SURFACES HAVE BEEN TREATED, RECOMPACT AND SMOOTH GRADE AS SPECIFIED ABOVE FOR FINISH SITE GRADING.

C. PLACING TOPPING

SPREAD MATERIAL ON SUBGRADE TO A DEPTH OF 3 INCHES, AND RAKE TO PROVIDE A RELATIVELY SMOOTH TOP SURFACE NOT BELOW REQUIRED FINISH ELEVATIONS.

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02100.15 GRAVEL PAVEMENT

PROVIDE GRAVEL PAVEMENT OF SOUND CRUSHED LIMESTONE, CRUSHED GRAVEL OR OTHER ACCEPTABLE MATERIAL.

MATERIALS, GRADATION AND CONSTRUCTION TO CONFORM TO OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS, ITEM 411.

DIVISION 2

02400 - STORM DRAINAGE

02400.01 SCOPE OF WORK

A. WORK SPECIFIED UNDER THIS SECTION

PERFORM ALL WORK AS SPECIFIED OR INDICATED TO COMPLETE STORM DRAINAGE WORK AND ALL RELATED WORK AS SHOWN AND SPECIFIED. THIS WORK INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING:

RAISING EXISTING CATCH BASINS
PLUGGING EXISTING CATCH BASINS
CONSTRUCTING CATCH BASINS AND INLETS
CONNECTING INTO EXISTING DRAINAGE STRUCTURE
PROVIDING SLOTTED VANE DRAIN

B. RELATED WORK SPECIFIED UNDER OTHER SECTIONS

EARTHWORK FOR FOUNDATIONS
SITE CLEARANCE
FINISH SITE GRADING

C. ITEMS DEFINED AND SPECIFIED IN SECTION 02100

PERFORM ALL WORK IN ACCORDANCE WITH THE FOLLOWING APPLICABLE REQUIREMENTS OF SECTION 02100:

PATCHING
DENSITY CONTROL
DISPOSAL OF MATERIALS

02400.02 APPLICABLE STANDARDS

THE APPLICABLE RECOMMENDATIONS IN THE LATEST ISSUE OF THE LISTED PUBLICATIONS OF THE FOLLOWING AUTHORITIES ARE INCORPORATED HEREIN BY REFERENCE:

AISI "HANDBOOK OF STEEL DRAINAGE AND HIGHWAY CONSTRUCTION PRODUCTS", HEREINAFTER REFERRED TO AS "AISI HANDBOOK"
AMERICAN CONCRETE PIPE ASSOCIATION (ACPA) "CONCRETE PIPE HANDBOOK", HEREINAFTER REFERRED TO AS "ACPA HANDBOOK"
CLAY SEWER PIPE ASSOCIATION (CSPA) "CLAY PIPE ENGINEERING MANUAL," HEREINAFTER REFERRED TO AS "CSPA MANUAL"

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02400.03 MATERIALS

A. SOIL MATERIALS

SOIL MATERIALS ARE AS SPECIFIED IN SECTION 02100 AND AS FOLLOWS:

BANK RUN GRAVEL - A NATURAL GRAVEL, 100 PERCENT PASSING THE 2 INCH SIEVE NOT LESS THAN 70 PERCENT RETAINED ON THE NO. 8 SIEVE, AND NOT MORE THAN 5 PERCENT PASSING THE 200 MESH SIEVE.

COARSE AGGREGATE - ASTM C 33, SIZE NO. 7 OR NO. 8.

FINE AGGREGATE - A NATURAL SAND GRADED IN ACCORDANCE WITH ASTM C 33.

B. PIPE

ALL PIPING 12 INCHES AND LARGER (EXCEPT FOR SLOTTED VANE DRAIN):

REINFORCED CONCRETE PIPE - ASTM C 76, SIZES AND CLASS AS SHOWN, OR CLASS IV WHERE CLASS IS NOT SHOWN. PROVIDE WITH JOINTS CONFORMING TO ASTM C 443.

ALL PIPING 10 INCHES AND SMALLER:

CLAY PIPE - PIPE, ASTM C 700, JOINTS, ASTM C 425.

SLOTTED VANE DRAIN PIPING:

PVC PLASTIC PIPE - ASTM D 3034-SDR 35

USE RING - TITE JOINT, OR APPROVED EQUAL, TO MEET ASTM D 3212, FOR PLASTIC TO PLASTIC AND ACCEPTABLE OTHER TYPES FOR PLASTIC TO METAL, CONTROL, OR TILE.

C. SLOTTED VANE DRAIN

PROVIDE SLOTTED VANE DRAIN ASSEMBLY COMPRISED OF PVC PIPE, AS SPECIFIED HEREINBEFORE, AND NEENAH MODEL R-3599 OR APPROVED EQUAL, CAST-IRON SLOTTED VANE DRAIN SECTIONS. ENTIRE ASSEMBLY TO BE CAST IN CONCRETE. INSTALLATION TO BE PER MANUFACTURER'S RECOMMENDATIONS.

D. CONCRETE

PROVIDE CONCRETE HAVING A MINIMUM COMPRESSIVE STRENGTH OF 3,000 POUNDS PER SQUARE INCH IN 28 DAYS AND WITH 3 TO 6 PERCENT ENTRAINED AIR. PROVIDE DEFORMED REINFORCING STEEL CONFORMING TO ASTM A 615 OR A 616, GRADE 40 MINIMUM. PROVIDE SMOOTH RUBBED FINISH ON EXPOSED CONCRETE SURFACES.

PROVIDE MATERIALS, FORMS, AND WORKMANSHIP CONFORMING WITH APPLICABLE PROVISIONS OF SECTION 03300.

E. CASTINGS

CAST IRON, AS MANUFACTURED BY NEENAH FOUNDRY COMPANY OR APPROVED EQUAL. CAST-IRON FRAMES, GRATES, LIDS, AND OTHER CASTINGS.

F. SURFACE DRAIN/CLEANOUT

PROVIDE NEENAH, MODEL R-4350, OR APPROVED EQUAL, CAST-IRON BEEHIVE GRATE-MOUNTED IN BELL END OF 18 INCH DIAMETER CONCRETE PIPE PER DRAWINGS.

02400.04 EXCAVATION AND TRENCHING

EXCAVATE TO A MINIMUM 6 INCHES BELOW BOTTOM OF PIPE AS SPECIFIED HEREINBEFORE, AND AS FOLLOWS. MAINTAIN TRENCH BANKS AS NEARLY VERTICAL AS POSSIBLE. REMOVE EXCESS EARTH. KEEP EXCAVATIONS DRY. MAKE WIDTH OF VERTICALLY WALLED TRENCHES NO LARGER THAN 8 INCHES ON EITHER SIDE OF PIPE BARREL FROM BOTTOM TO SPRING LINE, AND NO WIDER THAN NECESSARY ABOVE SPRING LINE FOR PROPER PERFORMANCE OF WORK. WHERE WET OR UNSUITABLE MATERIAL FOR PROPER SUPPORT OF PIPE IS ENCOUNTERED, REMOVE SUCH MATERIAL TO DEPTH REQUIRED. OVERDEPTH EXCAVATION MUST BE PERFORMED FOR FULL WIDTH OF TRENCH AND THEN BACKFILLED WITH BANK RUN GRAVEL TO THE PROPER GRADE AND COMPACTED IN ACCORDANCE WITH THE REQUIREMENTS FOR BEDDING AS SPECIFIED BELOW.

WHERE PIPES ARE PLACED IN FILL, PLACE FILL TO NOT LOWER THAN 1 FOOT ABOVE THE PIPE AS SPECIFIED IN SECTION 02100 FOR FILL AND EXCAVATE INTO COMPACTED FILL AS SPECIFIED ABOVE.

IN LIEU OF VERTICAL-SIDED TRENCHES, THE CONTRACTOR MAY, AT HIS OPTION, USE OPENCUT METHODS FOR EXCAVATION, PROVIDED THAT SIDES OF TRENCHES ARE KEPT VERTICAL TO 1 FOOT ABOVE TOP OF PIPES.

02400.05 BEDDING

PROVIDE BEDDING IN CONFORMANCE WITH APPLICABLE RECOMMENDATIONS OF THE FOLLOWING STANDARDS.

FOR CONCRETE PIPE - CLASS B (FIRST CLASS) BEDDING AS DEFINED IN THE ACPA HANDBOOK, WITH A 6 INCH MINIMUM BED OF GRANULAR MATERIAL.

FOR CLAY PIPE - ASTM C 12 FOR CLASS C BEDDING.

BACKFILL TO ELEVATION ABOVE BOTTOM QUADRANT WITH BANK RUN GRAVEL COMPACTED TO 95 PERCENT DENSITY. IMMEDIATELY BEFORE LAYING PIPE, ROUND PIPE BED TO ACCOMMODATE BOTTOM QUADRANT OF PIPE AND EXCAVATE AT JOINTS SO THAT PIPE WILL BE UNIFORMLY SUPPORTED FOR ITS ENTIRE LENGTH.

02400.06 ENTRANCES TO EXISTING DRAINAGE STRUCTURES

WHERE NECESSARY, CUT HOLES INTO EXISTING DRAINAGE STRUCTURES BY METHODS WHICH WILL NOT RESULT IN DAMAGE THERETO AND WILL RESULT IN CLEAN CUT WALLS OF PROPER SIZE. CALK AROUND OPENING BETWEEN STRUCTURE WALL AND PIPE BY PACKING SOLID WITH OAKUM TO WITHIN 1 INCH OF WALL SURFACE ON EACH SIDE, AND CALKING REMAINING SPACE ON EACH SIDE FULL WITH CELOTEX THERMOTEX B, OR APPROVED EQUAL.

02400.07 PIPE LAYING

THOROUGHLY INSPECT AND FIT PIPES BEFORE PLACING INTO TRENCHES. LAY LINES TO UNIFORM GRADE BETWEEN ELEVATIONS INDICATED OR AT GRADE SPECIFIED. USE ENGINEER'S LEVEL FOR ESTABLISHING GRADES AND SLOPES. USE GRADE BOARDS, GRADE CORD, PLUMB BOB AND MEASURING STICK TO TRANSFER GRADES FROM BENCH MARKS TO FLOW LINE OF PIPE. MAKE ALL JOINTS IN CONFORMANCE WITH RECOMMENDATIONS OF MANUFACTURER AND AS FURTHER SPECIFIED BELOW.

LAY PIPE IN CONFORMANCE WITH APPLICABLE RECOMMENDATIONS AND PROVISIONS OF FOLLOWING STANDARDS AND AS FURTHER SPECIFIED BELOW:

- FOR CONCRETE PIPE - ACPA HANDBOOK
- FOR CLAY PIPE - ASTM C 12
- FOR PLASTIC PIPE - ASTM D 2321

READ ALL INSTRUCTIONS FROM CONSTRUCTION MANAGER BEFORE BEGINNING ANY WORK ON GROUND PROVIDING QUESTIONABLE SUPPORT. PROVIDE FIRM BED FOR BARREL OF PIPE. PIPE MUST NOT REST ON JOINT WHEN BROUGHT TO GRADE. SET EACH LENGTH TO GRADE AND LINE BEFORE MAKING JOINT.

KEEP WATER OUT OF PIPES UNTIL JOINTS HAVE BEEN MADE. CLOSE ALL OPEN ENDS OF PIPING DURING CONSTRUCTION TO PREVENT EARTH ENTERING LINES. CLEAN SURFACES OF JOINTS AND INTERIOR OF ALL PIPE BEFORE MAKING JOINTS.

02400.08 BACKFILLING

AFTER PIPE IS INSTALLED, BACKFILL TO 1 FOOT ABOVE TOP OF PIPE WITH BANK RUN GRAVEL.

BACKFILL IN LAYERS NOT MORE THAN 4 INCHES THICK, USING CARE TO AVOID DISPLACING PIPE. POWER TAMP EACH LAYER TO A DENSITY OF 95 PERCENT.

FOR FILL ABOVE 1 FOOT ABOVE TOP OF PIPE, PROCEED AS FOLLOWS.

IN AREAS TO BE COVERED BY SUBGRADES FOR PAVEMENTS OR STRUCTURES, COMPLETE BACKFILL TO ELEVATION AND DENSITY OF FINISH SUBGRADE AS SPECIFIED HEREINBEFORE FOR FILL.

IN ALL OTHER AREAS COMPLETE BACKFILLING TO DENSITY SPECIFIED HEREINBEFORE FOR SITE FILLING. MOUND TOP OF BACKFILL SLIGHTLY ABOVE FINISHED GRADE. USE ONLY SUITABLE MATERIALS. DO NOT USE MATERIAL WHICH IS UNSUITABLE OR CONTAINS LARGE CLODS, OR LARGE STONES. IF AVAILABLE MATERIAL WHICH WOULD OTHERWISE BE SUITABLE IS FROZEN OR WET AT THE TIME THE TRENCHES MUST BE BACKFILLED, TO AVOID DELAY IN OTHER WORK ON THE PROJECT, BACKFILL WITH BANK RUN GRAVEL OR OTHER ACCEPTABLE GRANULAR MATERIAL.

02400.09 CONCRETE CATCH BASINS

CONSTRUCT PRECAST OR CAST-IN-PLACE CONCRETE CATCH BASINS AS SPECIFIED HEREIN.

SUBMIT SHOP DRAWINGS FOR REVIEW.

FOUNDATION - POURED REINFORCED CONCRETE.

CATCH BASIN - PRECAST OR CAST-IN-PLACE REINFORCED CONCRETE. PROVIDE PRECAST OPENINGS IN SIDE OF CATCH BASIN OF PROPER SIZE FOR PIPE SHOWN.

CALKING - CALK AROUND OPENING BETWEEN CATCH BASIN AND PIPE BY PACKING SOLID WITH OAKUM TO WITHIN 1 INCH OF CATCH BASIN WALL SURFACE ON EACH SIDE, AND CALK REMAINING SPACE ON EACH SIDE FULL WITH CELOTEX THERMOTEX B, OR APPROVED EQUAL.

TOP - CAST-IRON FRAME, SOLID LID OR GRATING, AND OTHER CASTINGS AS SPECIFIED ABOVE OR SHOWN ON DRAWINGS.

DIVISION 3

03300 - CONCRETE WORK

03300.01 SCOPE OF WORK

A. WORK SPECIFIED IN THIS SECTION

FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES NECESSARY TO COMPLETE ALL CAST-IN-PLACE CONCRETE WORK, INCLUDING FORMWORK, REINFORCING STEEL AND ALL RELATED WORK AS SHOWN AND SPECIFIED, EXCEPT AS SPECIFICALLY EXCLUDED HEREINAFTER.

IN ADDITION TO CONSTRUCTION OF CAST-IN-PLACE CONCRETE WORK, THE WORK INCLUDES THE ITEMS LISTED BELOW:

- SETTING ANCHOR BOLTS AND OTHER ITEMS INDICATED TO BE EMBEDDED IN CONCRETE (PHASE A)
- VAPOR BARRIER
- LABORATORY FIELD TESTING SERVICES
- REMOVING SURFACE OF EXISTING CONCRETE PAD AND CURBS
- RENOVATION OF EXISTING CONTAMINATED JOINTS AND CRACKS

COOPERATE WITH AFFECTED PERSONNEL IN SETTING AND/OR FASTENING ANCHOR BOLTS, SLEEVES, PIPING, CONDUITS, AND SIMILAR ITEMS IN THE FORMS, WHERE SUCH ITEMS ARE TO BE FURNISHED AND INSTALLED UNDER OTHER DIVISIONS.

REFER TO SECTION 01100 FOR ADDITIONAL INFORMATION AND REQUIREMENTS REGARDING SUBMITTALS.

B. RELATED WORK SPECIFIED UNDER OTHER SECTIONS

- FURNISHING ANCHOR BOLTS FOR STRUCTURES
- GROUTING OF BASEPLATES
- POLYURETHANE ELASTOMER/WEARING SURFACE
- EPOXY FLOOR COATING
- EPOXY COATING

03300.02 APPLICABLE STANDARDS

PROVIDE ALL MATERIALS AND PERFORM ALL WORK IN ACCORDANCE WITH ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" AND THE REFERENCE SPECIFICATIONS LISTED THEREIN.

03300.03 HOT AND COLD WEATHER CONDITIONS

PLACEMENT AND CURING OF CONCRETE UNDER THE REQUIREMENTS SPECIFIED HEREIN IS LIMITED TO AMBIENT TEMPERATURES BETWEEN 40F AND 90F. WHEN TEMPERATURES ARE TO BE OUTSIDE THESE TEMPERATURE LIMITATIONS, SUBMIT PROPOSED PROCEDURES FOR PROTECTION OF CONCRETE DURING PLACEMENT AND CURING.

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USE OF CALCIUM CHLORIDE IS PROHIBITED.

03300.04 CONCRETE MATERIALS

READY-MIXED CONCRETE CONFORMING TO ASTM C 94, HAVING PROPERTIES SPECIFIED UNDER PROPORTIONING, AND USING MATERIALS SPECIFIED UNDER THIS SUBSECTION.

PORTLAND CEMENT -ASTM C 150, TYPE I EXCEPT THAT FOR AIR-ENTRAINED CONCRETE, TYPE IA MAY BE USED.

AIR-ENTRAINING ADMIXTURES - ASTM C 260.

WATER-REDUCING ADMIXTURES - ASTM C 494, TYPE A.

NO ACCELERATORS OR ADMIXTURES CONTAINING CHLORIDES WILL BE PERMITTED.

USE FRESH, CLEAN AND DRINKABLE WATER FOR CONCRETE.

COARSE AND FINE AGGREGATE TO CONFORM TO ASTM C 33. FOR COARSE AGGREGATES, USE SIZE 57.

03300.05 PROPORTIONING

PROVIDE CONCRETE HAVING THE MIX SPECIFIED FOR EACH CLASS OF CONCRETE IN THE FOLLOWING LIST.

NORMAL WEIGHT TYPE I CEMENT CONCRETE

FOUNDATION CONCRETE NOT EXPOSED TO WEATHER: (PHASE A)

MIX NO:	FMPC #1
SPECIFIED STRENGTH (28 DAYS)	3000 PSI
TOTAL AIR CONTENT:	N/A
SPECIFIED SLUMP:	4" ± 1"
MAXIMUM AGGREGATE SIZE:	1"
MAXIMUM WATER/CEMENT RATIO:	0.68
MINIMUM CEMENT CONTENT:	470#

* WATER REDUCING AND RETARDING ADMIXTURES AS REQUIRED.

MISCELLANEOUS CONCRETE EXPOSED TO WEATHER:

MIX NO:	FMPC #2
SPECIFIED STRENGTH (28 DAYS):	3000 PSI
TOTAL AIR CONTENT:	5% ± 1-1/2%
SPECIFIED SLUMP:	4" ± 1"
MAXIMUM AGGREGATE SIZE:	1"
MAXIMUM WATER/CEMENT RATIO:	0.45
MINIMUM CEMENT CONTENT:	517#

* WATER REDUCING AND RETARDING ADMIXTURES AS REQUIRED.

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EXTERIOR PAD AND PAVEMENT/4000 PSI STRUCTURAL CONCRETE EXPOSED TO WEATHER:

MIX NO:	FMPC #4
SPECIFIED STRENGTH (28 DAYS):	4000 PSI
TOTAL AIR CONTENT:	5% ± 1-1/2%
SPECIFIED SLUMP:	4" ± 1"
MAXIMUM AGGREGATE SIZE:	1"
MAXIMUM WATER/CEMENT RATIO:	0.45
MINIMUM CEMENT CONTENT:	564#

* WATER REDUCING AND RETARDING ADMIXTURES AS REQUIRED.

PROVIDE CONCRETE HAVING ENTRAINED AIR CONTENTS WITHIN THE LIMITS SPECIFIED FOR EACH CLASS OF CONCRETE AS DETERMINED BY ASTM C 231.

03300.06 PRODUCTION OF CONCRETE

PROVIDE SITE DELIVERY TICKETS FOR EACH BATCH OF CONCRETE SHOWING FOLLOWING:

- BATCH NUMBER, VOLUME, AND DATE
- TIME OF LOADING
- DESIGN 28 DAY COMPRESSIVE STRENGTH
- APPROVED DESIGN MIX NUMBER

DO NOT ADD WATER TO MIX ON JOB PRIOR TO PLACEMENT, UNLESS AUTHORIZED IN WRITING BY THE CONSTRUCTION MANAGER'S REPRESENTATIVE. NOTE ON DELIVERY TICKET AMOUNT OF WATER ADDED AND NAME OF PERSON AUTHORIZING.

03300.07 PLACING CONCRETE

A. GENERAL

TIE REINFORCING BARS IN PROPER POSITION PRIOR TO PLACING CONCRETE.

PROVIDE SUFFICIENT TIME FOR INSPECTION OF PREPARATORY WORK BEFORE PROCEEDING WITH PLACING OF CONCRETE.

IMMEDIATELY PRIOR TO PLACING CONCRETE PAD OR FOUNDATION, LIGHTLY SPRINKLE SEMIPOROUS SUBGRADE SUFFICIENTLY TO ELIMINATE SUCTION.

DO NOT PLACE CONCRETE ON FROZEN GROUND.

B. CONSOLIDATION

PROVIDE INTERNAL VIBRATORS HAVING A MINIMUM FREQUENCY OF 8,000 VIBRATIONS PER MINUTE AND SUFFICIENT AMPLITUDE TO CONSOLIDATE THE CONCRETE AS DESCRIBED IN TABLE 5.1.4 OF ACI 309.

DO NOT USE VIBRATORS TO TRANSPORT CONCRETE WITHIN FORMS.

VIBRATE FULL DEPTH FOR PERIODS AND AT INTERVALS TO ENSURE CONSOLIDATION AND ELIMINATE AIR POCKETS BUT NOT SUFFICIENT TO CAUSE SEGREGATION OR LOSS OF AIR ENTRAINMENT.

C. FINISHING

FINISH CONCRETE PAD AND PAVEMENT IN ACCORDANCE WITH THE FOLLOWING FINISH AND TOLERANCE. FINISH AND TOLERANCE ARE AS SPECIFIED IN ACI 301. SURFACE OF CONCRETE TO RECEIVE POLYURETHANE ELASTOMER/WEARING SURFACE SHALL BE AS RECOMMENDED BY THE MANUFACTURER OF THE WEARING SURFACE.

DUSTING OF PAD OR PAVEMENT WITH CEMENT OR OTHER MATERIALS TO ABSORB EXCESS BLEED WATER IS STRICTLY PROHIBITED.

<u>ITEM</u>	<u>TOLERANCE CLASS</u>	<u>FINISH</u>
EXTERIOR PAD AND PAVEMENT	B	TROWELED

03300.08 REINFORCEMENT

A. GENERAL

DETAILS OF CONCRETE REINFORCEMENT AND ACCESSORIES NOT COVERED HEREIN OR SHOWN ON DRAWINGS TO BE IN ACCORDANCE WITH ACI 315.

SECURE REINFORCEMENT IN PROPER POSITION AND THOROUGHLY CLEAN OF ICE, LOOSE RUST, SCALE, GREASE OR OTHER COATINGS.

B. REINFORCING MATERIALS

FOR REINFORCING SHOWN PROVIDE DEFORMED BARS CONFORMING TO ASTM A 615, OR A 616 GRADE 60, EXCEPT THAT NO. 3 AND NO. 4 RODS USED FOR TIES MAY BE GRADE 40, YIELD STRENGTH NOT LESS THAN 40,000 PSI.

WELDED WIRE FABRIC - ASTM A 185 PLAIN WIRE FABRIC IN FLAT SHEETS. WELDED WIRE FABRIC IN ROLLS IS NOT ACCEPTABLE.

SMOOTH DOWELS - ASTM A 615 AND A 616, PLAIN BARS, MINIMUM YIELD STRENGTH OF 40,000 PSI.

ACCESSORIES TO CONFORM TO ACI SP-66.

WHERE REINFORCING RODS ARE USED AS SUPPORTS, USE RODS NO LIGHTER THAN NO. 5.

WHERE CONCRETE SURFACES ARE EXPOSED, MAKE THOSE PORTIONS OF ALL ACCESSORIES IN CONTACT WITH THE CONCRETE SURFACE OR WITHIN 1/2 INCH THEREOF, OF PLASTIC OR STAINLESS STEEL.

C. PLACING

PLACE REINFORCING IN CONFORMANCE WITH THE REQUIREMENTS OF CRSI. PLACE REINFORCEMENT IN PROPER POSITION PRIOR TO PLACING CONCRETE. PLACING REINFORCEMENT DURING CONCRETE PLACEMENT WILL NOT BE PERMITTED.

UNLESS OTHERWISE SHOWN OR INDICATED, PROVIDE MINIMUM CONCRETE PROTECTIVE COVERING FOR REINFORCEMENT AS FOLLOWS:

CONCRETE DEPOSITED AGAINST THE GROUND, 3 INCHES FORMED SURFACES EXPOSED TO WEATHER OR IN CONTACT WITH THE GROUND, 2 INCHES FOR REINFORCING BARS NO. 6 OR LARGER, AND 1-1/2 INCHES FOR REINFORCING BARS NO. 5 OR SMALLER

SUPPORT REINFORCING FOR PAD AND PAVEMENT ON STAGGERED CONCRETE BRICKS OR METAL OR PLASTIC BAR CHAIRS AND SPACERS WITH METAL PLATES.

UNLESS SPECIFICALLY AUTHORIZED, DO NOT BEND REINFORCEMENT PARTIALLY EMBEDDED IN HARDENED CONCRETE.

SUPPORT AND FASTEN DOWELS IN THE FORMWORK PRIOR TO PLACING CONCRETE. DO NOT PLACE DOWELS AFTER CONCRETE IS IN PLACE.

03300.09 JOINTS

A. GENERAL

CONSTRUCT JOINTS AS INDICATED. SAW CONTROL JOINTS WITHIN 4 TO 12 HOURS AFTER SLAB HAS BEEN PLACED AND FINISHED CONFORMING TO ACI 302.

LOCATION OF ANY CONSTRUCTION JOINT NOT SHOWN IS SUBJECT TO REVIEW AND ACCEPTANCE.

WHERE REINFORCING IS CONTINUOUS THROUGH A JOINT, PROVIDE SPLICE LENGTHS REQUIRED BY ACI 315.

B. JOINT MATERIALS

HORIZONTAL JOINT SEALER - TWO-COMPONENT SELF-LEVELING URETHANE CONFORMING TO FEDERAL SPECIFICATION TT-S-227E, TYPE I, CLASS A. COLOR TO MATCH CONCRETE. ACCEPTABLE PRODUCTS ARE:

<u>TYPE</u>	<u>MANUFACTURER</u>
DARASEAL-U	A. C. HORN
SONOLASTIC PAVING JOINT SEALER	SONNEBORN
POURTHANE	W. R. MEADOWS
OR APPROVED EQUAL	

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EPOXY BOND - 2-COMPONENT 100 PERCENT SOLIDS EPOXY RESIN, AMINE CURED. ACCEPTABLE MATERIALS ARE EUCLID CHEMICAL COMPANY NO. 463 EPOXY, GENERAL POLYMERS SBA 3574, AND SIKA CORPORATION SIKADURHIMOD.

EPOXY GROUT - EPOXY BOND FILLED WITH SUITABLE MINERAL FILLER, 100 PERCENT PASSING THE NO. 100 SIEVE, IN RATIO TO ENSURE THIXOTROPIC ACTION WITHOUT IMPAIRMENT OF ADHESIVE PROPERTIES.

C. DOWELED SLIP JOINTS

USE COMPLETELY SMOOTH ROUND BARS FOR DOWELS.

FOR CONSTRUCTION JOINTS, PAINT HALF OF BAR WITH ALKYD-OIL PAINT. WHEN DRY, COAT PAINTED END WITH SATISFACTORY GREASE TO ENSURE AGAINST BOND WITH CONCRETE.

PLACE IN FORMS TO ENSURE THAT BARS ARE PERPENDICULAR TO JOINT FACE. STOP REINFORCEMENT AT DOWELED SLIP JOINTS SO THAT IT WILL NOT EXTEND THROUGH JOINT.

D. BONDED JOINTS

WHERE SPECIFIED OR REQUIRED, BOND CONSTRUCTION JOINTS USING EPOXY BOND AS SPECIFIED ABOVE UNDER ARTICLE "JOINT MATERIALS." CONFORM TO APPLICABLE REQUIREMENTS AND RECOMMENDATIONS OF ACI 503.2 CONTINUE ALL REINFORCING THROUGH BONDED CONSTRUCTION JOINTS.

E. PLACING DOWELS IN EXISTING CONCRETE

USE SMOOTH ROUND BARS AS DOWELS UNLESS OTHERWISE SHOWN. DRILL HOLES IN EXISTING CONCRETE OF SIZE 1/2 INCH LARGER IN DIAMETER THAN THE DOWEL USING POWER-DRIVEN DRILL WITH TUNGSTEN-CARBIDE TIPPED BIT GROUND TO ENSURE AGAINST OVERSIZE HOLE. CLEAN OUT HOLES WITH AIR. THOROUGHLY SWAB SURFACES OF HOLE AND EMBEDDED PORTION OF DOWEL WITH EPOXY BOND. WHILE SURFACES ARE STILL WET, FILL HOLE 3/4 FULL OF EPOXY GROUT. FORCE DOWEL INTO PLACE. WIPE OFF EXCESS GROUT AND LET SET FOR NOT LESS THAN 12 HOURS AT A TEMPERATURE ABOVE 60F.

03300.10 FORMWORK

A. GENERAL

OBSERVE AND CHECK FORMWORK CONTINUOUSLY WHILE CONCRETE IS BEING PLACED TO DETERMINE THAT THERE ARE NO EVIDENCES OF CHANGES OF ELEVATIONS, PLUMBNESS, OR CAMBER. IF, DURING CONSTRUCTION, ANY SUCH EVIDENCE OR OTHER DEFECT APPEARS, STOP THE WORK, REMOVE CONCRETE PLACED, IF NECESSARY, AND REPAIR FORMWORK OR SUPPORTS BEFORE PROCEEDING.

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EARTH CUTS MAY BE USED AS FORMS FOR FOOTINGS IF SIDES ARE SHARP AND TRUE, IF CONCRETE IS NOT EXPOSED IN FINISHED STRUCTURE, AND IF CONCRETE IS NOT REQUIRED TO HAVE SURFACE TREATMENT OF ANY KIND.

B. FORMWORK MATERIALS

MAKE FORMS OF LUMBER, PLYWOOD, METAL OR OTHER MATERIALS SUITABLE TO PROVIDE THE STRENGTH AND TOLERANCES SPECIFIED HEREINBEFORE AND THE SURFACE FINISHES SPECIFIED HEREINAFTER.

FOR FORMING EXPOSED SURFACES USE ANY OF THE FOLLOWING MATERIALS AS SUITABLE FOR THE SPECIFIED FINISH, AND TO PRODUCE SMOOTH UNIFORM SURFACES, TRUE-TO-LINE, IN ORDER THAT SURFACES PRODUCED WILL REQUIRE LITTLE FINISHING:

NEW PLASTIC-BONDED NATURAL PLYWOOD, AMERICAN PLYWOOD ASSOCIATION, HD OVERLAY PLYFORM CLASS I, EXT-APA, OR EQUAL
TEMPERED CONCRETE-FORM-GRADE HARDBOARD
METAL FREE FROM IRREGULARITIES, DENTS AND SAGS

C. PREPARATION OF FORM SURFACES

WHERE JOINTS IN WOODEN FORMS HAVE BEEN OPENED BY SHRINKAGE OF WOOD, WET DOWN SUCH FORMS IMMEDIATELY PRIOR TO PLACING CONCRETE UNTIL JOINTS ARE CLOSED BY SWELLING.

FORMS ARE TO BE SECURED IN PROPER POSITION AND ALIGNMENT, CLEANED, THOROUGHLY WET (EXCEPT USE OIL IN FREEZING WEATHER), AND FREE OF ALL DEBRIS, SNOW AND ICE.

D. REMOVAL OF FORMS

FORMWORK IS TO REMAIN IN PLACE IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN SUBSECTION "CURING AND PROTECTION," HOWEVER, PROVIDE AT LEAST THREE FULL CURING DAYS.

FULL CURING DAYS WILL BE DETERMINED BY CUMULATIVE NUMBER OF DAYS OR FRACTIONS THEREOF DURING WHICH THE TEMPERATURE OF THE AIR IN CONTACT WITH THE CONCRETE IS ABOVE 50F.

WHENEVER FORMWORK IS REMOVED DURING CURING PERIOD, CONTINUE CURING OF BOTH UNEXPOSED AND EXPOSED CONCRETE AS SPECIFIED IN SUBSECTION "CURING AND PROTECTION."

03300.11 REPAIR OF SURFACE DEFECTS

A. GENERAL

PATCH ALL TIE HOLES AND REPAIR ALL HONEYCOMBED AND DEFECTIVE AREAS IMMEDIATELY AFTER FORM REMOVAL.

FOR SURFACES OTHER THAN THOSE TO BE BACKFILLED AGAINST, USE PATCHING MORTAR.

FOR SURFACES TO BE BACKFILLED AGAINST, USE MASTIC DAMPPROOFING COMPOUND, EXCEPT THAT WHERE REINFORCING IS EXPOSED, USE PATCHING MORTAR.

REMOVE ALL HONEYCOMBED AND DEFECTIVE CONCRETE DOWN TO SOUND CONCRETE PRIOR TO PATCHING. THOROUGHLY CLEAN TIE HOLES OF DIRT AND DEBRIS.

B. PATCHING MORTAR

CUT EDGES OF HONEYCOMBED AND DEFECTIVE CONCRETE TO FORM DOVE-TAIL (UNDERCUT) JOINTS. NO FEATHEREDGES WILL BE PERMITTED.

PATCH WITH CEMENT MORTAR AS SPECIFIED IN ACI 301, OR WITH PROPRIETARY PATCHING COMPOUNDS, EXCEPT THAT PROPRIETARY PATCHING MIXTURES MAY NOT BE USED ON EXPOSED SURFACES.

ACCEPTABLE PROPRIETARY PATCHING MIXTURES ARE:

L&M CONSTRUCTION CHEMICALS - EVERBOND
EUCLID CHEMICAL CORPORATION - POLY PATCH
SIKA - SIKASET MORTAR
OR APPROVED EQUAL

C. MASTIC DAMPPROOFING COMPOUND

PATCH FULL DEPTH OF HOLE, FLUSH WITH SURFACE, WITH EMULSIFIED ASPHALT MASTIC HEAVY VISCOSITY FOR TROWEL APPLICATION. PREPARE AND PLACE IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS. ACCEPTABLE PRODUCTS ARE:

W. R. MEADOWS - SEALMASTIC TROWEL MASTIC
EUCLID CHEMICAL COMPANY - DAMPPROOFING ASPHALT COATINGS
SONNEBORN - HYDROCID 700 MASTIC
OR APPROVED EQUAL

03300.12 FINISHING OF FORMED SURFACES - GENERAL

AFTER REMOVAL OF FORMS, GIVE SURFACES OF CONCRETE THE FOLLOWING FINISHES AS SPECIFIED IN ACI 301.

<u>SURFACE</u>	<u>FINISH</u>
UNEXPOSED	ROUGH FORM
EXPOSED TO PUBLIC VIEW	SMOOTH FORM

03300.13 CURING AND PROTECTION

A. GENERAL

CURE PAD AND PAVEMENT FOR THE FIRST 72 HOURS BY THE USE OF FOG SPRAYING, SPRINKLING OR CONTINUOUSLY WET ABSORPTIVE MATS OR FABRIC. CONTINUE CURING BY USE OF MOISTURE RETAINING COVER UNTIL CONCRETE HAS OBTAINED ITS SPECIFIED 28 DAY COMPRESSIVE STRENGTH.

FOR ALL CAST-IN-PLACE CONCRETE, CONCRETE FORMWORK IS TO BE MAINTAINED IN A MOIST CONDITION UNTIL RESULTS OF COMPRESSIVE STRENGTH TESTS ARE OBTAINED AND ARE SATISFACTORY. ALL FORMED SURFACES MUST BE PROTECTED AGAINST LOSS OF MOISTURE FOR A MINIMUM OF 7 DAYS FOLLOWING THE PLACING OF THE CONCRETE BY USE OF A WATER SPRAY, WATER SATURATED FABRIC OR LIQUID MEMBRANE CURING COMPOUND. MAINTAIN FORMS AND CONCRETE IN MOIST CONDITION UNTIL 28 DAY COMPRESSIVE STRENGTH IS OBTAINED.

B. MATERIALS

WHERE MOISTURE RETAINING MEMBRANES ARE USED FOR CURING, PROVIDE ONLY MATERIALS CONFORMING TO THE FOLLOWING REQUIREMENTS:

- POLYETHYLENE FILM - ASTM C 171, TYPE II
- WATERPROOF PAPER - ASTM C 171, TYPE I
- ABSORPTIVE COVER - AASHTO M 182, CLASS 3, BURLAP CLOTH MADE FROM JUTE OR KENAF OR ASTM C 440 COTTON MATS

DO NOT USE MOISTURE RETAINING CURING COMPOUNDS FOR CURING SURFACES TO RECEIVE THE FOLLOWING COVERINGS, UNLESS IT HAS BEEN DEMONSTRATED THAT SUCH COMPOUNDS WILL NOT PREVENT BOND OF:

- POLYURETHANE ELASTOMER/WEARING SURFACE
- EPOXY GROUT OR BONDING MATERIAL
- EPOXY COATINGS

C. TEMPERATURE, WIND AND HUMIDITY

DO NOT PERMIT CONCRETE NOT FULLY CURED TO BE EXPOSED TO EXCESSIVE TEMPERATURE CHANGES, OR HIGH WINDS.

03300.14 VAPOR BARRIER

APPLY ON SUBGRADE UNDER NEW CONCRETE SLAB-ON-GRADE, AND ON SCABBLED SURFACE OF EXISTING CONCRETE PAD, A VAPOR BARRIER CONSISTING OF HIGH DENSITY POLYETHYLENE FILM NOT THINNER THAN 12 MILS, CONFORMING TO ASTM D 2103 AND MEETING WATER RETENTION REQUIREMENTS OF ASTM C 171.

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PROVIDE FILM IN WIDTH AND LENGTH NOT LESS THAN 1 FOOT LARGER THAN DIMENSIONS OF SCABBLED SURFACE UNLESS PATENTLY IMPRACTICABLE. WHERE JOINTS ARE NECESSARY, LAP EDGES NOT LESS THAN 4 INCHES. TAKE CARE TO AVOID PUNCTURING FILM. TAPESEAL ALL SEAMS, JOINTS, TEARS, CUTS AND HOLES.

03300.15 CHEMICAL RESISTANT COATING - TRENCHES AND SUMPS

COAT THE ENTIRE INTERIOR SURFACE OF NEW TRENCHES AND SUMPS AND EXISTING INLETS WITH EPOXY FLOOR COATING AS SPECIFIED IN SECTION 09702.

03300.16 RENOVATION OF CONCRETE PAD

A. REMOVING CONCRETE SURFACE

SCABBLE OR MECHANICALLY ABRABE ENTIRE SURFACE OF EXISTING CONCRETE PAD TO REMOVE A MINIMUM OF 1/4 INCH OF SURFACE INCLUDING ALL LOOSE CONCRETE, LAITANCE, DIRT, GREASE, EXISTING COATINGS AND OTHER CONTAMINATING MATERIALS. EQUIPMENT TO BE FITTED WITH DUST COLLECTORS AND MEPA/HEPA FILTERS.

B. RESURFACING CONCRETE

AFTER REMOVING EXISTING SURFACE, PRIME THE EXISTING CONCRETE AND RESURFACE AREAS ROUGH IN TEXTURE OR WITH ABRUPT CHANGE IN SURFACE WITH SUITABLE LATEX CONCRETE. PROVIDE TROWELED FINISH MEETING SLOPES AND ELEVATIONS OF ADJACENT, CONTIGUOUS SURFACES.

03300.17 RENOVATION OF JOINTS AND CRACKS IN EXISTING SLABS

AFTER THE SURFACE OF THE EXISTING PAD HAS BEEN REMOVED AS SPECIFIED HEREINBEFORE, AND BEFORE ANY RESURFACING WORK BEGINS, THE OPERATING CONTRACTOR WILL RADIOLOGICALLY SURVEY ALL EXISTING JOINTS AND CRACKS TO DETERMINE LEVELS OF CONTAMINATION, IF ANY, IN SUCH JOINTS AND CRACKS.

ANY JOINTS OR CRACKS DETERMINED TO BE CONTAMINATED ARE TO BE CUT OUT AND REPLACED IN ACCORDANCE WITH THE DETAILS OR THE DRAWINGS, USING MATERIALS SPECIFIED HEREINBEFORE IN THIS SECTION.

THE SUBCONTRACTOR IS TO INCLUDE IN HIS BID ALL REQUIRED COSTS FOR THE RENOVATION OF 600 LINEAR FEET OF CONTAMINATED JOINTS AND CRACKS, INCLUDING THE TIME ALLOWANCE FOR THE OPERATING CONTRACTOR'S RADIOLOGICAL SURVEY OF SUCH JOINTS AND CRACKS.

03300.18 EMBEDDED ITEMS

PRIOR TO CONCRETING, PLACE EMBEDDED ITEMS TO BE PROVIDED UNDER THIS SECTION OR TO BE FURNISHED UNDER OTHER SECTIONS FOR INSTALLATION UNDER THIS SECTION.

GIVE ALL SUBCONTRACTORS WHOSE WORK IS RELATED TO THE CONCRETE OR MUST BE SUPPORTED BY IT, AMPLE NOTICE AND OPPORTUNITY TO INTRODUCE AND/OR FURNISH EMBEDDED ITEMS BEFORE THE CONCRETE IS PLACED.

SET ANCHOR BOLTS FOR THE FRAMED STRUCTURES AND LIGHT POLES IN ACCORDANCE WITH SETTING DRAWINGS OR TEMPLATES, FURNISHED BY THE VENDOR, WHICH HAVE BEEN REVIEWED AND FOUND SATISFACTORY.

WHERE HOLES IN CONCRETE FOR SUCH PURPOSES AS PASSAGeways FOR PIPES AND THE LIKE ARE SHOWN FORMED BY SLEEVES, THE SUBCONTRACTOR MAY, AT HIS OPTION, PROVIDE SUCH HOLES BY DRILLING WITH ACCEPTABLE DIAMOND OR TUNGSTEN CARBIDE TIPPED DRILL BITS.

03300.19 TESTING

A. GENERAL

THE CONSTRUCTION MANAGER WILL MAKE ARRANGEMENTS WITH AND PAY FOR SERVICES OF TESTING AGENCY FOR OBTAINING TEST SPECIMENS AND PERFORMING ROUTINE TESTING OF MATERIALS OF PROPOSED MIX DESIGNS AND OF RESULTING CONCRETE FOR COMPLIANCE WITH TECHNICAL REQUIREMENTS OF SPECIFICATIONS.

TESTING OF FIELD-CURED TEST CYLINDERS, OR TESTING REQUIRED BECAUSE OF CHANGES REQUESTED BY SUBCONTRACTOR IN MATERIALS OR PROPORTIONS OF THE MIX, AS WELL AS ANY EXTRA TESTING OF CONCRETE OR MATERIALS OCCASIONED BY FAILURE TO MEET SPECIFICATION REQUIREMENTS, TO BE AT SUBCONTRACTOR'S EXPENSE.

FAILURE OF THE TESTING LABORATORY TO DETECT ANY DEFECTIVE WORK OR MATERIALS IS NOT IN ANY WAY TO PREVENT LATER REJECTION WHEN SUCH DEFECT IS DISCOVERED, NOR IS IT TO OBLIGATE THE CONSTRUCTION MANAGER FOR FINAL ACCEPTANCE.

THE TESTING AGENCY AND/OR ITS REPRESENTATIVES ARE NOT AUTHORIZED TO REVOKE, ALTER, RELAX, ENLARGE OR RELEASE ANY REQUIREMENT OF THE SPECIFICATIONS, NOR TO APPROVE OR ACCEPT ANY PORTION OF THE WORK, NOR TO ACT AS SUPERVISOR OR PERFORM OTHER DUTIES FOR SUBCONTRACTOR.

B. SERVICES PROVIDED BY THE TESTING AGENCY

FIELD SAMPLING - SECURE FROM DIFFERENT BATCHES, ON A TRULY RANDOM BASIS, COMPOSITE SAMPLES FOR ALL FIELD TESTING REQUIRED BELOW IN ACCORDANCE WITH ASTM C 172 WHERE APPLICABLE. TAKE ALL SAMPLES AT DISCHARGE END OF CONVEYING SYSTEM. CLEARLY MARK EACH TEST SPECIMEN MASTER AS TO EXACT PART OF THE STRUCTURE REPRESENTED, CLASS OF CONCRETE, CURING CONDITIONS, TEMPERATURE OF CONCRETE, AND TIME AND DATE OF SAMPLE.

COMPRESSIVE STRENGTH TEST - MOLD AND CURE TEST CYLINDERS IN ACCORDANCE WITH ASTM C 31 AND TEST EACH CYLINDER FOR STRENGTH IN ACCORDANCE WITH ASTM C 39. TAKE ONE "TEST SET" CONSISTING OF THREE CYLINDERS FOR EACH DAY'S POUR OF 50 CUBIC YARDS OR LESS, AND ONE ADDITIONAL TEST SET FOR EVERY 50 CUBIC YARDS, OR PART THEREOF, THEREAFTER. TEST ONE CYLINDER AT 7 DAYS AND TWO AT 28 DAYS.

SLUMP TESTS - DETERMINE SLUMP RANGE FOR EACH "TEST SET" IN CONFORMANCE WITH ASTM C 143. PERFORM ADDITIONAL SLUMP TESTS WHEN DIRECTED BY THE CONSTRUCTION MANAGER.

AIR CONTENT TEST - DETERMINE AIR CONTENT FOR EACH "TEST SET" FOR AIR-ENTRAINED CONCRETE IN ACCORDANCE WITH ASTM C 231.

SUBMIT ONE COPY OF THE RESULTS OF EACH OF THE ABOVE TESTS AND INSPECTIONS TO THE SUBCONTRACTOR AND THE CONSTRUCTION MANAGER REPRESENTATIVE.

SHOULD ANY OF THE TEST RESULTS FAIL TO MEET THE REQUIREMENTS SPECIFIED, MAKE AN IMMEDIATE TELEPHONE REPORT TO THE SUBCONTRACTOR AND THE CONSTRUCTION MANAGER.

FURNISH EVALUATION REPORTS OF COMPRESSION TESTS AS RECOMMENDED BY ACI 214 WHEN ANY COMPRESSION TEST FAILS TO MEET THE SPECIFIED STRENGTH.

03300.20 ACCEPTANCE OF CONCRETE WORK

A. GENERAL

ACCEPTANCE OF CONCRETE WORK WILL BE MADE IN CONFORMANCE WITH ACI 301, EXCEPT THAT SUBCONTRACTOR MUST PAY ALL COSTS INCURRED FOR PROVIDING ANY ADDITIONAL TESTING OR ANALYSIS REQUIRED WHEN STRENGTH OF STRUCTURE IS CONSIDERED POTENTIALLY DEFICIENT.

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B. CRACKS

THE SUBCONTRACTOR WILL BE REQUIRED TO RESTORE, WITHOUT ADDITIONAL CONTRACT COST, ANY CONCRETE OR SURFACING WHICH DEVELOPS CRACKS WITHIN A PERIOD OF ONE YEAR AFTER PLACEMENT WHICH HAS NOT BEEN CAUSED BY ACTION OF OTHERS IN OVERSTRESSING THE CONCRETE.

REPAIR THE CRACKS BY MEANS THAT WILL RESTORE THE CRACKED AREA TO THE DESIGNED INTEGRITY AND APPEARANCE AND WHICH WILL NOT IMPAIR THE APPEARANCE OF THE AFFECTED SURFACES, IF EXPOSED. SUCH REPAIRS MUST BE PERFORMED BY AN ORGANIZATION HAVING SATISFACTORILY DEMONSTRATED ABILITY IN THE TECHNIQUES NECESSARY TO EFFECT SUCH REPAIRS. REPAIR WORK TO INCLUDE REPAIRS TO ALL COATINGS, TOPPING OR WEARING SURFACES.

DIVISION 5

05500 - MISCELLANEOUS METAL

05500.01 SCOPE OF WORK

A. WORK SPECIFIED IN THIS SECTION

PROVIDE MISCELLANEOUS METALWORK, INCLUDING:

BOLLARDS AND PIPE POSTS FOR DOOR CONTROLS
TRENCH AND SUMP GRATING

B. RELATED WORK SPECIFIED IN OTHER SECTIONS

FRAME SUPPORTED FABRIC STRUCTURES
FINISH PAINT, EXCEPT AS SPECIFIED

05500.02 SUBMITTALS

A. SHOP DRAWINGS

COORDINATE MISCELLANEOUS METALWORK WITH WORK OF GENERAL CONSTRUCTION, MECHANICAL AND ELECTRICAL TRADES PRIOR TO SUBMISSION OF COMPLETE SHOP DRAWINGS FOR REVIEW.

REFER TO SECTION 01100 FOR ADDITIONAL INFORMATION AND REQUIREMENTS REGARDING SUBMITTALS.

B. FIELD MEASUREMENTS

TAKE FIELD MEASUREMENTS AT JOBSITE TO VERIFY SHOP DRAWINGS. SUBMIT WRITTEN NOTIFICATION OF DISCREPANCIES BETWEEN FIELD CONDITIONS, SHOP DRAWINGS AND OTHER CONTRACT DOCUMENTS, TO CONSTRUCTION MANAGER.

05500.03 APPLICABLE STANDARDS

PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH APPLICABLE PROVISIONS OF LATEST EDITION OF FOLLOWING PUBLICATIONS.

A. AMERICAN WELDING SOCIETY (AWS)

STRUCTURAL WELDING CODE (AWS D1.1), LATEST EDITION, INCLUDING SUPPLEMENTS.

AN FMPC WELDING PERMIT IS REQUIRED PRIOR TO ANY FLAME CUTTING OR WELDING.

B. STEEL STRUCTURES PAINTING COUNCIL (SSPC)

STEEL STRUCTURES PAINTING MANUAL

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05500.04 FABRICATION, DELIVERY AND ERECTION

A. GENERAL

FABRICATE AND ERECT ACCORDING TO AISC CODE OF GENERAL PRACTICE. FIT WORK TOGETHER AT SHOP AS FAR AS POSSIBLE AND DELIVER TO JOB COMPLETE AND READY FOR ERECTION. MAKE PROVISIONS FOR SECURELY ANCHORING MISCELLANEOUS METALWORK. FABRICATE TO MEET REQUIREMENTS OF WORK UNDER OTHER SECTIONS OR SPECIFICATIONS AND SECURED TO MISCELLANEOUS METALWORK.

PROVIDE PROTECTION, PLANKING, COVERING, ETC., REQUIRED BY LAWS HAVING JURISDICTION. AT COMPLETION, REMOVE EQUIPMENT PROMPTLY.

B. FABRICATION

INSOFAR AS POSSIBLE, FIT AND SHOP ASSEMBLE ALL WORK. EXECUTE WORK IN STRICT ACCORDANCE WITH CONTRACT DOCUMENTS. WELDING TO BE DONE BY CERTIFIED WELDERS WITH EXPOSED JOINTS DRESSED FLUSH AND SMOOTH.

C. DELIVERY

PROVIDE WORK IN AMPLE TIME TO PREVENT DELAYS IN JOB PROGRESS. DELIVER ITEMS TO JOBSITE AT SUCH TIME AS REQUIRED FOR PROPER COORDINATION.

D. STORAGE

STACK AND SUPPORT MATERIALS WITH BLOCKING. STORE MATERIALS IN DRY AND CLEAN AREA AND REMOVE EARTH, GREASE AND OTHER FOREIGN MATTER FROM METAL SURFACES BEFORE ERECTING.

E. SHOP PAINTING

UNLESS OTHERWISE SPECIFIED, PAINT SURFACES OF MISCELLANEOUS METALWORK WITH ONE SHOP COAT OF METAL PROTECTIVE PRIMER. PREPARE SURFACES IN ACCORDANCE WITH STANDARDS OF STEEL STRUCTURES PAINTING COUNCIL SPECIFICATION SP-3 FOR POWER TOOL CLEANING, AND APPLY PAINT IN ACCORDANCE WITH SPECIFICATION PA-1, PAINT APPLICATION SPECIFICATIONS. DO NOT PAINT CONTACT SURFACES OF MEMBERS TO BE FIELD CONNECTED BY WELDS OR HIGH TENSILE BOLTS.

APPLY TWO COATS OF PRIMER TO SURFACES WHICH ARE INACCESSIBLE AFTER ASSEMBLY OR ERECTION.

APPLY PRIMER TO PROVIDE MINIMUM 2 MIL DRY THICKNESS PER COAT AT ALL POINTS.

PREPARE SURFACES AND PAINT ABRADED OR DAMAGED PAINT SURFACES OF STEEL, WELDS, AND HEADS AND NUTS OF FIELD BOLTS AFTER ERECTION WITH SAME SURFACE PREPARATION AND PAINT SPECIFIED FOR SHOP PAINTING.

PAINT AS MANUFACTURED BY:

SHERWIN-WILLIAMS - KEM KROMIK
PORTER PAINT CO. - NO. 298 GRAY PRIMER
PRATT & LAMBERT - NO. C-107 GRAY PRIMER, OR EQUAL

F. ERECTION

PROVIDE AND SET HANGERS, RODS, BARS, PLATES, BOLTS, BUTTS, SCREWS, ANCHORS, BRACKETS, RIVETS, WELDS, LUGS, ETC., AS MAY BE REQUIRED TO COMPLETE THIS WORK AND TO JOIN WORK OF OTHERS. WHEN EXPOSED, PROVIDE MATERIALS AND FINISHES IDENTICAL TO ADJACENT WORK.

PROVIDE BRACING, BLOCKING, CUTTING, FITTING, DRILLING, TAPPING, LEADING, ETC., AS REQUIRED TO COMPLETE THIS WORK AND JOIN TO WORK OF OTHERS.

ERECT WORK SQUARE, PLUMB, STRAIGHT AND TRUE, ACCURATELY FITTED WITH TIGHT JOINTS AND INTERSECTIONS ADEQUATELY REINFORCED AND ANCHORED IN PLACE. FINISH EXPOSED WORK TO BE SMOOTH WITH EVEN, CLOSE JOINTS AND NEAT CONNECTIONS.

05500.05 MATERIALS - GENERAL

A. MACHINE SCREWS

FEDERAL SPECIFICATION FF-S-92.

B. STEEL PIPE

ASTM A 53, TYPE E OR S, GRADE A. STANDARD WEIGHT (SCHEDULE 40).

C. STRUCTURAL STEEL SHAPES, PLATES AND BARS

ASTM A 36, UNLESS OTHERWISE INDICATED.

D. WELDING RODS

GAS WELDING RODS AND ARC WELDING ELECTRODES MUST MEET REQUIREMENTS OF AWS SPECIFICATIONS FOR IRON AND STEEL ARC WELDING ELECTRODES.

05500.06 ANCHORAGE AND SUPPORT ITEMS

PROVIDE MACHINE BOLTS, NUTS AND WASHERS AS REQUIRED. BOLTS LESS THAN 3/4 INCH DIAMETER TO COMPLY WITH ASTM A 307, GRADE A, OR EQUAL, AS CERTIFIED BY SUBCONTRACTOR.

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FOR BOLTS 3/4 INCH DIAMETER AND LARGER PROVIDE HIGH STRENGTH BOLTS, HEX HEADS AND WASHERS AS REQUIRED AND TO COMPLY WITH ASTM A 325.

05500.07 TRENCH GRATING

NEENAH R-4990 HEAVY DUTY DUCTILE IRON, CLASS A, TRENCH GRATING, OR EQUAL, 1-1/2 INCHES THICK. COVER: GRATED TYPE A. FRAME: TYPE X.

AT EACH SUMP PROVIDE SAME GRATING 2 INCHES THICK.

05500.08 MISCELLANEOUS STRUCTURAL STEEL

PROVIDE CONCRETE FILLED STANDARD WEIGHT PIPE BOLLARDS, AND SIMILAR PIPE POSTS FOR MOUNTING OF VEHICLE DOOR CONTROL PUSHBUTTONS. PROVIDE BOLLARDS AND CONTROL POSTS BOTH INDOORS AND OUTDOORS OF VEHICLE DOORS

LOCATION OF EACH SUCH BOLLARD AND POST MUST BE CAREFULLY LOCATED WITH FULL CONSIDERATION OF CLEARANCES AND OPERATION OF VEHICLES.

DIVISION 9

09701 - POLYURETHANE ELASTOMER/WEARING SURFACE

09701.01 SCOPE OF WORK

A. WORK SPECIFIED IN THIS SECTION

PROVIDE ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES AND DO ALL WORK NECESSARY TO PROVIDE COMPLETE EXTERIOR POLYURETHANE ELASTOMER/WEARING SURFACE WORK.

B. RELATED WORK SPECIFIED UNDER OTHER SECTIONS

CONCRETE
JOINT SEALANTS
EPOXY FLOOR COATING
EPOXY COATING
FINISH PAINTING

09701.02 SUBMITTALS

A. GENERAL

SUBMIT LIST OF SIMILAR EXTERIOR POLYURETHANE ELASTOMER/WEARING SURFACE INSTALLATIONS DEMONSTRATING SUCCESSFUL USAGE AND DURABILITY.

SUBMIT MANUFACTURER'S SPECIFICATIONS, MSDS DATA SHEETS, AND SPECIFIC APPLICATION INSTRUCTIONS FOR WORK UNDER THIS SECTION.

MANUFACTURER'S SPECIFICATIONS TO INCLUDE, BUT NOT NECESSARILY BE LIMITED TO, THE FOLLOWING:

ULTIMATE DIRECT TENSILE STRENGTH
TENSILE YOUNG'S MODULUS OF ELASTICITY
FLEXURAL YOUNG'S MODULUS OF ELASTICITY
ULTIMATE COMPRESSIVE STRENGTH
MOISTURE ABSORPTION
TEMPERATURE RESISTANCE, MAXIMUM ALLOWABLE TEMPERATURE,
CONTINUOUS AND INTERMITTENT
ASTM D 696 TEST DATA VERIFYING COEFFICIENT OF THERMAL
EXPANSION
CHEMICAL RESISTANCE TABLES

APPLICATION INSTRUCTIONS TO INCLUDE, BUT NOT NECESSARILY BE LIMITED TO, THE FOLLOWING:

SURFACE PREPARATION
DETAILED APPLICATION PROCEDURES
MINIMUM AND MAXIMUM APPLICATION LIMITS OF HUMIDITY AND
TEMPERATURES

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CURING TIMES REQUIRED FOR EACH COMPONENT
MAXIMUM PERMISSIBLE MOISTURE CONTENT OF CONCRETE SLAB PRIOR
TO APPLICATION

SUBMIT THE NAME OF MANUFACTURER'S REPRESENTATIVE WHO WILL BE RESPONSIBLE FOR INSPECTION OF AREAS TO RECEIVE THE POLYURETHANE ELASTOMER/WEARING SURFACE AND FOR CERTIFICATION THAT CONCRETE BASE SLAB MOISTURE CONTENT IS BELOW THE MANUFACTURER'S MAXIMUM PERMISSIBLE MOISTURE CONTENT.

B. SAMPLES

SUBMIT TWO 12 INCH BY 12 INCH SAMPLE PANELS OF MATERIAL SPECIFIED, WITH TEXTURE TO SIMULATE ACTUAL CONDITIONS, INCLUDING ABRASIVE AGGREGATE.

ALL FINISHED WORK MUST CONFORM TO ACCEPTED SAMPLES.

C. ADDITIONAL REQUIREMENTS

REFER TO SECTION 01100 FOR ADDITIONAL INFORMATION AND REQUIREMENTS REGARDING SUBMITTALS.

09701.03 DELIVERY AND STORAGE

DELIVER MATERIALS TO THE JOBSITE IN ORIGINAL, NEW AND UNOPENED PACKAGES AND WITH CONTAINERS BEARING MANUFACTURER'S NAME AND LABEL.

PROVIDE LABELS ON EACH CONTAINER INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING INFORMATION.

- NAME OR TITLE OF MATERIAL
- MANUFACTURER'S STOCK NUMBER
- MANUFACTURER'S NAME
- CONTENTS BY VOLUME, FOR MAJOR ELEMENTS
- BATCHING DATE
- BATCHING NUMBER
- APPLICATION INSTRUCTIONS
- COLOR

STORE MATERIALS USED ON JOB IN A SINGLE AREA PROTECTED FROM WEATHER. KEEP STORAGE AREA NEAT AND CLEAN. PROTECT FLOOR AND OTHER SURFACES WITH DROP CLOTHS OR BUILDING PAPER. TAKE NECESSARY PRECAUTIONS TO PREVENT FIRE. COMPLY WITH OSHA REQUIREMENTS FOR AMBIENT AIR CONDITIONS.

09701.04 HEAT AND RELATIVE HUMIDITY

BEFORE, DURING AND AFTER INSTALLATION, INSURE THAT AMBIENT TEMPERATURE AND RELATIVE HUMIDITY WILL BE AT VALUES REQUIRED BY THE MANUFACTURER FOR PROPER INSTALLATION.

SUBCONTRACTOR INSTALLING POLYURETHANE ELASTOMER/WEARING SURFACE UNDER THIS SECTION IS RESPONSIBLE FOR PROVIDING ANY ADDITIONAL PROTECTION REQUIRED FOR PROPER INSTALLATION AND MUST PROVIDE ALL REQUIRED FACILITIES TO INSURE INSTALLATION DURING PERIODS OF REQUIRED RELATIVE HUMIDITY CONDITIONS.

09701.05 MATERIALS, PRODUCTS AND MANUFACTURERS

PROVIDE A HEAVY DUTY CHEMICAL AND ABRASION RESISTANT NON-SKID SURFACE CONSISTING OF THE FOLLOWING:

- A. TWO COATS OF POLYURETHANE ELASTOMER AS MANUFACTURED BY NEOGARD, URETHANE PLASTICS, GENERAL POLYMERS, PETERSON CHEMICAL, OR AMERICAN COLLOID CO., EACH COAT A MINIMUM OF 25 MILS DRY.
- B. THIRD COAT OF POLYURETHANE ELASTOMER, FINISHED THICKNESS A MINIMUM OF 10 MILS DRY. WHILE STILL WET, BROADCAST 20-24 GRIT ALUMINUM OXIDE OR EQUIVALENT HARD AGGREGATE OVER THE SURFACE IN EXCESS. AFTER HARDENING, SWEEP OFF EXCESS AGGREGATE.
- C. SEMI-FLEXIBLE, LOW MODULUS EPOXY (100% SOLID) HAVING A MINIMUM TENSILE ELONGATION OF 15%, AT A SPREAD RATE OF 70-80 SQ. FT./GAL. (APPROXIMATELY 20 MILS). WHILE STILL WET, BROADCAST 20-24 GRIT ALUMINUM OXIDE OR EQUIVALENT HARD AGGREGATE OVER THE SURFACE IN EXCESS. AFTER HARDENING, SWEEP OFF EXCESS AGGREGATE.

ACCEPTABLE SUPPLIERS ARE AMERICAN COLLOID CO., EUCLID CHEMICAL, GENERAL POLYMERS, SIKA CHEMICALS OR ADHESIVE ENGINEERING.

- D. AFTER PROPER CURING, SEAL NON-SKID SURFACE WITH TWO COATS OF CHEMICAL RESISTANT, ALIPHATIC POLYURETHANE COATING. THICKNESS OF EACH APPLIED COAT TO BE A MINIMUM OF 3 MILS DRY. SUPPLIERS OF ACCEPTABLE MATERIALS INCLUDE AMERICAN COLLOID CO., ADVANCE CHEMICAL, GENERAL POLYMERS, LORD CHEMICAL, OR TENNENT COMPANY.

09701.06 JOB CONDITIONS AND STANDARDS

SUBCONTRACTOR, POLYURETHANE ELASTOMER/WEARING SURFACE INSTALLER AND MATERIAL MANUFACTURER'S REPRESENTATIVE TO JOINTLY INSPECT AREAS TO BE COVERED, IN THE PRESENCE OF THE CONSTRUCTION MANAGER'S REPRESENTATIVE. INSPECTION TO INCLUDE, BUT NOT NECESSARILY BE LIMITED TO, THE FOLLOWING:

SURFACE QUALITY AND REQUIRED SLOPE OF CONCRETE BASE SLABS
CONCRETE BASE SLAB CONSTRUCTION DETAILS, INCLUDING RAMPS AND CURBS
CONCRETE BASE SLAB JOINT LAYOUT
CONCRETE BASE SLAB SUBGRADE AND VAPOR RETARDER MEMBRANE
CALKING OF ALL FLOOR JOINTS

SUBCONTRACTOR, INSTALLER AND MATERIAL MANUFACTURER ARE TO REPORT IN WRITING ANY CONDITIONS DETRIMENTAL TO THE PERFORMANCE OF THIS WORK TO THE CONSTRUCTION MANAGER'S REPRESENTATIVE.

DO NOT PROCEED WITH THIS WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED AND ALL CONDITIONS ARE CERTIFIED AS ACCEPTABLE BY THE SUBCONTRACTOR, INSTALLER AND MATERIAL MANUFACTURER.

STARTING OF WORK CONSTITUTES ACCEPTANCE OF SURFACES BY THE SUBCONTRACTOR, INSTALLER AND MATERIAL MANUFACTURER AND ANY REPLACEMENT REQUIRED TO CORRECT DEFECTS IS TO BE MADE AT THE SUBCONTRACTOR'S EXPENSE.

09701.07 INSTALLATION

A. GENERAL

ALLOW NEW CONCRETE TO CURE A MINIMUM OF 30 DAYS. REMOVE ALL SOLVENT, GREASE, OIL, DUST OR FOREIGN MATERIAL PRIOR TO APPLICATION OF POLYURETHANE ELASTOMER/WEARING SURFACE.

IF CLEANING OF BASE SLABS WITH COMMERCIAL CLEANERS IS REQUIRED, PERMIT SLABS TO DRY FOR AT LEAST 1 WEEK PRIOR TO MOISTURE TESTING AND SUBSEQUENT APPLICATION OF POLYURETHANE ELASTOMER/WEARING SURFACE.

B. SURFACE PREPARATION

SANDBLAST CONCRETE SLAB WITH SELF-CONTAINED NON-SILICONE BLASTING EQUIPMENT TO REMOVE GREASE, DIRT, DUST, LOOSE CONCRETE AND OTHER CONTAMINATING MATERIALS.

C. MOISTURE TESTING

BEFORE COMMENCING INSTALLATION OF POLYURETHANE ELASTOMER/WEARING SURFACE, SUBCONTRACTOR TO CERTIFY THAT CONCRETE BASE SLAB HAS DRIED OUT SUFFICIENTLY TO SATISFY SPECIFICATION REQUIREMENTS OF THE POLYURETHANE ELASTOMER/WEARING SURFACE MANUFACTURER.

SUBCONTRACTOR TO SUBMIT WRITTEN CERTIFICATION OF ACCEPTANCE OF BASE SLAB CONDITIONS, SIGNED BY THE SUBCONTRACTOR, THE INSTALLER AND MATERIAL MANUFACTURER'S REPRESENTATIVE. AFTER NOTIFICATION OF RECEIPT AND APPROVAL OF CERTIFICATION BY THE CONSTRUCTION MANAGER'S REPRESENTATIVE, INSTALLATION MAY BE STARTED.

D. JOINTS AND CRACKS

PROVIDE ELASTOMERIC CRACK BRIDGING MEMBRANE, 40 MILS THICK, MINIMUM 36 INCHES WIDE, SELF-BONDING, AS MANUFACTURED BY N.A.C. PRODUCTS, INC. OR EQUAL. JOINTS TO BE TREATED AND INSTALLED BELOW THE POLYURETHANE ELASTOMER/WEARING SURFACE IN ACCORDANCE WITH THE ELASTOMERIC CRACK BRIDGING MEMBRANE MANUFACTURER'S PRINTED INSTRUCTIONS.

E. CURING

CURE THE POLYURETHANE ELASTOMER/WEARING SURFACE IN ACCORDANCE WITH THE PRINTED RECOMMENDATIONS OF THE MANUFACTURER. DO NOT ALLOW TRAFFIC ON THE SURFACE BEFORE MANUFACTURER'S MINIMUM RECOMMENDED NUMBER OF HOURS.

F. FINAL TESTING

UPON COMPLETION OF INSTALLATION AND CURING OF THE POLYURETHANE ELASTOMER/WEARING SURFACE THE SUBCONTRACTOR SHALL BEGIN TESTING BY WET FILM GAGE, TOOKE GAGE OR CUTTING CORES, AT LEAST ONE TEST SAMPLE PER 1,000 SQUARE FEET, AND ONE ON EACH RAMP SLOPE, PREPARING A LOG OF ALL SUCH SAMPLES TAKEN, RECORDING TIME, DATE, TEST METHOD AND MIL THICKNESS MEASUREMENT OBSERVED. THE LOG RECORDS SHALL COVER THE ENTIRE SURFACE INSTALLED UNDER THIS PROJECT, AND THE SUBCONTRACTOR SHALL SUBMIT WRITTEN CERTIFICATION AND COPY OF LOG, SIGNED BY THE SUBCONTRACTOR, THE INSTALLER, AND THE MATERIAL MANUFACTURER. AFTER NOTIFICATION OF RECEIPT AND APPROVAL OF CERTIFICATION BY THE CONSTRUCTION MANAGER, THE SUBCONTRACTOR MUST REPAIR ALL TEST SAMPLE LOCATIONS AND RESTORE THE POLYURETHANE ELASTOMER/WEARING SURFACE TO ITS ORIGINAL CONDITION.

G. CLEANUP AND PROTECTION

AT THE COMPLETION OF THE POLYURETHANE ELASTOMER/WEARING SURFACE WORK, CLEAN OFF ALL MISPLACED MATERIAL AND OTHER BLEMISHES CAUSED BY THE WORK FROM ALL FINISHED SURFACES AND RESTORE THEM TO THEIR ORIGINAL CONDITION.

ON A DAILY BASIS, REMOVE ALL DISCARDED MATERIALS, DEBRIS, CANS AND RAGS.

PROTECT WORK OF OTHER TRADES FROM DAMAGE. CORRECT ANY DAMAGES BY CLEANING, REPAIRING OR REPLACING AS DIRECTED.

09701.08 GUARANTEE

PROVIDE 2 YEAR WRITTEN GUARANTEE FOR ALL WORK PERFORMED UNDER THIS SECTION FROM DATE OF FINAL ACCEPTANCE.

UNDER THE GUARANTEE, THE SUBCONTRACTOR, THE INSTALLER AND THE MATERIAL MANUFACTURER MUST AGREE TO REPAIR OR REPLACE ANY OF THE POLYURETHANE ELASTOMER/WEARING SURFACE WHICH FAILS TO BE FREE FROM DEFECTS IN MATERIALS, ADHESION, WEARING QUALITY, AND WORKMANSHIP.

DIVISION 9

09702 - EPOXY FLOOR COATING

09702.01 GENERAL

A. WORK SPECIFIED IN THIS SECTION

PROVIDE ALL LABOR, MATERIALS, EQUIPMENT AND SERVICES TO COMPLETE CHEMICAL RESISTANT EXTERIOR EPOXY FLOOR COATING WORK, COVERING ALL CONCRETE SURFACES OF NEW AND EXISTING CONCRETE TRENCHES AND SUMPS.

B. RELATED WORK SPECIFIED UNDER OTHER SECTIONS

POLYURETHANE ELASTOMER/WEARING SURFACE
EPOXY COATING - METAL SURFACES
PAINTING
CONCRETE

09702.02 SUBMITTALS

SUBMIT LIST OF SIMILAR EXTERIOR EPOXY FLOOR COATING INSTALLATIONS DEMONSTRATING SUCCESSFUL USAGE AND INSTALLATION.

SUBMIT MANUFACTURER'S SPECIFICATIONS, MSDS DATA SHEETS, AND SPECIFIC APPLICATION INSTRUCTIONS FOR WORK UNDER THIS SECTION.

MANUFACTURER'S SPECIFICATIONS TO INCLUDE, BUT NOT NECESSARILY BE LIMITED TO, THE FOLLOWING:

MOISTURE ABSORPTION
TEMPERATURE RESISTANCE, MAXIMUM ALLOWABLE TEMPERATURE,
CONTINUOUS AND INTERMITTENT
CHEMICAL RESISTANCE TABLES

APPLICATION INSTRUCTIONS TO INCLUDE, BUT NOT NECESSARILY BE LIMITED TO, THE FOLLOWING:

SURFACE PREPARATION
DETAILED APPLICATION PROCEDURES
MINIMUM AND MAXIMUM APPLICATION LIMITS OF HUMIDITY AND
TEMPERATURES
CURING TIMES REQUIRED FOR EACH COMPONENT
MAXIMUM PERMISSIBLE MOISTURE CONTENT OF CONCRETE SLAB PRIOR
TO APPLICATION

SUBMIT THE NAME OF MANUFACTURER'S REPRESENTATIVE WHO WILL BE RESPONSIBLE FOR INSPECTION OF AREAS TO RECEIVE THE EPOXY FLOOR COATING AND FOR CERTIFICATION THAT CONCRETE BASE MOISTURE CONTENT IS BELOW THE MANUFACTURER'S MAXIMUM PERMISSIBLE MOISTURE CONTENT.

REFER TO SECTION 01100 FOR ADDITIONAL INFORMATION AND REQUIREMENTS REGARDING SUBMITTALS.

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09702.03 HEAT AND RELATIVE HUMIDITY

BEFORE, DURING AND AFTER EPOXY FLOOR COATING INSTALLATION, INSURE THAT AMBIENT TEMPERATURE AND RELATIVE HUMIDITY WILL BE AT VALUES REQUIRED BY THE MANUFACTURER FOR PROPER INSTALLATION.

SUBCONTRACTOR INSTALLING EPOXY FLOOR COATING UNDER THIS SECTION IS RESPONSIBLE FOR PROVIDING ANY ADDITIONAL PROTECTION REQUIRED FOR PROPER INSTALLATION OF THE FLOOR COATING, AND ALL REQUIRED FACILITIES TO INSURE INSTALLATION DURING PERIOD OF REQUIRED RELATIVE HUMIDITY.

09702.04 MATERIALS

A. GENERAL

CURED EPOXY FLOOR COATING TO MEET THE FOLLOWING PHYSICAL PROPERTIES.

MOISTURE ABSORPTION	0.20 PERCENT, MAXIMUM
TEMPERATURE RESISTANCE	140F CONTINUOUS, 175F INTERMITTENT

B. EPOXY FLOOR COATING

TNEMEC HIBUILD EPOXILINE NO. 66 FLOORING SYSTEM, PORTER PAINT CO. MCR 4361/MCR 65, GENERAL POLYMER DE 3549/3543 OR EQUAL.

COLOR TO BE CLEAR OR GRAY.

C. PRIMER

PRIMER TO BE OF TYPE RECOMMENDED BY FLOOR COATING MANUFACTURER.

D. PATCHING COMPOUND

ACRYLIC POLYMER CONCRETE PATCHING COMPOUND RECOMMENDED BY EPOXY COATING MANUFACTURER.

E. CALKING

TWO-COMPONENT POLYURETHANE ELASTOMERIC BASE SEALANT CONFORMING TO FEDERAL SPECIFICATION TT-S-00227E, CLASS A, TYPE I (SELF-LEVELING).

F. JOINT BACKING

COMPRESSIBLE JOINT BACKING, NONSTAINING, NONABSORBENT, IN ROUND FORM. PROVIDE SIZE AS REQUIRED. USE CLOSED CELL POLYETHYLENE.

09702.05 JOB CONDITIONS AND STANDARDS

SUBCONTRACTOR, EPOXY FLOOR COATING INSTALLER AND COATING MANUFACTURER TO JOINTLY INSPECT AREAS THAT RECEIVE EPOXY FLOOR COATING IN THE PRESENCE OF THE CONSTRUCTION MANAGER'S REPRESENTATIVE. INSPECTION TO INCLUDE, BUT NOT NECESSARILY BE LIMITED TO, THE FOLLOWING:

- SURFACE QUALITY OF CONCRETE TRENCH
- CONCRETE JOINTS REQUIRING CALKING
- CONCRETE SURFACE DEFICIENCIES REQUIRING PATCHING

SUBCONTRACTOR, EPOXY FLOOR COATING INSTALLER AND COATING MANUFACTURER TO REPORT IN WRITING ANY CONDITIONS DETRIMENTAL TO THE PERFORMANCE OF THIS WORK TO THE CONSTRUCTION MANAGER'S REPRESENTATIVE.

DO NOT PROCEED WITH THIS WORK UNTIL UNSATISFACTORY CONDITIONS ARE CERTIFIED AS ACCEPTABLE BY THE SUBCONTRACTOR, EPOXY FLOOR COATING INSTALLER AND COATING MANUFACTURER.

STARTING OF WORK CONSTITUTES ACCEPTANCE OF SURFACES BY THE SUBCONTRACTOR, EPOXY FLOOR COATING INSTALLER AND COATING MANUFACTURER AND ANY REPLACEMENT REQUIRED TO CORRECT DEFECTS IS TO BE MADE AT THE SUBCONTRACTOR'S EXPENSE.

09702.06 INSTALLATION

A. GENERAL

REMOVE ALL SOLVENT, GREASE, OIL, DUST OR FOREIGN MATERIAL PRIOR TO APPLICATION OF EPOXY FLOOR COATING.

IF CLEANING OF CONCRETE TRENCH AND SUMP WITH COMMERCIAL CLEANERS IS REQUIRED, PERMIT CONCRETE TO DRY PRIOR TO MOISTURE TESTING AND SUBSEQUENT APPLICATION OF EPOXY FLOOR COATING.

B. SURFACE PREPARATION

IF NECESSARY SANDBLAST CONCRETE TRENCH AND SUMP WITH SELF-CONTAINED NON-SILICONE BLASTING EQUIPMENT TO REMOVE GREASE, DIRT, DUST, LOOSE CONCRETE AND OTHER CONTAMINATING MATERIALS. OBTAIN CONSTRUCTION MANAGER'S AND FMPC APPROVAL OF SANDBLASTING PROCEDURE.

C. MOISTURE TESTING

BEFORE COMMENCING INSTALLATION OF EPOXY FLOOR COATING, SUBCONTRACTOR TO CERTIFY THAT CONCRETE SURFACES WHICH ARE TO RECEIVE COATING HAVE DRIED SUFFICIENTLY TO SATISFY SPECIFICATION REQUIREMENTS OF THE EPOXY FLOOR COATING MANUFACTURER.

SUBCONTRACTOR TO SUBMIT WRITTEN CERTIFICATION OF THE ACCEPTANCE OF CONCRETE CONDITIONS, SIGNED BY THE SUBCONTRACTOR, THE EPOXY FLOOR COATING INSTALLER AND COATING MANUFACTURER'S REPRESENTATIVE. AFTER NOTIFICATION OF RECEIPT AND APPROVAL OF SUCH CERTIFICATION BY THE CONSTRUCTION MANAGER'S REPRESENTATIVE, INSTALLATION OF FLOOR COATING MAY BE STARTED.

D. PRIMING

APPLY PRIMER ON AREA TO RECEIVE EPOXY FLOOR COATING. INSPECT SURFACE TO ENSURE THERE IS NO PUDDLING OR VOIDS.

FOLLOW MANUFACTURER'S PRINTED INSTRUCTIONS FOR MIXING AND APPLICATION OF PRIMER. SUBCONTRACTOR TO CERTIFY PROPER DEGREE OF ADHESION FOR START OF COATING APPLICATION.

E. COATING APPLICATION

APPLY COATING OVER THE PRIMER.

MINIMUM THICKNESS OF EPOXY FLOOR COATING TO BE 5 MILS DFT.

FOLLOW MANUFACTURER'S PRINTED INSTRUCTIONS FOR MIXING AND APPLICATION OF EPOXY FLOOR COATING.

F. CURING

CURE THE EPOXY FLOOR COATING IN ACCORDANCE WITH THE PRINTED RECOMMENDATIONS OF THE MANUFACTURER. DO NOT ALLOW TRAFFIC ON FLOOR COATING BEFORE MANUFACTURER'S MINIMUM RECOMMENDED NUMBER OF HOURS.

G. FINAL TESTING

UPON COMPLETION OF INSTALLATION AND CURING OF THE EPOXY FLOOR COATING SURFACE THE SUBCONTRACTOR SHALL BEGIN TESTING BY WET FILM GAGE, TOOKE GAGE OR CUTTING CORES, AT LEAST ONE TEST SAMPLE PER 1,000 SQUARE FEET, AND ONE ON EACH RAMP SLOPE, PREPARING A LOG OF ALL SUCH SAMPLES TAKEN, RECORDING TIME, DATE, TEST METHOD AND MIL THICKNESS MEASUREMENT OBSERVED. THE LOG RECORDS SHALL COVER THE ENTIRE SURFACE INSTALLED UNDER THIS PROJECT, AND THE SUBCONTRACTOR SHALL SUBMIT WRITTEN CERTIFICATION AND COPY OF LOG, SIGNED BY THE SUBCONTRACTOR, THE INSTALLER, AND THE MATERIAL MANUFACTURER. AFTER NOTIFICATION OF RECEIPT AND APPROVAL OF CERTIFICATION BY THE CONSTRUCTION MANAGER, THE SUBCONTRACTOR MUST REPAIR ALL TEST SAMPLE LOCATIONS AND RESTORE THE EPOXY FLOOR COATING SURFACE TO ITS ORIGINAL CONDITION.

H. CLEANUP AND PROTECTION

AT THE COMPLETION OF THE EPOXY FLOOR COATING WORK, CLEAN OFF ALL MISPLACED COATING, CALKING, AND OTHER BLEMISHES CAUSED BY THE WORK FROM ALL FINISHED SURFACES AND RESTORE THEM TO THEIR ORIGINAL CONDITION.

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ON A DAILY BASIS, REMOVE ALL DISCARDED FLOOR COATING MATERIALS, DEBRIS, CANS AND RAGS.

PROTECT WORK OF OTHER TRADES FROM DAMAGE BY EPOXY FLOOR COATING WORK. CORRECT ANY DAMAGES BY CLEANING, REPAIRING OR REPLACING AS DIRECTED.

09702.07 GUARANTEE

PROVIDE 2 YEAR WRITTEN GUARANTEE FOR ALL WORK PERFORMED UNDER THIS SUBDIVISION FROM DATE OF FINAL ACCEPTANCE.

UNDER THE GUARANTEE, THE SUBCONTRACTOR, THE EPOXY FLOOR COATING INSTALLER AND THE COATING MANUFACTURER MUST AGREE TO REPAIR OR REPLACE EPOXY COATING WHICH FAILS TO BE FREE FROM DEFECTS IN MATERIALS, ADHESION, AND WORKMANSHIP.

DIVISION 9

09870 - EPOXY COATING - METAL SURFACES

09870.01 SCOPE OF WORK

A. WORK SPECIFIED IN THIS SECTION

PROVIDE EPOXY COATING FOR NEW METAL TRENCH AND SUMP GRATING, NEW GRATING FRAMES, MANHOLE COVERS, AND OTHER METAL FLOOR SURFACES.

B. RELATED WORK SPECIFIED IN OTHER SECTIONS

POLYURETHANE ELASTOMER/WEARING SURFACE
EPOXY FLOOR COATING IN TRENCHES
FINISH PAINTING

09870.02 GENERAL

A. EQUIPMENT

PROVIDE STAGING, SPRAYING, BRUSHES AND OTHER EQUIPMENT AS NECESSARY FOR PROPER CONDUCT OF WORK. PLACE STAGING, AND OTHER EQUIPMENT TO INTERFERE AS LITTLE AS POSSIBLE WITH OTHER WORK.

B. STORAGE

STORE MATERIALS USED ON JOB IN A SINGLE PLACE AS DIRECTED. PROTECT FROM WEATHER. KEEP STORAGE PLACE NEAT AND CLEAN. PROTECT FLOOR WITH DROP CLOTHS OR BUILDING PAPER. REPAIR DAMAGE TO STORAGE AREAS AS DIRECTED. TAKE NECESSARY PRECAUTIONS TO PREVENT FIRE, AND PREVENT MATERIALS FROM FREEZING. COMPLY WITH OSHA REQUIREMENTS FOR AMBIENT AIR CONDITIONS.

C. PROTECTION OF WORK

PROTECT WORK AND MATERIALS INSTALLED. REMOVE SOILED RAGS AND WASTE EVERY NIGHT. REMOVE TRENCH GRATING AND SIMILAR ITEMS WHEREVER PRACTICABLE TO COAT BOTH SIDES, EDGES, AND FRAMES, AND REPLACE AFTER COMPLETION OF COATING. ADEQUATELY PROTECT ITEMS WHICH ARE IN PLACE DURING COATING OPERATIONS. PROTECT ALL WORK OF OTHER TRADES AGAINST DAMAGE.

D. DELIVERY

DELIVER MATERIALS TO SITE IN ORIGINAL CONTAINERS WITH LABELS INTACT AND SEALS UNBROKEN. PROVIDE LABELS ON EACH CONTAINER WITH NAME OR TITLE OF MATERIAL, FEDERAL SPECIFICATION NUMBER, IF APPLICABLE, MANUFACTURER'S STOCK NUMBER, MANUFACTURER'S NAME, THINNING AND MIXING INSTRUCTION (FOR 2 OR 3 COMPONENT COMPOUNDS), APPLICATION INSTRUCTIONS.

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E. SUBMITTALS

SUBMIT COPIES OF MANUFACTURER'S SPECIFICATIONS, INCLUDING MATERIAL LABEL ANALYSIS, AND APPLICATION INSTRUCTIONS FOR EACH MATERIAL SPECIFIED, INCLUDING PERCENTAGE OF SOLIDS, AND MSDS DATA SHEETS.

REFER TO SECTION 01100 FOR ADDITIONAL INFORMATION AND REQUIREMENTS REGARDING SUBMITTALS.

F. COLORS

COLORS TO BE AS SELECTED.

TINT AND MATCH ALL COLORS AS DIRECTED.

G. MANUFACTURERS

- THE GLIDDEN COMPANY
- PPG INDUSTRIES, INC.
- PORTER PAINT CO.
- PRATT & LAMBERT INC.
- CARBOLINE
- THE SHERWIN-WILLIAMS COMPANY
- MOBIL CHEMICAL COMPANY, OR EQUAL

09870.03 JOB CONDITIONS

INSPECT SURFACES TO RECEIVE EPOXY COATING. REPORT IN WRITING ANY CONDITIONS DETRIMENTAL TO THE PERFORMANCE OF THIS WORK. STARTING OF APPLICATION CONSTITUTES ACCEPTANCE OF SURFACES BY COATING APPLICATOR.

BEFORE STARTING APPLICATION, SUBCONTRACTOR TO CERTIFY THAT SHOP OR PRIME COATS ON SURFACES TO RECEIVE EPOXY COATING ARE COMPATIBLE WITH THE COATINGS SPECIFIED HEREIN.

09870.04 SURFACE PREPARATION

A. GENERAL

PERFORM PREPARATION AND CLEANING PROCEDURES IN COMPLIANCE WITH THE COATING MANUFACTURER'S INSTRUCTIONS FOR THE PARTICULAR SUBSTRATE CONDITIONS, AND AS HEREIN SPECIFIED.

CLEAN SURFACES TO BE COATED BEFORE APPLYING COATINGS OR SURFACE TREATMENTS. REMOVE OIL AND GREASE WITH CLEAN CLOTHS AND CLEANING SOLVENTS PRIOR TO MECHANICAL CLEANING. PROGRAM THE CLEANING AND APPLICATION SO THAT DUST AND OTHER CONTAMINANTS FROM THE CLEANING PROCESS WILL NOT FALL ON WET, NEWLY COATED SURFACES. REMOVE ALL DUST AND DIRT. SURFACES TO BE FREE OF OIL, GRIT, FROST AND IN A CONDITION TO RECEIVE THE SPECIFIED COATING.

DO NOT PAINT OVER SURFACES WHERE THE MOISTURE CONTENT EXCEEDS THAT PERMITTED IN THE MANUFACTURER'S PRINTED DIRECTIONS.

B. FERROUS METAL SURFACES

TOUCH UP SHOP-APPLIED PRIME COATS WHICH HAVE BEEN DAMAGED. USE THE SAME PRIMER AS THE SHOP COAT.

CLEAN NONGALVANIZED, FERROUS SURFACES, WHICH HAVE NOT BEEN SHOP COATED, OF OIL, GREASE, DIRT, LOOSE MILL SCALE AND OTHER FOREIGN SUBSTANCES BY SOLVENT OR MECHANICAL CLEANING, COMPLYING WITH STEEL STRUCTURES PAINTING COUNCIL (SSPC) RECOMMENDATIONS.

09870.05 COATING TYPES

COATING TYPES SPECIFIED ARE FROM THE CATALOG OF PORTER PAINT CO. OTHER MANUFACTURERS' MATERIAL MUST BE EQUAL TO THE KIND AND QUALITY LISTED:

<u>TYPE</u>	<u>MATERIAL IDENTIFICATION</u>
1	TWO COMPONENT, POLYAMIDE CURED, RUST INHIBITIVE EPOXY PRIMER, 2 MILS DFT, 48 PERCENT SOLIDS BY VOLUME
2	TWO COMPONENT, HIGH-BUILD, POLYAMIDE CURED HIGH-BUILD GLOSS EPOXY, 2 MILS DFT, 49 PERCENT SOLIDS BY VOLUME

09870.06 COATING SCHEDULE

<u>SURFACE</u>	<u>TYPE FIRST COAT</u>	<u>TYPE SECOND COAT</u>
FERROUS METAL	1	2

09870.07 EPOXY COATING APPLICATION

COATING TO BE APPLIED BY AUTHORIZED APPLICATOR IN STRICT ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS, RECOMMENDATIONS AND SPECIFICATIONS AS SET OUT IN APPROVED APPLICATOR'S MANUAL. WORKMEN TO BE EXPERIENCED AND SKILLED IN THE INSTALLATION OF THE MATERIAL AND TO PRODUCE A FINE, WORKMANLIKE AND DURABLE INSTALLATION. VENTILATION IN ALL SPACES IN WHICH COATINGS ARE BEING APPLIED TO BE RESPONSIBILITY OF SUBCONTRACTOR.

APPLY COATINGS TO SURFACES AFTER ALL CONSTRUCTION WORK IS COMPLETE, SURFACES HAVE BEEN PROPERLY PREPARED. APPLY COATINGS PRIOR TO CALKING OF JOINTS.

SPEC. 02892-4301
JULY 14, 1989

ALL SURFACES TO RECEIVE SPECIFIED COATINGS MUST BE CLEAN, DRY AND FREE OF FOREIGN MATTER. SURFACE AND AIR TEMPERATURE, MINIMUM 60F, PREFERRED 70F.

09870.08 CLEANUP

UPON COMPLETION OF WORK, CLEAN ALL PAINT-SPATTERED SURFACES, USING PROPER METHODS. REMOVE ALL DISCARDED COATING MATERIALS, RUBBISH, CANS AND RAGS RESULTING FROM THE WORK.

DIVISION 9

09900 - PAINTING

09900.01 SCOPE OF WORK

A. WORK SPECIFIED IN THIS SECTION

PAINTING WORK INCLUDES PAINTING AND FINISHING OF NEW INTERIOR AND EXTERIOR SURFACES AND ITEMS THROUGHOUT THE PROJECT, USUALLY PAINTED OR FINISHED TO MAKE A COMPLETE JOB IN EVERY RESPECT, EXCEPT AS SPECIFIED OR SCHEDULED OTHERWISE.

WHEN AN ITEM OR AREA IS NOT MENTIONED OR PARTICULARLY SCHEDULED, PAINT OR FINISH TO MATCH WORK IN SIMILAR LOCATIONS, OR AS DIRECTED.

SURFACE PREPARATION, PRIMING AND COATS OF PAINT SPECIFIED ARE IN ADDITION TO SHOP PRIMING AND SURFACE TREATMENT SPECIFIED IN OTHER SECTIONS, EXCEPT AS OTHERWISE SPECIFIED.

THE TERMS "PAINT" AND "PAINTING" AS USED HEREIN MEAN ALL COATING SYSTEM MATERIALS, INCLUDING PRIMERS, EMULSIONS, ENAMELS, STAINS, SEALERS AND FILLERS, AND OTHER APPLIED MATERIALS WHETHER USED AS PRIME, INTERMEDIATE OR FINISH COATS AND THE APPLICATION OF THESE MATERIALS. MINIMUM DRY FILM THICKNESS 2 MILS PER COAT.

B. RELATED WORK SPECIFIED IN OTHER SECTIONS

POLYURETHANE ELASTOMER/WEARING SURFACE
EPOXY FLOOR COATING
EPOXY COATING - METAL SURFACES

C. SURFACES NOT INCLUDED

DO NOT PAINT THE FOLLOWING SURFACES:

POLYURETHANE ELASTOMER/WEARING SURFACE
ALUMINUM, STAINLESS STEEL, COPPER, BRONZE, CHROMIUM PLATE
PLASTIC FABRIC COVERS
EPOXY-COATED TRENCHES AND METAL SURFACES
MACHINED SURFACES
FACTORY FINISHED EQUIPMENT
LIGHTING FIXTURES

09900.02 SUBMITTALS

A. MANUFACTURERS' LITERATURE

SUBMIT TWO COPIES OF MANUFACTURERS' SPECIFICATIONS, INCLUDING PAINT LABEL ANALYSIS AND APPLICATION INSTRUCTIONS FOR EACH MATERIAL SPECIFIED, INCLUDING PERCENTAGE OF SOLIDS AND MSDS DATA SHEETS.

B. SAMPLES

SUBMIT SAMPLES OF EACH COLOR SELECTED AND MATERIAL SPECIFIED.

ALL FINISHED WORK MUST CONFORM TO ACCEPTED SAMPLES.

AFTER SAMPLES HAVE BEEN REVIEWED, A JOB MEETING IS TO BE HELD BETWEEN THE PAINTING SUBCONTRACTOR, THE PAINT MANUFACTURER'S REPRESENTATIVE, AND THE CONSTRUCTION MANAGER'S REPRESENTATIVE TO DISCUSS PAINT APPLICATION AND WORKMANSHIP. DO NOT START PAINTING WORK UNTIL THIS MEETING HAS BEEN HELD, DOCUMENTED, AND THE MEETING NOTES APPROVED.

C. OTHER REQUIREMENTS

REFER TO SECTION 01100 FOR ADDITIONAL INFORMATION AND REQUIREMENTS REGARDING SUBMITTALS.

09900.03 GENERAL

A. DELIVERY AND STORAGE

DELIVER ALL MATERIALS TO THE JOBSITE IN ORIGINAL, NEW AND UNOPENED PACKAGES AND CONTAINERS BEARING MANUFACTURER'S NAME AND LABEL.

PROVIDE LABELS ON EACH CONTAINER WITH THE FOLLOWING INFORMATION:

- NAME OR TITLE OF MATERIAL
- FEDERAL SPECIFICATION NUMBER, IF APPLICABLE
- MANUFACTURER'S STOCK NUMBER
- MANUFACTURER'S NAME
- CONTENTS BY VOLUME, FOR MAJOR PIGMENT AND VEHICLE ELEMENTS
- THINNING INSTRUCTIONS
- APPLICATION INSTRUCTIONS

STORE MATERIALS USED ON JOB IN A SINGLE AREA. PROTECT FROM WEATHER. KEEP STORAGE AREA NEAT AND CLEAN. PROTECT FLOOR AND OTHER SURFACES WITH DROP CLOTHS OR BUILDING PAPER. TAKE NECESSARY PRECAUTIONS TO PREVENT FIRE. STORAGE PROCEDURES TO BE SUCH THAT THE STORAGE SPACE AMBIENT AIR CONDITIONS DO NOT EXCEED OSHA STANDARDS.

B. JOB CONDITIONS

INSPECT SURFACE TO BE PAINTED. STARTING OF WORK CONSTITUTES ACCEPTANCE OF THE SURFACES.

C. CLEANUP AND PROTECTION

AT THE COMPLETION OF THE PAINTING WORK, CLEAN OFF MISPLACED PAINT AND OTHER BLEMISHES CAUSED BY THIS WORK FROM FINISHED SURFACES AND RESTORE THEM TO THEIR ORIGINAL CONDITION.

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ON A DAILY BASIS REMOVE ALL DISCARDED PAINT MATERIALS, DEBRIS, CANS AND RAGS.

PROTECT WORK OF OTHER TRADES, WHETHER TO BE PAINTED OR NOT, FROM DAMAGE BY PAINTING WORK. CORRECT DAMAGES BY CLEANING, REPAIRING OR REPLACING, AND REPAINTING AS DIRECTED.

REMOVE HARDWARE AND SIMILAR ITEMS BEFORE PAINTING AND REPLACE AFTER COMPLETION OF PAINTING. DO NOT DISPOSE OF PAINT MATERIALS IN ANY PLUMBING FIXTURE, OPEN WASTE OR VENT PIPE, OR OTHER PIPE OF ANY KIND. DO NOT USE WATER CLOSETS OR OTHER PLUMBING FIXTURES AS SUPPORTS FOR PLANKING.

D. COLORS

EXCEPT AS OTHERWISE INDICATED, FURNISH COLORS AS SELECTED.

PAINT BOLLARDS YELLOW.

09900.04 MATERIALS

A. PAINT MATERIALS

PROVIDE PAINTING MATERIALS OF TYPES AND BRANDS SPECIFIED, INCLUDING HIGHEST QUALITY BASIC PAINTING MATERIALS SUCH AS LINSEED OIL, SHELLAC, TURPENTINE AND THINNERS.

SPECIFIC PRODUCTS DESIGNATED HEREIN BY MANUFACTURER'S NAME AND NUMBER OR SIMILAR IDENTIFICATION ARE USED ONLY TO ESTABLISH STANDARDS OF QUALITY AND TYPE.

EQUIVALENT PRODUCTS OF THE FOLLOWING MANUFACTURERS, OR APPROVED EQUAL, MAY BE SUBMITTED, SUBJECT TO REVIEW FOR SPECIFICATION COMPLIANCE.

DU PONT
THE GLIDDEN COMPANY
DEVOE PAINT DIVISION OF CELANESE COATING COMPANY
PPG INDUSTRIES, INC.
PORTER PAINT COMPANY
PRATT AND LAMBERT, INC.
THE SHERWIN-WILLIAMS COMPANY
BENJAMIN MOORE AND COMPANY

B. PAINT TYPES

PROVIDE PAINTS OF FOLLOWING TYPES. NAMES AND NUMBERS ARE FROM CATALOG OF PORTER PAINT COMPANY.

- TYPE 1 298N ALKYD CHROMATE PRIMER
- TYPE 2 2400 SERIES INDUSTRIAL ALKYD GLOSS
- TYPE 3 2481 ALKYD EGGSHELL
- TYPE 4 290 GALVANIZED METAL PRIMER

C. PAINT FINISH SCHEDULE

	<u>PAINT TYPES</u>			
	<u>SURFACE PREPARATION</u>	<u>FIRST COAT</u>	<u>SECOND COAT</u>	<u>THIRD COAT</u>
EXTERIOR:				
FERROUS METAL, PRIMED	•	2	2	-
INTERIOR:				
FERROUS METAL, UNPRIMED	*	1	3	3
FERROUS METAL, PRIMED	*	3	3	-
GALVANIZED METAL, UNPRIMED	*	4	3	3
FACTORY PRIMED METAL SURFACES	**	3	3	-
ELECTRICAL OR MECHANICAL ITEMS NOT FACTORY FINISHED	•	1	3	3

* AS SPECIFIED

**TOUCH UP WITH SHOP OR FACTORY PRIMER

09900.05 PREPARATION OF SURFACES

A. GENERAL

PERFORM SURFACE PREPARATION IN STRICT ACCORDANCE WITH PAINT MANUFACTURER'S INSTRUCTIONS AND AS SPECIFIED HEREIN, FOR EACH PARTICULAR SURFACE.

REMOVE HARDWARE, HARDWARE ACCESSORIES, PLATES, LIGHTING FIXTURES, AND SIMILAR ITEMS IN PLACE AND NOT TO BE FINISH PAINTED, OR PROVIDE SURFACE APPLIED PROTECTION PRIOR TO SURFACE PREPARATION AND PAINTING OPERATIONS. AT COMPLETION OF PAINTING OF EACH AREA, REINSTALL REMOVED ITEMS BY WORKMEN SKILLED IN TRADES INVOLVED.

BRUSH SURFACES CLEAN OF DUST AND DIRT. PREPARED SURFACES TO BE SMOOTH, DRY, FREE OF OIL, GREASE, SCALE, GRIT, FROST, AND IN CONDITION SUITABLE TO RECEIVE PAINT OR OTHER SPECIFIED MATERIALS.

B. FERROUS METAL

CLEAN FERROUS SURFACES, WHICH ARE NOT GALVANIZED OR SHOP-PRIMED, OF OIL, GREASE, DIRT, LOOSE MILL SCALE AND OTHER FOREIGN MATERIAL BY SOLVENT OR MECHANICAL CLEANING.

C. GALVANIZED METAL

REMOVE ALL GREASE, OIL, DIRT OR OTHER FOREIGN MATERIAL BY SOLVENT OR DETERGENT CLEANING. APPLY ZINC PHOSPHATE TREATMENT EQUAL TO PORTER PAINT COMPANY NO. 45 GALVAPREP IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, RINSE WITH CLEAR WATER AND ALLOW TO DRY. DO NOT USE VINEGAR OR ACETIC ACID.

D. EXISTING SURFACES

REMOVE GREASE, OIL, DUST, DIRT OR OTHER FOREIGN MATERIALS BY SOLVENT OR DETERGENT CLEANING. REMOVE CHIPPED, PEELING OR BLISTERED PAINT BY HAND TOOL OR POWER TOOL CLEANING, OR AS RECOMMENDED BY THE COATING MANUFACTURER. DULL HARD OR GLOSSY OLD PAINT BY LIGHT SANDING, SANDBLASTING OR OTHER ABRASIVE METHODS, WITH SELF-CONTAINED NON-SILICONE BLASTING EQUIPMENT.

09900.06 TOUCH-UP AND PRIMING

TOUCH UP SHOP PRIMER WHEREVER DAMAGED OR BARE. CLEAN, AS SPECIFIED ABOVE, AND TOUCH UP WITH SAME TYPE PAINT AS SHOP-APPLIED PRIMER. APPLY PRIME COAT OR COATS TO ANY SURFACE NOT SHOP PRIMED.

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09900.07 PATCH PAINTING

PAIN T AREAS DISTURBED OR DAMAGED TO MATCH ADJOINING SURFACES. PAINT SURFACES BEYOND DAMAGED OR PATCHED AREAS TO NEAREST EXTERNAL OR INTERNAL CORNER, OR TO BOTH ENDS (AND TOP TO BOTTOM) OF ANY BAY, COLUMN TO COLUMN, HORIZONTALLY AND VERTICALLY IN ALL DIRECTIONS.

09900.08 APPLICATION

APPLY COATINGS IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS. USE EQUIPMENT AND APPLICATION METHODS BEST SUITED FOR THE TYPE MATERIAL BEING APPLIED. APPLY EACH COAT AT COATING MANUFACTURER'S RECOMMENDED RATE OF COVERAGE SO CORRECT MINIMUM DRY FILM THICKNESS IS ACHIEVED, PER COAT.

DO NOT PAINT WHILE SURFACE IS DAMP, DURING COLD, RAINY OR MISTY WEATHER OR WHEN WINDS CARRY DUST OR DIRT AND EMBED IT IN PAINT.

DO NOT APPLY PAINT WHEN AMBIENT OR SURFACE TEMPERATURE IS BELOW 50F OR ABOVE 100F. DO NOT APPLY PAINT UNLESS SURFACE TEMPERATURE IS 5F ABOVE DEW POINT. DO NOT APPLY PAINT TO SURFACES EXPOSED TO HOT SUN.

APPLY MATERIALS UNDER ADEQUATE ILLUMINATION, SPREAD EVENLY AND FLOW ON SMOOTHLY WITHOUT RUNS OR SAGS. ALLOW EACH COAT TO DRY THOROUGHLY BEFORE APPLYING THE SUCCEEDING COAT.

HAVE EACH COAT OF MATERIAL INSPECTED BEFORE APPLYING SUCCEEDING COATS; CREDITS FOR CONCEALED COAT WILL NOT BE GIVEN. GIVE NOTIFICATION WHEN EACH COAT IS READY FOR INSPECTION.

DO NOT THIN COATINGS MORE THAN RECOMMENDED BY PAINT MANUFACTURER AND USE ONLY WITHIN RECOMMENDED LIMITS. THOROUGHLY STIR COATINGS AND MAINTAIN AT A UNIFORM CONSISTENCY DURING APPLICATION.

SAND LIGHTLY BETWEEN EACH COAT OF ENAMEL.

WHENEVER SPRAY APPLICATION IS USED, EACH SPRAY-APPLIED COAT MUST BE EQUIVALENT IN ALL RESPECTS TO THE SAME COAT, BRUSH APPLIED BY HIGH QUALITY BRUSH APPLICATION. THE NUMBER OF COATS REQUIRED IS THE SAME, REGARDLESS OF APPLICATION METHOD. DOUBLING BACK WITH SPRAY EQUIPMENT FOR PURPOSE OF BUILDING UP FILM THICKNESS OF TWO COATS IN ONE OPERATION IS PROHIBITED.

DIVISION 10
10400 - SIGNS

10400.01 SCOPE OF WORK

A. WORK SPECIFIED IN THIS SECTION

PROVIDE LABOR, MATERIALS AND EQUIPMENT TO COMPLETE SIGNS AS SPECIFIED.

B. RELATED WORK SPECIFIED IN OTHER SECTIONS

FRAME SUPPORTED FABRIC STRUCTURE
HOLLOW METAL DOORS AND FRAMES

10400.02 GENERAL

A. APPLICABLE PUBLICATIONS

NAAMM FINISHES MANUAL
APPLICABLE ASTM, ALUMINUM ASSOCIATION, AISC AND AISI SPECIFICATIONS

B. SUBMITTALS

LIST OF DOOR NUMBER AND DOOR DESIGNATION SIGNS
ILLUSTRATION OF PROPOSED BUILDING IDENTIFICATION SIGN

REFER TO SECTION 01100 FOR ADDITIONAL INFORMATION AND REQUIREMENTS REGARDING SUBMITTALS.

10400.03 DOOR NUMBER AND DOOR DESIGNATION SIGN

PLASTIC SIGNS TO BE 1/8 INCH THICK, BLACK, WITH INCISED WHITE LETTERS, PLAIN BLOCK LETTERS, 3/4 INCH HIGH. SIGNS TO BE 1-1/2 BY 8 INCHES FOR DOORS, WITH SPACE FOR SIX NUMBERS. DOOR DESIGNATION SIGNS TO BE SIMILAR, LENGTHS TO VARY FROM 8 TO 12 INCHES, TO SUIT SPACE DESIGNATIONS.

10400.04 BUILDING IDENTIFICATION SIGNS (3 REQUIRED)

A. SIGN TYPES

NONILLUMINATED
EXTERIOR
SINGLE-FACED
POST-MOUNTED

B. MANUFACTURERS

ANDCO
ARCHITECTURAL GRAPHICS, INC.
MATTHEWS

SPANJER
SUPERSINE
VOMAR
OR EQUAL

C. SIGN FRAMING AND PANELS

ANDCO 33 SERIES POST AND PANEL FREESTANDING SIGN SYSTEM, WITH 3 INCH SQUARE.

EXTRUDED ALUMINUM PERIMETER FRAMING, MITERED AND HELIARC WELDED FLAT PANELS WITH 2 METAL FACES, FRONT AND BACK. SIZE TO BE 72 INCHES WIDE BY 36 INCHES HIGH EACH.

PROVIDE 10 FOOT LONG POSTS, ENCASED IN CONCRETE, AND DESIGNED PER ANDO GM-1-Y DETAIL, REMOVABLE PLATE.

SIGN DESIGNATION:

TO BE DETERMINED BY OPERATING CONTRACTOR

D. SIGN FINISHES

CATALYZED POLYURETHANE, WHITE FRONT, BLACK FRAME
GENERAL APPEARANCE OF SIGN TO COMPLEMENT OTHER EXISTING SIMILAR SIGNS

E. SIGN LETTERING

SIZE OF LETTERS AS REQUIRED.

LETTER TYPE: PAINTED, BLACK

F. INSTALLATION

PROVIDE MOUNTING ACCESSORIES AND INSTALL SECURELY, AS REQUIRED.

COORDINATE LOCATION OF BUILDING SIGNS WITH CONSTRUCTION MANAGER'S REPRESENTATIVE.

ROOM NUMBER AND ROOM DESIGNATION SIGNS TO BE FASTENED TO EXTERIOR DOORS WITH STAINLESS STEEL SCREWS.

DIVISION 13

13120 - FRAME SUPPORTED FABRIC STRUCTURES

13120.01 SCOPE OF WORK

PROVIDE DESIGN AND ENGINEERING FOR STRUCTURES AND FOUNDATIONS, FABRICATION AND DELIVERY TO PROJECT SITE, SUPERVISION, ERECTION IN TWO PHASES.

PROVIDE FRAME SUPPORTED FABRIC STRUCTURES COMPLETE AND WEATHERTIGHT WITH MISCELLANEOUS ITEMS AND ALL REQUIRED ACCESSORIES AS SHOWN ON DRAWINGS AND SPECIFIED HEREIN. THE SMALLER OF THE THREE STRUCTURES IS TO BE BUILT IN PHASE D, THE TWO LARGER UNITS IN PHASE A.

A. BUILDING TYPE

FREE SPAN ARCH FRAMED BUILDING SYSTEM, WITH EXTRUDED ALUMINUM ARCHES WITHOUT CENTER COLUMNS, AND WITH SPECIAL FABRIC COVER.

B. WORK INCLUDED

WORK INCLUDES, BUT IS NOT NECESSARILY LIMITED TO, FURNISHING AND ERECTING THE STRUCTURES, COMPLETE WITH COMPONENTS, AS FOLLOWS:

STRUCTURAL FRAMING INCLUDING WIND BRACING
PVC FABRIC WALL AND ROOF COVER
CALKING AND SEALANTS
REINFORCED CONCRETE PIERS FOR ARCH SUPPORT AND CONTINUOUS
CONCRETE WALL FOOTING OR CURB BETWEEN ALL PIERS
ARCH BASEPLATES AND GROUTING
MISCELLANEOUS ACCESSORIES AS HEREINAFTER SPECIFIED
RIDGE VENTILATORS
HOLLOW METAL DOORS, FRAMES AND HARDWARE
ROLLING STEEL DOORS OR HORIZONTAL SLIDING DOORS
ADJUSTABLE EXTRUDED ALUMINUM LOUVERS
FLASHINGS AND CLOSURES, INCLUDING HORIZONTAL BASE FLASHING,
ROOF PENETRATIONS AND DOORS
METAL PASS DOORS AND FRAMES; MOTOR OPERATED VEHICLE ACCESS
DOORS
ELECTRIC LIGHTING AND POWER

FURNISH ANCHOR BOLTS FOR INSTALLATION UNDER ANOTHER SECTION.

C. RELATED WORK SPECIFIED UNDER OTHER SECTIONS

EXCAVATION FOR CONCRETE FLOOR SLABS AND EXTERIOR PAVEMENT
BACKFILLING, DRAINAGE FILL, AND VAPOR BARRIER
CONCRETE FILLED PIPE POSTS AT EACH SIDE OF VEHICLE DOORS AND
SIMILAR POSTS FOR MOUNTING OF DOOR CONTROL PUSHBUTTONS
INSTALLATION OF ANCHOR BOLTS
BUILDING SIGNS
FINISH PAINTING OF MISCELLANEOUS METAL, METAL DOORS AND FRAMES
EXCAVATION FOR FOUNDATION SYSTEM

13120.02 SUBMITTALS

FURNISH COMPLETE DESCRIPTIVE DATA COVERING THE SPECIFIED STRUCTURES. INDICATE ANY AND ALL DEVIATIONS OR EXCEPTIONS TAKEN TO THIS SECTION. EXCEPTIONS TO MINIMUM CLEAR INTERIOR HEIGHTS, OR DESIGN LOADS, WILL NOT BE ALLOWED.

SUBMIT COMPLETE SHOP DRAWINGS, INCLUDING ANCHOR BOLT SETTING PLAN, OF THE FRAME SUPPORTED FABRIC STRUCTURES, CONCRETE FOUNDATIONS, AND ALL FABRICATED ITEMS FOR REVIEW, INCLUDING ALL OPENING AND SPECIAL FRAMES, RIDGE VENTILATORS, SIDEWALL LOUVERS, DOORS, AND LIGHTS.

SUBMIT CATALOG SAMPLES AND PERFORMANCE DATA OF FABRIC COVER AND FINISH, INCLUDING STRUCTURAL, THERMAL, FIRE RESISTANCE, WIND AND SNOW LOAD LIMITS.

REFER TO SECTION 01100 FOR ADDITIONAL INFORMATION AND REQUIREMENTS REGARDING SUBMITTALS.

13120.03 STRUCTURAL REQUIREMENTS

THE DESIGN AND FABRICATION OF THE COMPLETE STRUCTURAL SYSTEM INCLUDING COLUMNS, BEAMS, PURLINS, GIRTS, ROOF PANELS, WALL PANELS, CONNECTIONS AND ATTACHMENTS MUST CONFORM TO STATE, LOCAL AND OTHER APPLICABLE BUILDING CODE REQUIREMENTS AND ORDINANCES.

13120.04 DELIVERY, STORAGE AND HANDLING

DELIVER, STORE AND HANDLE MATERIALS TO PREVENT DAMAGE AND DEFORMATION. STORE ARCHES AND OTHER SPECIFIED BUILDING COMPONENTS ON PLATFORMS OR PALLETS WITH ONE END ELEVATED FOR DRAINAGE. PROTECT MATERIALS FROM THE WEATHER WITH TARPAULINS OR OTHER SUITABLE COVERING. STORE FABRIC COVER MATERIAL IN A TEMPERATURE CONTROLLED WEATHERPROOF SHELTER.

13120.05 BUILDING CRITERIA

A. DESIGN AND FABRICATION SPECIFICATIONS

PRIMARY AND SECONDARY STRUCTURAL FRAMING TO COMPLY WITH CURRENT ISSUES OF AISC, AISI, NEMA AND ASTM SPECIFICATIONS, AS APPLICABLE.

WELDING TO COMPLY WITH AMERICAN WELDING SOCIETY "STRUCTURAL WELDING CODE D1.1" INCLUDING SUPPLEMENT.

ALL STRUCTURAL FRAMING, IF NOT ALUMINUM, TO BE PAINTED WITH MANUFACTURER'S STANDARD SHOP COAT, 2 MILS MINIMUM DRY THICKNESS, LIGHTEST COLOR AVAILABLE.

B. BUILDING DESIGN CRITERIA

DESIGN TO MEET APPLICABLE REQUIREMENTS OF BOCA NATIONAL BUILDING CODE, NFPA AND UL REQUIREMENTS, AND OSHA
LIVE LOAD ON ROOF - 20 POUNDS PER SQUARE FOOT, PLUS 5 POUNDS PER SQUARE FOOT FOR SUSPENDED MECHANICAL AND ELECTRICAL ITEMS
MAXIMUM WIND VELOCITIES ON BUILDING WALLS - 134 MPH
SEISMIC LOADING - ZONE 2 PER LATEST EDITION, BUILDING CODE
UPLIFT ON ROOF - 20 POUNDS PER SQUARE FOOT
ROOF SLOPE SHALL BE NOT LESS THAN 27 PERCENT

PROVIDE ROOF AND WALL BRACING TO SATISFY DESIGN LOADS ABOVE.

PROVIDE STRUCTURAL FRAMING ADEQUATE TO SUPPORT LIGHT FIXTURES AND RELATED ACCESSORIES.

C. FABRIC COVER

THE OPAQUE TEDLAR-TREATED FABRIC SHALL BE PVC COATED POLYESTER SCRIM, TREATED WITH INHIBITORS TO PREVENT ULTRAVIOLET DEGENERATION, SELF-EXTINGUISHING PER NFPA 701.

D. BASE FLASHING

PROVIDE MANUFACTURER'S STANDARD ALUMINUM BASE FLASHING AT BOTTOM OF FABRIC COVER, TO PERMIT ADEQUATE ATTACHMENT TO THE CONCRETE FOUNDATION. PROVIDE STAINLESS STEEL FASTENERS, AS REQUIRED.

E. FLASHINGS, CLOSURES AND TRIM

PROVIDE FLASHINGS AT ROOF PENETRATIONS, TRIM AT DOORS AND LOUVERS. THE BUILDING MANUFACTURER TO DESIGN FLASHINGS AND CLOSURES SO AS TO PRODUCE A COMPLETELY WEATHERTIGHT INSTALLATION. PROVIDE ALL FLASHINGS REQUIRED FOR THE COMPLETE BUILDING, INCLUDING ALL PENETRATIONS.

PROVIDE ALL NECESSARY TAPES, FOAM CLOSURES, GASKETS, SEALANT MATERIALS, METAL FLASHING AND OTHER METHODS OF SEALING AS REQUIRED TO PROVIDE WEATHERTIGHT JOINTS BETWEEN EXTERIOR BUILDING COMPONENTS. COLOR OF SEALING MATERIALS MUST MATCH ADJACENT METAL BUILDING COMPONENTS.

F. FASTENERS

FASTENERS OF ARCHES AND FABRIC WALL SYSTEMS MAY BE CONCEALED OR EXPOSED. EXPOSED FASTENERS TO BE NEOPRENE-GASKETED STAINLESS STEEL, SELF-TAPPING, WITH PLASTIC OR COLOR COATED HEADS TO MATCH SIDING AND ROOFING.

ANCHOR BOLTS - BLACK STEEL MINIMUM YIELD POINT OF 43,300 PSI UNPAINTED

HIGH STRENGTH BOLTS - BLACK STEEL, UNPAINTED, ASTM A 325

ALL OTHER BOLTS AND NUTS - GALVANIZED, ASTM A 307, OR EQUAL AS CERTIFIED BY SUBCONTRACTOR

ALL SCREWS - STAINLESS STEEL

13120.06 ELECTRICAL CRITERIA

A. STANDARDS

ALL WORK TO BE IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF DIV 16.

B. POWER SUPPLY

UNDER DIV 16, A SINGLE SOURCE OF 480 VOLTS, 3-PHASE, 3-WIRE POWER (WITHOUT NEUTRAL WIRE BUT DERIVED FROM A GROUNDED NEUTRAL SOURCE), PROTECTED AT 70 AMPERES, WILL BE EXTENDED OVERHEAD TO A SERVICE TERMINAL POLE AT STRUCTURE B AS INDICATED, AND TERMINATED IN A JUNCTION BOX NEAR THE TOP OF THE POLE. EMPTY UNDERSLAB CONDUITS WILL ALSO BE PROVIDED UNDER DIV 16, AS INDICATED, TO FACILITATE INTERCONNECTIONS BETWEEN STRUCTURES UNDER THIS SECTION.

C. SCOPE

UNDER THIS SECTION, PROVIDE ALL NECESSARY ELECTRICAL WORK, INCLUDING BUT NOT NECESSARILY LIMITED TO THAT SPECIFIED IN THIS SECTION BUT NOT OTHERWISE PROVIDED UNDER DIV 16, SO AS TO PROVIDE COMPLETE FUNCTIONAL STRUCTURES.

D. PANELBOARDS

PROVIDE AN INDIVIDUAL 480 VOLT CIRCUIT BREAKER PANELBOARD, WITH MAIN BREAKER, IN EACH STRUCTURE. LOCATE ADJACENT TO THE SOUTH PERSONNEL DOOR IN STRUCTURES A AND B, AND TO THE WEST PERSONNEL DOOR IN STRUCTURE C. DO NOT SUBFEED STRUCTURES ONE FROM ANOTHER, SUCH THAT OPERATION OF A MAIN BREAKER WOULD SHUT DOWN MORE THAN ONE STRUCTURE.

E. LIGHTING

PROVIDE HIGH PRESSURE SODIUM (HPS) LIGHTING (LUMINAIRES AS FURTHER DESCRIBED UNDER DIV 16) TO PROVIDE MINIMUM MAINTAINED ILLUMINANCE ON THE FLOOR IN AN ASSUMED UNOBSTRUCTED, UNOCCUPIED SPACE OF 10 FOOT-CANDLES, SUBJECT TO THE FOLLOWING DESIGN AND INSTALLATION REQUIREMENTS:

- 1. TOTAL LIGHT LOSS FACTOR (LLF): 0.75 MAXIMUM.
- 2. REFLECTANCES
 - (a) CEILING (SURFACES MORE THAN 13 FEET ABOVE FLOOR): 30 PERCENT
 - (b) WALL (SURFACES 13 FEET AND LESS ABOVE FLOOR): 10 PERCENT

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- (c) FLOOR: 10 PERCENT
- 3. MAXIMUM LUMINAIRE SPACING:
 - (a) ACROSS (NARROW) WIDTH: 30 FEET
 - (b) ALONG (LONG) LENGTH: 25 FEET
- 4. MOUNTING: 13 FEET MINIMUM HEIGHT TO BOTTOM OF LUMINAIRES. MOUNT LUMINAIRES WITH SWIVEL HANGERS TIGHT TO STRUCTURAL FRAMING, USING CLOSE NIPPLES AT HANGERS. DO NOT SUSPEND WITH STEMS (I.E., HANGING ALL LONGITUDINAL ROWS OF LUMINAIRES AT A HEIGHT COMMON TO EACH OTHER IS NEITHER NECESSARY NOR DESIRED).
- 5. HOT RESTRIKE PROTECTION: PROVIDE A SUFFICIENT QUANTITY OF THE LUMINAIRES, UNIFORMLY DISTRIBUTED, WITH AN AUXILIARY QUARTZ INCANDESCENT LAMP TO PRODUCE APPROXIMATELY 0.1 FOOTCANDLE AVERAGE DURING THE RESTRIKE PERIOD.
- 6. CONTROL: PANEL SWITCH ALL LIGHTS. CIRCUIT AND DISTRIBUTE SUCH THAT FULL ILLUMINANCE (10 FOOTCANDLES) OR APPROXIMATELY UNIFORM HALF-ILLUMINANCE (5 FOOTCANDLES) MAY BE SELECTED. WIRE ONE LUMINAIRE (WHICH IS TO INCLUDE AUXILIARY QUARTZ LAMP) NEAREST THE LIGHTING PANEL IN EACH STRUCTURE TO BURN CONTINUOUSLY AS A NIGHT LIGHT.
- 7. VOLTAGE: ANY STANDARD VOLTAGE FROM 120 VOLTS TO 480 VOLTS, AS SELECTED UNDER THIS SECTION (PARTICULAR ATTENTION IS DIRECTED TO LIMITING VOLTAGE DROPS TO ACCEPTABLE VALUES). PROVIDE ALL NECESSARY TRANSFORMATION, OVERCURRENT PROTECTION, ETC., AS REQUIRED BY THE SELECTED SCHEME.
- 8. EMERGENCY: PROVIDE INCANDESCENT EXIT SIGN (GREEN LETTERS ON OPAQUE WHITE), MOUNTED APPROXIMATELY 13 FEET ABOVE FLOOR AT EACH PERSONNEL DOOR. SIGNS TO BE SELF-CONTAINED STYLE, WITH NICKEL-CADMIUM BATTERY SUITABLE FOR 55C OPERATION. PROVIDE UNIT TYPE EMERGENCY LIGHTS ADEQUATE FOR SAFE EGRESS FROM STRUCTURE, WITH NICKEL-CADMIUM BATTERY SUITABLE FOR 55C OPERATION.

F. SMALL POWER

PROVIDE ONE GROUND FAULT CIRCUIT INTERRUPTER (GFCI) STYLE 120 VOLT DUPLEX CONVENIENCE RECEPTACLE IN EACH STRUCTURE, LOCATED ADJACENT TO THE LIGHTING AND POWER PANELBOARD(S).

G. MOTOR OPERATOR DOORS

TO OPERATE AT 480 VOLTS, 3-PHASE. PROVIDE A LOCAL FUSED DISCONNECT AT EACH DOOR OPERATOR.

H. STRUCTURE GROUNDING AND BONDING

GROUND THE METAL FRAMING OF EACH STRUCTURE AROUND ITS PERIPHERY, AT INTERVALS AS RECOMMENDED IN CHAPTER 3 OF NFPA 78. ASSURE THAT ALL METAL FRAMING MEMBERS FOR THE STRUCTURE, DOOR FRAMES, ELECTRICAL CONDUITS, ETC., ARE ELECTRICALLY CONTINUOUS WITH ONE ANOTHER.

I. SURGE PROTECTION

PROVIDE LOW VOLTAGE SURGE (LIGHTING) ARRESTERS FOR THE INCOMING OVERHEAD ELECTRICAL SERVICE TO STRUCTURE B IN ACCORDANCE WITH NEC ARTICLE 280.

13120.07 FRAMED OPENINGS FOR DOORS, ROOF VENTILATORS AND LOUVERS

PROVIDE REINFORCING AND FRAMES FOR ROOF AND WALL OPENINGS FOR HOLLOW METAL DOORS, OR SLIDING FABRIC DOORS OR ROLLING STEEL DOORS, AND LOUVERS, CONSISTING OF FRAMING MEMBERS SO CONSTRUCTED TO STRUCTURALLY REPLACE THE WALL AND/OR FRAMING DISPLACED AND TO SUPPORT APPURTENANCES TO BE INSTALLED.

13120.08 HOLLOW METAL DOORS AND FRAMES

PROVIDE 18 GAGE HOLLOW METAL DOORS AND 16 GAGE FRAMES, SHOP COATED, REINFORCED AND MORTISED FOR HARDWARE, AS MANUFACTURED BY THE FOLLOWING:

- AMERICAN STEEL PRODUCTS CORPORATION
- SUPERIOR FIREPROOF DOOR COMPANY
- WILLIAMSBURG STEEL PRODUCTS COMPANY
- PIONEER INDUSTRIES
- TRUSSBILT, INC.
- CURRIES MANUFACTURING, INC.
- EMERSON ENGINEERING, INC.
- STEELCRAFT MANUFACTURING COMPANY
- THE CECO COMPANY
- AMWELD BUILDING PRODUCTS
- MESKER INDUSTRIES, INC., OR EQUAL

CUT, REINFORCE, DRILL AND TAP FOR MORTISE TYPE HARDWARE AT THE FACTORY, FROM TEMPLATES FURNISHED BY HARDWARE SUPPLIER IN ACCORDANCE WITH ANSI A115.

PROVIDE BOLTS, ANCHORS, CONNECTING MEMBERS AND CLIPS FOR PROPER ANCHORAGE AND SUPPORT OF FRAMES. PROVIDE GALVANIZED OR CADMIUM-PLATED STEEL SCREWS AND BOLTS IN CONCEALED LOCATIONS.

PROVIDE FLOOR ANCHORS AT EACH JAMB AND MULLION. 14 GAGE STEEL MINIMUM, WITH 2 HOLES PER ANCHOR TO RECEIVE FASTENERS.

WHERE REQUIRED, PROVIDE APPROPRIATE ANCHORS FOR EXTERIOR FRAMES ATTACHED TO PREFABRICATED METAL BUILDING WALLS.

BONDERIZE DOORS AND FRAMES AND APPLY SHOP PRIME COAT, INSIDE AND OUTSIDE, OF RUST-INHIBITIVE PRIMER, BAKED ON, MANUFACTURER'S STANDARD.

EXTERIOR AND PASSAGE DOORS TO HAVE 10 BY 10 INCH OPENINGS, GLAZED WITH 1/4 INCH THICK CLEAR WIRE GLASS.

FURNISH AND INSTALL ALL FINISH HARDWARE FOR ALL HOLLOW METAL DOORS, TO BE COMPATIBLE IN STYLE AND SIZE TO SIMILAR DOORS IN ADJACENT FMPC CONSTRUCTION, WHICH USE "BEST" CYLINDERS AND BE CAPABLE OF BEING MASTERKEYED, ACCORDINGLY.

13120.09 HARDWARE FOR PEDESTRIAN DOORS

PROVIDE ALL WROUGHT OR CAST MORTISE TYPE, FINISH HARDWARE OF 32D FINISH FOR ALL DOORS. ITEMS NOT AVAILABLE IN 32D FINISH, MAY BE 26D FINISH.

HINGES TO BE FIVE-KNUCKLES, BALL BEARING, 4-1/2 BY 4-1/2 INCHES, 1-1/2 PAIRS PER DOOR.

LOCKSETS TO BE STORAGE TYPE. PROVIDE CONSTRUCTION CORES, THEN PERMANENT CYLINDERS FOR FINAL INSTALLATION.

CLOSERS TO BE FULL FEATURE TYPE, WITH HOLD-OPEN FEATURE, ADJUSTABLE SPRING POWER, ADJUSTABLE BACK CHECK, NONHANDED, SWEEP SPEED CONTROL, AND LATCH SPEED CONTROL. PROVIDE CAST ALUMINUM WEATHER-TIGHT HOUSING.

EACH DOOR TO HAVE KICK PLATES, 16 GAGE, NO. 4 FINISH, STAINLESS STEEL, 8 INCHES HIGH.

PROVIDE THREE SILENCERS PER DOOR FRAME.

DELIVER KEYS, PROPERLY IDENTIFIED, AS DIRECTED.

13120.10 EXTERIOR FRAMED SLIDING FABRIC DOORS OR ROLLING STEEL DOOR OPENINGS

PROVIDE FRAMING AND BRACING FOR DOOR OPENINGS, SIZE AS SCHEDULED.

COORDINATE LOCATION OF TRACKS, CONTROLS, HARDWARE AND RELATED WORK.

13120.11 VEHICLE ACCESS DOORS

AT SUBCONTRACTORS OPTION PROVIDE HORIZONTAL ROLLING DOORS OR PROVIDE VERTICAL ROLLING METAL DOORS COMPLETE WITH ACCESSORIES AS REQUIRED FOR SUPPORT OF DOOR, MOTOR, CONTROLS AND OTHER DOOR ITEMS.

PROVIDE PULL CORD CONTROL ON INSIDE OF EACH DOOR, SUPPORTED ON FRAMING AND HANGERS, AS REQUIRED.

EXTEND ELECTRICAL POWER FROM PANELBOARD TO EACH DOOR LOCATION.

STEEL PIPE POSTS FOR MOUNTING OF DOOR CONTROL PUSHBUTTONS ON OUTSIDE OF DOORS ARE SPECIFIED IN SECTION 05500.

SUBMIT COMPLETE SHOP DRAWINGS SHOWING FABRICATION AND ERECTION DETAILS, MOTOR OPERATION, WIRING DIAGRAMS, AND RECOMMENDED SPARE PARTS LIST.

PROVIDE DOORS OF ONE OF THE FOLLOWING MANUFACTURERS:

- KINNEAR
- MAHON ROLLING DOOR
- THE COOKSON COMPANY
- CORNELL IRON WORKS, INC.
- J. G. WILSON CORPORATION
- JIM WALTER DOORS/NORTH AMERICAN
- OVERHEAD DOOR CORP., OR EQUAL

FABRICATE SLATS FROM 22 GAGE HOT-DIPPED GALVANIZED STEEL WITH 2 ROWS OF FULL WIDTH VISION PANELS OF CLEAR ACRYLIC PLASTIC. PANELS TO BE WEATHER RESISTANT AND DUST-TIGHT.

PROVIDE A REPLACEABLE, CONTINUOUS NEOPRENE, VINYL OR RUBBER JAMB WEATHER STRIPPING, A CONTINUOUS RUBBER, VINYL OR NEOPRENE BOTTOM GASKET AND A FULL WIDTH RUBBER BAFFLE WITHIN THE HOOD.

PROVIDE GUIDES OF STEEL ANGLES AND COUNTERBALANCING OIL TEMPERED STEEL HELICAL TORSION SPRINGS AND ACCESSORIES.

PROVIDE GALVANIZED HAND CHAIN EMERGENCY OPERATOR.

PROVIDE 460 VOLT, 3-PHASE, 60 HZ HIGH-STARTING TORQUE, REVERSIBLE, CONSTANT DUTY, CLASS A INSULATED ELECTRIC MOTOR WITH OVERLOAD PROTECTION, AND 3 BUTTON POST-MOUNTED CONTROL UNITS WITH PUSH-BUTTONS LABELED "OPEN," "CLOSE" AND "STOP." MOMENTARY PRESSURE REQUIRED TO OPERATE "CLOSE" BUTTON.

COORDINATE LOCATION OF PROTECTIVE STEEL PIPE BOLLARDS AND PIPE POSTS FOR DOOR CONTROL BUTTONS GIVING CAREFUL CONSIDERATION TO DESIGN OF STRUCTURE FRAMING, DOOR OPENING AND VEHICLE OPERATION. CONCRETE FILLED BOLLARDS AND PIPE POSTS ARE SPECIFIED IN SECTION.05500.

PROVIDE COMBINATION WEATHERSEAL AND ELECTRIC SAFETY STRIP MOUNTED ALONG BOTTOM EDGE OF THE DOOR TO OPERATE IN CONJUNCTION WITH DOOR OPERATOR TO STOP AND REVERSE DOOR TO OPEN POSITION IF AN OBSTRUCTION IS IN THE DOOR OPENING.

13120.12 LOUVERS

PROVIDE STORMPROOF LOUVERS, AS MANUFACTURED BY INDUSTRIAL LOUVERS, MODEL 470, OR EQUAL, ADJUSTABLE EXTRUDED ALUMINUM LOUVERS. PROVIDE 1/2 INCH MESH ALUMINUM BIRD SCREEN FOR EACH LOUVER SECTION. BEARINGS TO BE STAINLESS STEEL BALL BEARINGS IN CORROSION RESISTANT RACES.

13120.13 ERECTION

ERECTION OF THE FRAME SUPPORTED FABRIC STRUCTURES, ITS COMPONENTS, AND MISCELLANEOUS ITEMS TO BE BY THE BUILDING MANUFACTURER OR HIS AUTHORIZED REPRESENTATIVE, USING CERTIFIED SHOP AND ERECTION DRAWINGS. WHERE WELDING IS REQUIRED, PERFORM ALL WELDING IN ACCORDANCE WITH AMERICAN WELDING SOCIETY'S "STRUCTURAL WELDING CODE" AWS D1.1, INCLUDING SUPPLEMENT. QUALIFY WELDERS AS PRESCRIBED IN "THE STANDARD QUALIFICATION PROCEDURE" OF THE AMERICAN WELDING SOCIETY. OBTAIN FMPC WORK PERMIT PRIOR TO START OF CONSTRUCTION.

IMMEDIATELY FOLLOWING ERECTION, CLEAN ALL SURFACES OF ALL COMPONENTS OF DIRT OR IMPERFECTIONS AND REPAIR FINISHES WITH THE SAME FABRIC MATERIALS TO THE CONSTRUCTION MANAGER'S SATISFACTION.

13120.14 SPECIAL GUARANTEES

A. BUILDING GUARANTEE

PROVIDE A 5 YEAR PRO RATA WEATHERTIGHTNESS GUARANTEE AGAINST RUPTURE, STRUCTURAL FAILURE, PEELING, CRACKING, OR BLISTERING OF FABRIC FINISH AND 10 YEAR GUARANTEE AGAINST LEAKING.

DIVISION 16

16010 - ELECTRICAL WORK - GENERAL

16010.01 GENERAL

FURNISH MATERIALS AND EQUIPMENT WHICH ARE NEW, PRODUCTS OF REPUTABLE MANUFACTURERS CONFORMING TO THE REQUIREMENTS OF APPLICABLE STANDARDS AND RECOMMENDED PRACTICES OF AUTHORITIES LISTED BELOW AND WHICH CONFORM TO THOSE STANDARDS AND RECOMMENDED PRACTICES IN DESIGN, MANUFACTURE, RATINGS AND TEST.

- AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
- INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)
- INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)
- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
- UNDERWRITERS LABORATORIES INC. (UL), INCLUDING PRODUCT DIRECTORIES
- AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
- AMERICAN WOOD PRESERVERS ASSOCIATION (AWPA)
- FACTORY MUTUAL (FM) "APPROVAL GUIDE" AND "LOSS PREVENTION DATA"
- ELECTRICAL AND ELECTRONICS GRAPHIC SYMBOLS AND REFERENCE DESIGNATIONS, ANSI/IEEE Y32E
- GENERAL SERVICES ADMINISTRATION, FEDERAL SUPPLY SERVICE, "FEDERAL STANDARDS" AND "FEDERAL SPECIFICATIONS"

ALL WORK TO COMPLY WITH THE FOLLOWING:

- DEPARTMENT OF LABOR "OCCUPATIONAL SAFETY AND HEALTH STANDARDS," TITLE 29, CODE OF FEDERAL REGULATIONS (CFR), PART 1910 (OSHA) AND PART 1926 (SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION)
- NATIONAL ELECTRICAL CODE (NEC)
- NATIONAL ELECTRICAL SAFETY CODE (NESC)
- NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
- OHIO BASIC BUILDING CODE (OBBC)
- FEDERAL, STATE AND LOCAL CODES
- DOE 6430.1A, "GENERAL DESIGN CRITERIA MANUAL"
- UNIFORM BUILDING CODE (UBC), SECTION 2312 "EARTHQUAKE REGULATIONS"
- AMERICAN WELDING SOCIETY (AWS), STRUCTURAL WELDING CODE (AWS D1.1)

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OBTAIN REQUIRED PERMITS AND, AT COMPLETION OF WORK, CERTIFICATES OF FINAL INSPECTION BY OPERATING CONTRACTOR.

PROVIDE EQUIPMENT AND MATERIALS HAVING FEATURES AND CHARACTERISTICS AS REQUIRED SO THAT THE COMPLETED FACILITIES COMPLY WITH ALL APPLICABLE SAFETY REQUIREMENTS.

ALL WORK AND MATERIALS TO BE SUCH THAT THE COMPLETED FACILITIES COMPLY WITH ALL APPLICABLE REQUIREMENTS OF SEISMIC ZONE 2 (OBBC).

16010.02 MANUFACTURERS' NAMES

LISTING OF A MANUFACTURER'S NAME FOR ANY MATERIAL OR EQUIPMENT DOES NOT NECESSARILY IMPLY ACCEPTANCE OF THAT MANUFACTURER'S PRODUCT UNLESS IT COMPLIES WITH STANDARDS AND DETAIL SPECIFICATIONS RELATING THERETO.

16010.03 EQUIPMENT RATINGS

VOLTAGE, AMPERE, INTERRUPTING AND OTHER RATINGS FOR EQUIPMENT ARE SHOWN ON DRAWINGS, UNLESS OTHERWISE INDICATED.

16010.04 NAMEPLATES

PROVIDE NAMEPLATE FOR EACH OF THE FOLLOWING ITEMS OF EQUIPMENT, AND AS ADDITIONALLY INDICATED, TO INDICATE DESIGNATION OR PURPOSE.

MOTOR CONTROL CENTER COMPARTMENT
CONTROL DEVICE
PANELBOARD
TRANSFORMER
DISCONNECT

NAMEPLATE TO BE ENGRAVED LAMINATED PHENOLIC, BLACK LETTERS ON WHITE BACKGROUND, 1 INCH HIGH BY 3 INCHES WIDE, OR OTHER ACCEPTABLE SMALLER SIZE, FASTENED BY MEANS OTHER THAN ADHESIVES, SUCH AS SUITABLY SIZED SELF-TAPPING SCREWS OR RIVETS.

PROVIDE SUITABLE STEEL MOUNTING PLATE ADJACENT TO EQUIPMENT AND FASTEN NAMEPLATE THERETO WHEN SIZE, CONTOUR, OR NEMA CLASSIFICATION OF THE ENCLOSURE PROHIBITS FASTENING NAMEPLATE TO EQUIPMENT.

ALL ELECTRICAL UTILIZATION EQUIPMENT AND RECEPTACLES TO HAVE THEIR SOURCES OF POWER IDENTIFIED USING NAMEPLATES AS HEREINBEFORE SPECIFIED. FASTEN NAMEPLATE TO EQUIPMENT, RECEPTACLE OR DEVICE PLATE AS APPROPRIATE, AND TO ITS DISCONNECTING MEANS. COORDINATE NOMENCLATURE WITH CONSTRUCTION MANAGER SO AS TO BE CONSISTENT WITH PLANTWIDE IDENTIFICATION METHODS.

NAMEPLATE REQUIREMENTS WILL NOT BE FURTHER SPECIFIED UNDER INDIVIDUAL HEADINGS.

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16010.05 APPEARANCE

GIVE SPECIAL ATTENTION TO THE APPEARANCE OF ALL FACILITIES EXPOSED TO VIEW, AND INSTALL MATERIAL AND DEVICES AS REQUIRED TO GIVE A NEAT AND ORDERLY APPEARANCE.

WHERE EXPOSED TO VIEW, INSTALL RACEWAYS, MATERIALS AND DEVICES PARALLEL OR PERPENDICULAR TO STRUCTURE LINES. INSTALL DEVICES AND PANELS ON INTERIOR AND EXTERIOR WALLS IN ALIGNMENT WITH ONE ANOTHER, WITH CONSTRUCTION INSTALLED UNDER OTHER DIVISIONS OF THESE SPECIFICATIONS AND, WHERE APPROPRIATE, WITH EXISTING DEVICES, PANELS AND CONSTRUCTION.

WHERE INSTALLATION HEIGHT FOR DEVICES IS NOT INDICATED OR WHERE THERE IS ANY QUESTION AS TO THE APPEARANCE OF THE INSTALLATION, LOCATE DEVICES AS DIRECTED BY THE CONSTRUCTION MANAGER.

16010.06 SUPPORTS FOR EQUIPMENT

PROVIDE ALL NECESSARY SUPPORTS FOR EQUIPMENT PROVIDED OR INSTALLED UNDER THIS DIVISION. SUPPORTS TO CONSIST OF STEEL FRAMES, PLATES, BRACKETS, RACKS AND OTHER SHAPES OF ADEQUATE SIZE AND FASTENED WITH BOLTS, SCREWS OR BY WELDING, TO PROVIDE RIGID SUPPORT OF SUFFICIENT STRENGTH. WELDS TO BE CONTINUOUS AND REASONABLY SMOOTH. SURFACES TO BE SUITABLY PROTECTED FROM THE ENVIRONMENT. ACCEPTABLE METHODS INCLUDE FULL GALVANIZING AFTER FABRICATION OR COVERING WITH ZINC RICH PAINT AS SPECIFIED HEREINAFTER. WHERE PAINT IS USED, MAINTAIN TIGHT CONTROL ON EACH STEP OF THE OPERATION FROM SURFACE PREPARATION, THROUGH PRIMER AND TO FINAL FINISH COATS.

16010.07 FIELD CONDITIONS

COORDINATE WORK WITH THE VARIOUS TRADES INVOLVED IN THE PROJECT TO FIT AVAILABLE SPACE. IF THERE IS ANY QUESTION AS TO WHERE ELECTRICAL SYSTEM COMPONENTS SHOULD BE LOCATED SO THAT THE WORK OF OTHER TRADES CAN BE PROPERLY INSTALLED, MEET AND DISCUSS SUCH QUESTIONS WITH THE OTHER TRADES INVOLVED, JOINTLY PREPARE SKETCHES OR COORDINATION DRAWINGS IF NECESSARY, AND OTHERWISE COORDINATE THE WORK. ANY WORK INSTALLED IN SUCH LOCATIONS AS TO PREVENT OTHER TRADES FROM INSTALLING THEIR WORK WITH REASONABLE CONVENIENCE MUST BE RELOCATED AT NO ADDITIONAL CONTRACT COST.

DRAWINGS INDICATE DESIRED POSITION OF EQUIPMENT. UNLESS DIMENSIONED, RACEWAY ROUTING IS SHOWING SCHEMATICALLY. DO NOT INSTALL RACEWAYS IN LOCATIONS WHICH WOULD MAKE IMPOSSIBLE THE WORK OF OTHER TRADES. COORDINATE WORK WITH OTHER TRADES TO AVOID INTERFERENCES. IF CONDITIONS ARE ENCOUNTERED WHICH MAKE INDICATED ARRANGEMENTS IMPOSSIBLE OR IMPRACTICAL, SUBMIT REQUEST FOR DEVIATION WITH DRAWINGS AS REQUIRED TO CLARIFY THE REQUEST.

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16010.08 OPENINGS, PENETRATIONS AND SEALS FOR CONDUIT OR CABLE

PROVIDE A SCHEDULE 40 PIPE SLEEVE FOR EACH SINGLE CONDUIT WHICH PENETRATES PARTITIONS OR WALLS IN EXISTING BUILDINGS. USE PIPE TWO SIZES LARGER THAN CONDUIT. PACK VOID BETWEEN CONDUITS AND PIPE SLEEVE WITH OAKUM WHERE CONDUIT PASSES THROUGH SLEEVE IN EXTERIOR WALLS ABOVE OR BELOW GRADE. FILL ENDS OF SLEEVES WITH GENERAL ELECTRIC SILICONE FOAM RTV 851, OR APPROVED EQUAL, AND TROWEL NEATLY TO MAKE SEAL. PIPE SLEEVES IN WALLS TO BE FLUSH WITH WALL SURFACES AND PIPE SLEEVES IN FLOORS TO BE EXTENDED 1-1/2 INCHES ABOVE FINISHED FLOOR. PROVIDE SPLIT PLATES TO CLOSE AROUND EXPOSED CONDUITS PASSING THROUGH WALLS AND AROUND EXPOSED SLEEVES EXTENDING ABOVE FLOORS.

PENETRATIONS OF BUILDINGS A, B AND C TO BE MADE IN STRICT ACCORDANCE WITH BUILDING MANUFACTURER'S INSTRUCTIONS.

16010.09 ACCESS

PROVIDE ACCESS FOR ALL ITEMS REQUIRING INSPECTION OR MAINTENANCE, SUCH AS JUNCTION, PULL AND OUTLET BOXES AND SEALING FITTINGS.

16010.10 PROTECTION OF PROPERTY

PROTECT EQUIPMENT AND MATERIALS FROM INTRUSION OF ALL FOREIGN MATERIALS. DO NOT INSTALL SENSITIVE ELECTRICAL EQUIPMENT UNTIL MAJOR CONSTRUCTION WORK IS COMPLETED. DURING AND AFTER INSTALLATION, PROTECT EQUIPMENT FROM DAMAGE BY WATER, DUST, PAINT, WET CONCRETE, IMPACT, ETC.

16010.11 CUTTING AND PATCHING

WHERE SLEEVES, FRAMING OR FORMING HAVE NOT BEEN PLACED FOR PROPER INSTALLATION OF WORK, OBTAIN FROM THE CONSTRUCTION MANAGER THE LOCATIONS NECESSARY TO CONTINUE WITH CONSTRUCTION OPERATION.

PATCH SUCH OPENINGS IN ACCORDANCE WITH APPLICABLE REQUIREMENTS SPECIFIED UNDER OTHER DIVISIONS OF THESE SPECIFICATIONS BY WORKERS SKILLED IN THE TRADE INVOLVED.

NEATLY BAND HOLES CUT IN GRATINGS. WHERE GRATINGS ARE GALVANIZED, IMMEDIATELY COAT THE BANDING AND ANY ABRADED SURFACES WITH TWO COATS OF ZINC RICH PAINT AS SPECIFIED HEREINAFTER.

INSOFAR AS POSSIBLE, AVOID MAKING HOLES IN EXISTING OR NEW STRUCTURAL STEEL. IF HOLES ARE REQUIRED, OBTAIN CONSTRUCTION MANAGER'S PERMISSION AND DRILL OR PUNCH HOLES. DO NOT CUT WITH TORCH.

16010.12 WELDING

NO WELDING OR OPEN FLAME WORK WILL BE PERMITTED IN THE CONSTRUCTION AREA UNLESS PERMITTED BY, PREARRANGED WITH, AND COORDINATED WITH THE CONSTRUCTION MANAGER, AND AN FMPC WELDING PERMIT OBTAINED.

WELDING MUST BE DONE BY ACCEPTABLE CERTIFIED WELDERS AND IN ACCORDANCE WITH FMPC APPROVED WELDING STANDARDS AND COMPLYING WITH THE LATEST AWS D1.1 CODE OR WITH ANY STATE OR LOCAL CODE REQUIREMENTS WHICH SUPERSEDE IT.

BEFORE WELDING, SUBMIT CERTIFICATION OF COMPLIANCE FORMS FOR EACH WELDER. ALL WELDING AND MATERIALS TO BE SUITABLE FOR USE IN SEISMIC ZONE 2.

16010.13 PAINTING

A. GENERAL

UNLESS FACTORY FINISH IS SPECIFIED, OR PRIOR PAINTING IS PART OF MANUFACTURER'S STANDARD PROCEDURE, PRIME PAINT FABRICATED OR MANUFACTURED EQUIPMENT AND MATERIAL PRIOR TO, OR IMMEDIATELY AFTER, INSTALLATION AS HEREINAFTER SPECIFIED.

ITEMS NOT INCLUDED:

- GALVANIZED OR SIMILAR TREATED SURFACES. INSOFAR AS POSSIBLE, AVOID FIELD CUTTING, BURNING OR WELDING OF GALVANIZED HARDWARE. WHERE SUCH OPERATIONS ARE NECESSARY, SPOT PRIME AND PAINT INVOLVED SURFACES WITH HIGH ZINC DUST CONTENT PAINT FOR REGALVANIZING GALVANIZED STEEL, AS MANUFACTURED BY AMERON, CARBOLINE, PORTER, TNEMEC, OR APPROVED EQUAL
- NONFERROUS SURFACES
- NONMETALLIC SURFACES
- PLATED SURFACES
- STAINLESS STEEL SURFACES
- INSIDE OF CONDUITS AND DEVICES
- WEARING SURFACES

THOROUGHLY CLEAN AND REPRIME SHOP COATED MATERIALS OR EQUIPMENT WHICH SHOW EVIDENCE OF CORROSION.

FIELD FINISH PAINTING IS SPECIFIED UNDER SECTION 09900 EXCEPT AS INDICATED FOR TOUCH-UP OF DAMAGED GALVANIZED SURFACES.

B. PAINTING

CLEAN ALL SURFACES TO REMOVE DIRT, OIL, GREASE, DUST, SCALE, RUST AND FOREIGN MATTER BEFORE APPLYING PAINT. PREPARE SURFACES AND APPLY PAINT IN ACCORDANCE WITH PAINT MANUFACTURER'S RECOMMENDATIONS.

PAINT WITH ONE COAT OF PRIMER. USE PORTER NO. 298 GRAY ALKYD PRIMER, OR EQUIVALENT PPG, SHERWIN-WILLIAMS, DUPONT, PRATT AND LAMBERT, DEVOE, GLIDDEN, BENJAMIN MOORE, OR APPROVED EQUAL.

16010.14 TESTS AND REPORTS

MAKE TESTS AND ARRANGE FOR INSPECTIONS NECESSARY TO DETERMINE THAT WIRING AND EQUIPMENT INSTALLED UNDER THESE SPECIFICATIONS ARE IN SATISFACTORY CONDITION TO BE ENERGIZED. SCHEDULE TESTS AND INSPECTIONS AT TIMES SATISFACTORY TO THE CONSTRUCTION MANAGER'S REPRESENTATIVE TO ENABLE THEM TO BE PRESENT. ALL PARTS OF THE INSTALLATION, WHEN TESTED, TO MEET APPLICABLE STANDARDS.

KEEP A COMPLETE AND ACCURATE RECORD OF ALL TESTS AND INSPECTIONS AND SUBMIT ONE COPY FOR REVIEW.

FURNISHING AND SETTING UP OF REQUIRED TEST EQUIPMENT AND PERFORMANCE OF WORK INCIDENTAL TO MAKING TESTS IS A PART OF WORK UNDER THIS DIVISION.

REPLACE ANY WORK AND EQUIPMENT PROVIDED UNDER THIS DIVISION AND FOUND FAULTY OR DEFECTIVE UNDER TEST. SHOULD THE CONSTRUCTION MANAGER AGREE, FAULTY OR DEFECTIVE WORK AND EQUIPMENT MAY BE REPAIRED RATHER THAN REPLACED. AFTER REPLACEMENT OR REPAIR, TEST WORK AGAIN. FINAL ACCEPTANCE OF WORK DEPENDS ON SUCCESSFUL COMPLETION OF OPERATIONAL TESTS ON ALL EQUIPMENT TO SHOW THAT THE EQUIPMENT WILL PERFORM THE FUNCTIONS FOR WHICH IT IS SPECIFIED.

UPON RECEIPT OF EQUIPMENT FURNISHED FOR INSTALLATION UNDER THIS DIVISION, IMMEDIATELY INSPECT EQUIPMENT FOR DAMAGE, DEFECTS AND MISSING COMPONENTS. IF SUCH CONDITIONS ARE FOUND WHICH MAKE THE EQUIPMENT UNSUITABLE FOR INSTALLATION, IMMEDIATELY NOTIFY CONSTRUCTION MANAGER FOR DISPOSITION.

PRIOR TO MAKING ALTERATIONS OR ADDITIONS TO EXISTING EQUIPMENT OR SYSTEMS, CHECK SUCH EXISTING EQUIPMENT OR SYSTEMS FOR PROPER OPERATION. IF EQUIPMENT OR SYSTEMS ARE FOUND TO BE FAULTY, DAMAGED, OR INOPERATIVE SO AS TO BE UNSUITABLE FOR ALTERATION OR ADDITION, IMMEDIATELY NOTIFY CONSTRUCTION MANAGER FOR DISPOSITION.

INSTRUMENTS USED FOR TESTS ARE TO BE MAINTAINED UNDER A DOCUMENTED CALIBRATION PROGRAM AS SPECIFIED IN SECTION 01100.

PERFORM CONTINUITY AND OPERATIONAL TESTS ON ALL LIGHTING, RECEPTACLE, POWER AND CONTROL CIRCUITS.

TEST ALL 125 VOLT, 3-WIRE GROUNDING RECEPTACLES, INCLUDING THOSE PROVIDED FOR TEMPORARY POWER, FOR CORRECT WIRING AND FOR CORRECT OPERATION OF GFCI (IF RECEPTACLE IS SO PROTECTED), BY USE OF A RECEPTACLE CIRCUIT TESTER SUCH AS GENERAL ELECTRIC MODEL TRC2-3 OR APPROVED EQUAL.

CHECK ALL CONTROL AND INTERLOCKING WIRING FOR PROPER OPERATION. PERFORM OPERATIONAL TESTS WITH CONSTRUCTION MANAGER TO ASSURE THAT CONTROL WIRING HAS BEEN PROPERLY INSTALLED.

PERFORM INSULATION RESISTANCE TEST ON 480 VOLT CIRCUITS AFTER INSTALLATION AND BEFORE ENERGIZATION USING A 1,000 VOLT BIDDLE MEGGER TEST SET, OR APPROVED EQUAL. MAINTAIN TEST UNTIL READINGS ARE STEADY. INVESTIGATE CAUSES AND TAKE APPROPRIATE REMEDIAL ACTION WHEN INSULATION RESISTANCE TESTS LESS THAN 5 MEGOHMS, OR WHEN MULTIPLE TESTS INDICATE A SIGNIFICANT DOWNWARD TREND IN THE RESISTANCE READINGS. SIMILARLY TEST CIRCUITS FOR LOWER VOLTAGES USING A 500 VOLT TEST SET.

DO NOT PERFORM INSULATION RESISTANCE TEST ON CIRCUITS OPERATED BELOW 120 VOLTS NOR ON SOLID-STATE EQUIPMENT OR STATIC GROUND FAULT DEVICES, INCLUDING GROUND FAULT CIRCUIT INTERRUPTERS, NOR ON ANY CIRCUIT CONNECTED TO EQUIPMENT CONTAINING SOLID-STATE DEVICES, UNLESS SUCH TEST IS AUTHORIZED BY, AND IS PERFORMED IN STRICT ACCORDANCE WITH, EQUIPMENT MANUFACTURER'S RECOMMENDATIONS, OR IN LIEU THEREOF, DISCONNECT EQUIPMENT FROM THE CIRCUIT.

INSPECT ALL GROUND CONNECTIONS FOR CONTINUITY AND TIGHT ELECTRICAL AND MECHANICAL CONNECTIONS. TEST RESISTANCE AT VARIOUS POINTS ON GROUNDING SYSTEM, USING BIDDLE GROUND OHMER, OR APPROVED EQUAL, OR OTHER STANDARD METHOD. MAXIMUM PERMISSIBLE GROUNDING SYSTEM RESISTANCE IS 5 OHMS.

TEST ALL EMERGENCY LIGHTING SYSTEMS FOR SATISFACTORY OPERATION AND PERFORMANCE AT EACH OUTLET AND EQUIPMENT LOCATION.

16010.15 PHASE ROTATION AND IDENTIFICATION

MAINTAIN NEMA PHASE POSITIONS IN ALL ELECTRICAL EQUIPMENT CONNECTIONS.

TAG EACH TERMINAL OF EQUIPMENT WITH PHASE MARKINGS AS AN AID IN MAKING PROPER WIRING CONNECTIONS.

16010.16 WORK ON ENERGIZED CIRCUITS AND EQUIPMENT

CERTAIN EXISTING FACILITIES WILL REMAIN IN SERVICE THROUGHOUT CONSTRUCTION WITH ONLY BRIEF SHUTDOWN PERIODS PERMITTED FOR MODIFICATIONS AND TIE-IN CONNECTIONS. SCHEDULE SHUTDOWN PERIODS TO CONFORM TO OPERATING CONTRACTOR'S AND CONSTRUCTION MANAGER'S REQUIREMENTS, AND ONLY WITH WRITTEN AUTHORIZATION FROM THE CONSTRUCTION MANAGER.

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WHEN IT IS NECESSARY TO PERFORM PORTIONS OF WORK ON OR ADJACENT TO ENERGIZED EQUIPMENT, USE ONLY PERSONNEL QUALIFIED AND EXPERIENCED IN SUCH OPERATIONS, AND TAKE PROPER SAFETY MEASURES TO PROTECT PERSONNEL AND EQUIPMENT.

FOLLOW FMPC LOCK AND TAG PROCEDURES.

16010.17 CODES, PERMITS AND INSPECTIONS

CONTRACT DOCUMENTS GOVERN WHERE MORE STRICT THAN LAWS, ORDINANCES, APPLICABLE STANDARDS OF UL, NFPA, AND NEC, EVEN THOUGH SUCH ADDITIONAL WORK IS NOT STATUTORILY REQUIRED BY ANY LAW OR ORDINANCES.

PROVIDE MATERIALS AND EQUIPMENT BEARING CERTIFICATION OF UL WHERE SUCH LABELS OR STAMPS ARE CUSTOMARY, REQUIRED, OR SPECIFIED.

WITHIN 30 DAYS AFTER AWARD OF CONTRACT, SUBMIT TO OPERATING CONTRACTOR SUCH WORKING AND LAYOUT DRAWINGS AS MAY BE REQUIRED. PROVIDE SERVICES OF A QUALIFIED ENGINEER, IF REQUIRED BY THE OPERATING CONTRACTOR, TO PREPARE DRAWINGS. OBTAIN APPROVAL BEFORE PROCEEDING.

16010.18 SHOP DRAWINGS

SUBMIT WIRING DIAGRAMS OR CONNECTION DIAGRAMS ACCOMPANIED BY ADEQUATELY DEFINED SYMBOLS LIST. PREPARE SCHEMATIC AND WIRING DIAGRAMS IN ACCORDANCE WITH ANSI/IEEE PUBLICATION Y32E, "ELECTRICAL AND ELECTRONICS GRAPHIC SYMBOLS AND REFERENCE DESIGNATIONS."

REFER TO SECTION 01100 FOR ADDITIONAL INFORMATION AND SHOP DRAWING SUBMITTAL REQUIREMENTS.

DIVISION 16

16020 - SCOPE OF ELECTRICAL WORK

16020.01 SCOPE OF WORK

FURNISH ALL EQUIPMENT AND MATERIALS, ALL LABOR AND SERVICES, AND DO ALL WORK SHOWN OR SPECIFIED, TOGETHER WITH ALL NECESSARY APPURTENANCES, TO PROVIDE COMPLETE AND OPERABLE ELECTRICAL SYSTEMS.

NOTE THAT CERTAIN WORK AND EQUIPMENT SPECIFIED IN DIVISION 16 OF THESE SPECIFICATIONS ARE INCLUDED ONLY FOR THE PURPOSE OF ESTABLISHING DESIGN REQUIREMENTS FOR ELECTRICAL WORK IN SECTION 13120, AND ARE NOT APPLICABLE TO THIS SCOPE OF WORK UNDER DIVISION 16.

IN GENERAL, WORK UNDER THIS DIVISION INCLUDES, BUT IS NOT NECESSARILY LIMITED TO:

- EMPTY UNDERGROUND CONDUIT
- MODIFICATION OF EXISTING MOTOR CONTROL CENTER
- GROUNDING
- CONDUIT AND WIRING SYSTEM FOR POWER TO POLE AT BULDING B
- DEMOLITION
- TEMPORARY POWER AND LIGHT WIRING FOR CONSTRUCTION

16020.02 DEMOLITION OF ELECTRICAL WORK

ALL DEMOLITION WORK TO BE PERFORMED IN ACCORDANCE WITH CURRENT FMPC OPERATING PROCEDURES. REFER TO SECTION 02050 FOR ADDITIONAL INFORMATION AND REQUIREMENTS REGARDING DEMOLITION.

PROVIDE ALL NECESSARY LABOR, MATERIALS, TOOLS, DEVICES AND EQUIPMENT AS REQUIRED TO COMPLETE THE FOLLOWING DEMOLITION WORK:

REMOVE EXISTING WOOD ELECTRICAL POLES AND ASSOCIATED LUMINAIRES FROM CONSTRUCTION PHASE A/B AREAS AS INDICATED ON THE DRAWINGS. POLES ARE TO BE REMOVED COMPLETELY INCLUDING ALL UNDERGROUND PORTIONS. BACKFILLING AND RESURFACING IS PROVIDED UNDER DIVISIONS 2 AND 3.

CUT OFF CONDUIT AND WIRE FEEDING POLES BELOW TOP OF EXISTING PAD AS INDICATED. TAPE AND ABANDON WIRES IN PLACE. SEALING OF CONDUIT IS PROVIDED UNDER DIVISION 3. DISCONNECT SECONDARY OF CONSTANT CURRENT TRANSFORMER NEAR PLANT 1 WHICH FEEDS LIGHTING CIRCUITS IN CONSTRUCTION PHASE A AND B AREAS.

CIRCUITRY TO BE MAINTAINED AS REQUIRED TO MAINTAIN PAD ILLUMINATION IN AREAS NOT BEING DEMOLISHED DUE TO PHASING OF WORK.

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16020.04 RESTORATION OF EXISTING FACILITIES

REPLACE OR RESTORE TO THEIR ORIGINAL UNDAMAGED CONDITION ALL FACILITIES DAMAGED DURING PROGRESS OF WORK EXCEPT AS OTHERWISE INDICATED FOR DEMOLITION OF LIGHT POLES AND FOR WORK ASSOCIATED WITH UNDERGROUND CONDUIT. SUCH REPLACEMENT OR RESTORATION APPLIES TO BOTH SURFACE AND SUBSURFACE INSTALLATIONS AND MATERIALS. USE MATERIALS AND INSTALLATION METHODS TO MATCH EXISTING INSTALLATIONS. PERFORM SITE WORK IN ACCORDANCE WITH THE REQUIREMENTS OF DIVISION 2.

16020.05 TEMPORARY WIRING

PROVIDE AND MAINTAIN DURING PERIOD OF CONSTRUCTION, TEMPORARY ELECTRIC SERVICE FOR GENERAL LIGHTING AND SMALL POWER TOOLS AT CONSTRUCTION AREAS.

MAKE SUPPLY CONNECTIONS TO OPERATING CONTRACTOR'S POWER DISTRIBUTION SYSTEM AS DIRECTED BY THE CONSTRUCTION MANAGER. THE OPERATING CONTRACTOR WILL PAY FOR ALL ENERGY USED FOR TEMPORARY POWER, PROVIDED REASONABLE CARE IS EXERCISED IN ITS USE.

ERECT TEMPORARY DISTRIBUTION PANELS AT POINTS SATISFACTORY TO THE CONSTRUCTION MANAGER, CONVENIENT TO CONSTRUCTION AREA.

PROVIDE DISTRIBUTION SYSTEM AND TRANSFORMERS AS REQUIRED TO PRODUCE IN-SERVICE VOLTAGE AT LAMP HOLDERS AND RECEPTACLES OF NOT LESS THAN 95 PERCENT OF THE VOLTAGES SPECIFIED FOR TEMPORARY POWER.

CHARACTERISTICS FOR TEMPORARY POWER - 120/240 VOLTS, SINGLE PHASE, OR 120/208 VOLTS, 3-PHASE.

EXTEND 120 VOLT CIRCUITS FOR LIGHTING AND SMALL POWER, PROPERLY PROTECTED AGAINST OVERCURRENT, THE FULL LENGTH OF CONSTRUCTION AREA. PROVIDE KEYLESS LAMP HOLDERS WITH 200 WATT INCANDESCENT LAMPS FOR EACH 400 SQUARE FEET OF AREA.

PROVIDE GUARDS OR REFLECTORS TO PREVENT ACCIDENTAL CONTACT WITH LAMPS.

FOR 120 VOLT POWER, PROVIDE GROUNDING TYPE, SINGLE PHASE RECEPTACLES OR CORD CONNECTORS, NOT MORE THAN 4 ON EACH RECEPTACLE CIRCUIT. PROVIDE AS MANY CIRCUITS AS REQUIRED TO LIMIT EACH CIRCUIT TO 1,600 WATTS. PROTECT RECEPTACLE CIRCUITS WITH GROUND FAULT CIRCUIT INTERRUPTERS.

WHERE NECESSARY FOR COMPLIANCE WITH THE NEC, PROVIDE GROUND RODS AT DISTRIBUTION PANELS AND ELSEWHERE AS REQUIRED, TO PROVIDE ADEQUATE GROUNDING FOR NEUTRAL CONDUCTOR OF THE WIRING SYSTEM, METAL ENCLOSURES AND PORTABLE POWER TOOLS. IF THE RESISTANCE OF A ROD TO EARTH IS GREATER THAN 25 OHMS, DRIVE ADDITIONAL RODS UNTIL SATISFACTORY LOW GROUND RESISTANCE IS OBTAINED. PROVIDE A SEPARATE GROUNDING CONDUCTOR PARALLELING THE RECEPTACLE CIRCUITS.

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DO NOT CONNECT ADDITIONAL GROUND RODS OR OTHER FORM OF GROUNDING ELECTRODE TO EXTENDED EXISTING NEUTRAL CONDUCTORS GROUNDED ELSEWHERE ON THE FMPC SITE.

ADDITIONAL EXTENSIONS REQUIRED FOR SMALL POWER OR LIGHTING ARE TO BE PROVIDED BY THE SUBCONTRACTOR OR SUB-SUBCONTRACTOR REQUIRING THE EXTENSION.

MAINTAIN TEMPORARY WIRING IN A SAFE AND SATISFACTORY WORKING CONDITION, INCLUDING THE REPLACEMENT OF FUSES AND LAMPS. AT CONCLUSION OF THE WORK, REMOVE ALL TRACES OF TEMPORARY WIRING FROM THE PREMISES.

IN THE EVENT THAT POWER WITH OTHER CHARACTERISTICS IS REQUIRED, THE SUBCONTRACTOR OR SUB-SUBCONTRACTOR REQUIRING SUCH SERVICE IS TO MAKE ALL ARRANGEMENTS FOR OBTAINING SUCH SERVICE (INCLUDING PROVISION OF GENERATORS WHERE NECESSARY), PROVIDE THE NECESSARY DISTRIBUTION FACILITIES, PAY ALL CHARGES FOR INSTALLATION AND MAINTENANCE OF THE SERVICE, AND AT CONCLUSION OF THE WORK, REMOVE ALL TRACES OF THIS SERVICE FROM THE PREMISES.

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DIVISION 16

16307 - ELECTRICAL SWITCHING AND CONTROLS - LOW VOLTAGE
(1,000 VOLTS AND BELOW)

16307.01 TRANSFORMER - LOW VOLTAGE DRY TYPE

MANUFACTURERS (OR APPROVED EQUAL):

GENERAL ELECTRIC
I-T-E
SQUARE D
WESTINGHOUSE

GENERAL PURPOSE INDOOR TRANSFORMER, 2 WINDING WITH NEMA STANDARD FULL CAPACITY HIGH VOLTAGE TAPS, MAXIMUM 220C INSULATION SYSTEM, 150C RISE.

INDICATE IMPEDANCE ON NAMEPLATE.

AUDIBLE SOUND LEVEL TO BE NEMA/ANSI STANDARD.

16307.02 PANELBOARD

MANUFACTURERS (OR APPROVED EQUAL):

GENERAL ELECTRIC
SQUARE D
WESTINGHOUSE

A. GENERAL

COMPLETELY FACTORY-BUILT AND -TESTED, TOTALLY ENCLOSED, DEAD FRONT, WALL MOUNTING NEMA 1 TYPE PANELBOARD. LOAD CENTER WILL NOT BE ACCEPTABLE.

CABINET CONSTRUCTED OF CODE GAGE GALVANIZED STEEL, WITH WIRING GUTTERS OF ADEQUATE SIZE TO MEET NEC/UL WIRE BENDING SPACE REQUIREMENTS. FINISH WITH PRIME COAT, OVER A RUST INHIBITOR, WITH A FINISH COAT OF THE MANUFACTURER'S STANDARD ENAMEL OVERALL.

PROVIDE DOOR FOR PANELBOARD. DOOR AND TRIM OF CODE GAGE STEEL, RABBETED, WITH ADJUSTABLE INDICATING TRIP CLAMPS, CONCEALED HINGES, AND LOCK AND CATCH COMBINATION. KEY ALL LOCKS ALIKE. NEATLY TYPED DIRECTORY, WITH A CLEAR PLASTIC COVER, IN FRAME ON TRIM OR INSIDE PANELBOARD DOOR AS APPLICABLE.

PROVIDE FULL LENGTH COPPER BUS AND EQUIP ALL SPACES, WHETHER OR NOT SPECIFIED FOR FUTURE USE, WITH HARDWARE AND BUSES TO RECEIVE FUTURE UNITS.

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WHERE NEUTRAL IS REQUIRED PROVIDE FULL-CAPACITY INSULATED COPPER SOLID NEUTRAL BUS WITH REQUIRED TERMINALS.

PROVIDE SEPARATE COPPER GROUND BUS WITH REQUIRED TERMINALS.

PROVIDE BREAKER HANDLE LOCKING CLIPS OR PADLOCKING DEVICE AND OTHER ACCESSORIES AND FEATURES AS REQUIRED.

16307.03 CIRCUIT BREAKERS

PROVIDE A MOLDED CASE 480 VOLT BREAKER IN MOTOR CONTROL CENTER MCC N2-2 IN FIRST FLOOR OF PLANT 1. BREAKER TO HAVE MINIMUM 25,000 AMPERES INTERRUPTING RATING. BREAKER TO HAVE CHARACTERISTICS AS REQUIRED TO MAKE IT COMPATIBLE WITH THE EXISTING MOTOR CONTROL CENTER AND THESE SPECIFICATIONS.

MOLDED CASE CIRCUIT BREAKERS, AMBIENT COMPENSATED OR FACTORY-CALIBRATED WHEN USED FOR PANELBOARD INSTALLATION IN STRUCTURES. CIRCUIT BREAKERS IN PANELBOARD TO BE BOLT-IN TYPE ONLY, USING A FULL SPACE MODULE PER POLE MINIMUM. PLUG-IN BREAKERS WILL NOT BE ACCEPTED.

BREAKERS ELECTRICALLY AND MECHANICALLY TRIP-FREE, QUICK-MAKE, QUICK-BREAK, TRIP INDICATING WITH THE TRIPPED POSITION OF THE BREAKER HANDLE MIDWAY BETWEEN THE ON AND OFF POSITION.

TRIP UNITS TO BE THERMAL MAGNETIC TYPE. FOR FRAME SIZES LESS THAN 225 AMPERES, PROVIDE NONINTERCHANGEABLE TRIP UNITS, CALIBRATED AND SEALED AT THE FACTORY AT MANUFACTURER'S STANDARD TRIP CURRENT RATING UNLESS OTHERWISE INDICATED.

480 VOLT MOLDED CASE CIRCUIT BREAKERS IN PANELBOARDS TO HAVE MINIMUM 14,000 AMPERES INTERRUPTING RATING. MOLDED CASE CIRCUIT BREAKERS 240 VOLT, AND BELOW, IN PANELBOARDS TO HAVE MINIMUM 10,000 AMPERES INTERRUPTING RATING.

PROVIDE CLASS A GROUND FAULT CIRCUIT INTERRUPTER (GFCI) TYPE BREAKERS WHERE REQUIRED, AND WIRE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

16307.04 SWITCHING AND CONTROL EQUIPMENT

SWITCHING AND CONTROL MANUFACTURERS (OR APPROVED EQUAL) UNLESS OTHERWISE INDICATED:

- GENERAL ELECTRIC
- SQUARE D
- WESTINGHOUSE

ENCLOSURE TYPES TO BE NEMA 1 INDOORS.

A. SAFETY AND DISCONNECT SWITCHES

FRONT-OPERATED, TYPE HD, SINGLE THROW, QUICK-MAKE, QUICK-BREAK, HORSEPOWER RATED, VISIBLE BLADE SWITCHING UNIT. INTERLOCK OPERATING HANDLE TO PREVENT OPENING DOOR UNLESS SWITCH IS IN OPEN POSITION. FUSIBLE TYPES TO BE PROVIDED WITH FUSE TERMINALS TO ACCOMMODATE TYPE OF FUSES INDICATED. INCLUDE PROVISION FOR PADLOCKS TO LOCK THE SWITCH IN OPEN POSITION.

SWITCHES TO HAVE LOAD TERMINALS AT BOTTOM AND TO BE CLOSED WHEN HANDLE IS IN UP POSITION.

B. FUSES

ALL FUSES IN EACH RESPECTIVE VOLTAGE CLASS TO BE SAME MANUFACTURER.

ALL REJECTION TYPE FUSES TO BE INSTALLED IN REJECTION TYPE FUSEHOLDERS.

FUSES, 600 VOLTS AND LOWER:

UL CLASS RKI, 200,000 AIC SYMMETRICAL, REJECTION TYPE
BUSS LPS-RK LOW PEAK, DUAL ELEMENT, 600 VOLT RATING, AND
BUSS LPN-RK LOW PEAK, DUAL ELEMENT, 250 VOLT RATING,
OR APPROVED EQUAL.

DIVISION 16

16400 - ELECTRICAL WIRING

16400.01 ELECTRIC SERVICE SYSTEMS

A. POWER DISTRIBUTION

120/240 VOLTS, SINGLE PHASE, 3-WIRE, 60 HZ, GROUNDED NEUTRAL.

208Y/120 VOLTS, 3-PHASE, 4-WIRE, 60 HZ, GROUNDED NEUTRAL.

240 VOLTS, 3-PHASE, 3-WIRE, 60 HZ.

480 VOLTS, 3-PHASE, 3-WIRE, 60 HZ.

480Y/277 VOLTS, 3-PHASE, 4-WIRE, 60 HZ, GROUNDED NEUTRAL.

B. LIGHTING DISTRIBUTION SYSTEM VOLTAGES

480Y/277 VOLTS, 3-PHASE, 4-WIRE, 60 HZ, WITH 277 VOLT SINGLE PHASE BRANCH CIRCUITS FOR LIGHTING. NOT MORE THAN 3 CIRCUITS ON SEPARATE PHASES HAVING COMMON NEUTRAL.

208Y/120 VOLTS, 3-PHASE, 4-WIRE, 60 HZ, WITH 120 VOLT SINGLE PHASE BRANCH CIRCUITS. NOT MORE THAN 3 CIRCUITS ON SEPARATE PHASES HAVING COMMON NEUTRAL.

120/240 VOLTS, SINGLE PHASE, 3-WIRE, 60 HZ, WITH 120 VOLTS SINGLE PHASE BRANCH CIRCUITS. NOT MORE THAN 2 CIRCUITS ON SEPARATE LEGS HAVING COMMON NEUTRAL.

C. SMALL POWER

240 VOLTS, SINGLE PHASE, 60 HZ.

208 VOLTS, SINGLE PHASE, 60 HZ.

120 VOLTS, SINGLE PHASE, 60 HZ.

208 VOLTS, 3-PHASE, 3-WIRE, 60 HZ.

240 VOLTS, 3-PHASE, 3-WIRE, 60 HZ.

480 VOLTS, 3-PHASE, 3-WIRE, 60 HZ.

16400.02 WIRING

GENERAL:

INSTALL ALL WIRING, EXCEPT AERIAL DISTRIBUTION IN CONDUIT OR OTHER ACCEPTABLE RACEWAY.

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PULL NO WIRE UNTIL THE CONDUIT SYSTEM IS COMPLETELY AND THOROUGHLY SWABBED. USE INERT PULLING COMPOUNDS FREE OF INGREDIENTS HARMFUL TO INSULATION. DO NOT USE GREASE OR OIL. PLACE ALL WIRES OF A CIRCUIT IN SAME RACEWAY.

LABEL AND COLOR CODE WIRE AND CABLE IN ACCORDANCE WITH NEC AND IN ACCORDANCE WITH OPERATING CONTRACTOR'S CRITERIA, AS FOLLOWS:

HANDWRITTEN OR WRAPAROUND LABELS ARE NOT ACCEPTABLE FOR USE AT THE FMPC. LABEL ALL CABLES PROPERLY USING A RAYCHEM TYPE TMS, OR APPROVED EQUAL, RECTANGULAR, FLAT, NONHEAT-SHRINKABLE TAG WITH 1/8 INCH HIGH LETTERING, FASTENED BY NYLON "TIE-WRAP" PASSED THROUGH PREPUNCHED HOLES. FOR SINGLE CONDUCTORS AND INDIVIDUAL CABLE WIRES, PROVIDE SLIP-ON, HEAT-SHRINKABLE SLEEVE MARKERS, WITH BLACK LETTERING ON A WHITE BACKGROUND, W. H. BRADY COMPUTER-PRINTABLE "BRADY-SLEEVE," OR APPROVED EQUAL. MARK ALL SPARE WIRES AND CABLES "SP" AT BOTH ENDS. MARK CABLES WITH A CIRCUIT OR CABLE NUMBER. MARK ALL SINGLE CONDUCTOR WIRE AND CONDUCTORS OF CABLES WITH A WIRE NUMBER AND CIRCUIT NUMBER. IF SEVERAL CIRCUITS ARE CONTAINED WITHIN THE CABLE, ALSO MARK EACH CONDUCTOR WITH A CIRCUIT NUMBER.

WITH THE EXCEPTIONS NOTED BELOW, LOCATE MARKERS AT ORIGIN AND DESTINATION, AND AT ALL INTERVENING ACCESSIBLE SPLICE OR JUNCTION BOXES. MARK ALL WIRE AND CABLE WITH A CABLE OR CIRCUIT NUMBER ONLY.

LOCATE WIRE MARKERS WITHIN 3 INCHES OF A TERMINATION OR SPLICE. LOCATE CABLE MARKERS WITHIN 3 INCHES OF THE SPREAD, CABLE END, PENETRATION, OR BOX EXIT.

FOR BRANCH CIRCUITS AND ALL INTERIOR SUPPLY SIDE CIRCUITS, COLOR CODE AS FOLLOWS:

FOR 120/240 VAC SYSTEMS

HOT - BLACK
HOT - RED
NEUTRAL - WHITE
GROUND - GREEN

FOR 480/277 VAC SYSTEM

PHASE A - YELLOW
PHASE B - ORANGE
PHASE C - BROWN
NEUTRAL - GRAY
GROUND - GREEN

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FOR 208/120 VAC SYSTEM

PHASE A - BLACK
PHASE B - RED
PHASE C - BLUE
NEUTRAL - WHITE
GROUND - GREEN

COLOR CODE UNGROUNDED ("PHASE" OR "HOT") CONDUCTORS IN SIZES NO. 8 AWG AND SMALLER BY MEANS OF COLORED INSULATION OR JACKET. WHERE COLORED INSULATIONS OR JACKETS ARE ONLY AVAILABLE ON SPECIAL ORDER, ALTERNATE METHODS FOR COLOR CODING UNGROUNDED CONDUCTORS MAY BE APPROVED UPON REQUEST TO THE CONSTRUCTION MANAGER.

COLOR CODE UNGROUNDED ("PHASE" OR "HOT") CIRCUIT CONDUCTORS IN SIZES NO. 6 AWG AND LARGER BY MEANS OF COLORED INSULATION OR JACKET, OR BY USE OF COLORED TAPE AT TERMINALS AND AT ALL POINTS WHERE ACCESSIBLE AFTER INSTALLATION.

YELLOW TAPE TO CONSIST OF TWO SEPARATE BANDS AT EACH APPLICATION POINT IN ORDER TO AVOID CONFUSION WITH WHITE, GRAY, OR ORANGE AFTER AGING.

FOR ALL CONDUCTOR SIZES, GREEN, GRAY OR WHITE COLORS ARE RESERVED EXCLUSIVELY FOR GROUNDING AND GROUNDED CONDUCTORS RESPECTIVELY. DO NOT USE THESE COLORS IN ANY WAY TO IDENTIFY AN UNGROUNDED CONDUCTOR. USE GRAY OR WHITE, AS REQUIRED BY THE APPROPRIATE COLOR CODE, ONLY FOR THE GROUNDED OR NEUTRAL CONDUCTOR IDENTIFICATION.

COLOR CODE GROUNDED ("NEUTRAL") CIRCUIT CONDUCTORS AND EQUIPMENT GROUNDING ("GROUND WIRE") CONDUCTORS IN SIZES NO. 6 AWG AND SMALLER ONLY BY MEANS OF COLORED INSULATION OR JACKET. COLOR CODE THESE CONDUCTORS IN SIZES NO. 4 AWG AND LARGER BY MEANS OF COLORED INSULATION OR JACKET OR BY MEANS OF COLORED TAPE AT TERMINALS AND AT ALL POINTS WHERE ACCESSIBLE AFTER INSTALLATION.

PAINTING, TAPING, OR OTHER ALTERATION OF THE COLOR OF A GREEN, WHITE, OR GRAY COLORED CONDUCTOR IS PROHIBITED.

CONTROL WIRE TO BE INDIVIDUALLY COLOR CODED AND NUMBERED, AND TAGGED AT LOCATIONS INDICATED HEREINABOVE. TAG CONTROL WIRES WITH NUMBERS AS SHOWN ON CONTROL DRAWINGS OR MANUFACTURER'S DRAWINGS.

INSTALL WIRING CONTINUOUS FROM OUTLET TO OUTLET, WITHOUT SPLICES, EXCEPT IN OUTLET BOXES, ACCESSIBLE JUNCTION BOXES, OR ACCESSIBLE RACEWAYS.

ROUTE EQUIPMENT GROUNDING CONDUCTORS WITH SUPPLY CONDUCTORS BACK TO THE SOURCE.

TRAIN AND LACE WIRING INSIDE EQUIPMENT AND PANELBOARDS WITH PLASTIC WRAP FOR WORKMANLIKE NEATNESS. DO NOT LACE OR STRAP TIGHTLY ANY CURRENT CARRYING LIGHTING OR POWER WIRING.

INSULATE ENDS OF PULL WIRES WHICH TERMINATE IN CABINETS, PANELS OR OTHER ELECTRICAL DEVICE ENCLOSURES TO PREVENT CONTACT WITH "LIVE" TERMINATIONS.

SUPPORT CONDUCTORS IN VERTICAL RACEWAYS WITH O-Z/GEDNEY, RUSSELL AND STOLL OR APPROVED EQUAL, SUPPORTS IN JUNCTION BOXES.

16400.03 TAPS, SPLICES AND CONNECTIONS

THOROUGHLY CLEAN WIRES BEFORE INSTALLING LUGS AND CONNECTORS SO THAT JOINT WILL CARRY FULL CAPACITY OF CONDUCTORS WITHOUT PERCEPTIBLE TEMPERATURE RISE ABOVE CONDUCTOR TEMPERATURE.

SOLDERED JOINTS WILL NOT BE PERMITTED, EXCEPT WHEN PART OF VENDOR-FURNISHED EQUIPMENT WHERE SOLDERING IS STANDARD PRACTICE.

FOR WIRE NO. 10 AWG OR SMALLER, USE INSULATED SPRING PRESSURE CONNECTORS UTILIZING AN EXPANDABLE CONE-SHAPED COIL SPRING, SUCH AS 3M COMPANY SCOTCHLOKS, IDEAL INDUSTRIES INC. WING NUTS, THOMAS & BETTS PIGGY CONNECTORS, BUCHANAN B-CAPS, OR APPROVED EQUAL. INSULATED SPRING PRESSURE CONNECTORS UTILIZING A NONEXPANDABLE FULLY SEATED COIL SPRING, SUCH AS IDEAL "WIRE-NUT," ARE NOT ACCEPTABLE. ALSO ACCEPTABLE ARE CRIMP-TYPE CAPS APPLIED WITH PROPER INDENTOR TOOL, WHICH PROVIDES DEFORMATION OF THE CAP IN TWO DIRECTIONS AT RIGHT ANGLES TO EACH OTHER, AS MANUFACTURED BY AMP, BURNDY, THOMAS & BETTS, OR APPROVED EQUAL.

FOR NO. 8 AWG AND LARGER WIRE, SPLICE OR TERMINATE WITH INDENTOR, CRIMP-TYPE CONNECTORS AND COMPRESSION TOOLS OR WITH BOLTED CLAMP-TYPE CONNECTORS, AS MANUFACTURED BY AMP, BURNDY, THOMAS & BETTS, OR APPROVED EQUAL.

UNLESS PROPERLY INSULATED BY THE CONNECTOR, INSULATE ALL JOINTS AT LEAST EQUAL TO THE CONDUCTOR INSULATION. INSTALL SELF-FUSING RUBBER-BASED INSULATING COMPOUND, MOLDED AROUND SHARP EDGES AND/OR DIFFICULT SHAPES, TO PROVIDE SMOOTH SURFACE FOR APPLYING ELECTRICAL TAPE. INSULATING COMPOUND TO BE 3M COMPANY SCOTCH NO. 2200 PADS OR NO. 2210 ROLLS, OR APPROVED EQUAL. ELECTRICAL TAPE, 3M COMPANY NO. 33+ SCOTCH TAPE, OR APPROVED EQUAL.

16400.04 LOCATION OF OUTLETS

A. GENERAL

SECURELY ANCHOR ALL OUTLET BOXES, INDEPENDENT OF CONDUIT SUPPORTS.

B. LUMINAIRE OUTLETS

SPACE OUTLETS EVENLY AND IN ALIGNMENT.

C. MOUNTING HEIGHTS

UNLESS OTHERWISE INDICATED, THE FOLLOWING OUTLET HEIGHTS APPLY.

<u>OUTLET</u>	<u>ELEVATION TO CENTER LINE</u>
RECEPTACLE OUTLETS PANELBOARDS	4 FT. 6 IN. ABOVE FINISHED FLOOR 6 FT. 8 IN. FROM TOP OF PANELBOARD TO FINISHED FLOOR

16400.05 HANGERS AND SUPPORTS

A. EQUIPMENT SUPPORTS

UNLESS OTHERWISE INDICATED, PROVIDE EQUIPMENT SUPPORTS FABRICATED WITH STRUCTURAL STEEL, RIGIDLY WELDED OR BOLTED TO PRESENT WORKMANLIKE APPEARANCE, AND SUITABLE FOR THE SEISMIC ZONE 2 REQUIREMENTS SPECIFIED. USE HEXAGON HEAD BOLTS WITH SPRING LOCK WASHERS UNDER ALL NUTS.

B. CONDUIT SUPPORTS

ARRANGE CONDUIT SUPPORTS TO PREVENT DISTORTION OF ALIGNMENT BY WIRE PULLING OPERATIONS. PROVIDE GALVANIZED STEEL HANGERS, CLAMPS AND MALLEABLE IRON GALVANIZED CONDUIT STRAPS. PERFORATED PIPE STRAPS WILL NOT BE ACCEPTED. UNLESS OTHERWISE INDICATED, FASTEN HANGERS TO BUILDING STEEL WITH MECHANICAL BEAM CLAMPS. USE TOGGLE BOLTS IN HOLLOW MASONRY WALLS, AND EXPANSION SHIELDS IN CONCRETE OR BRICK WALLS. TRAPEZE HANGERS WITH CONDUIT CLAMPS MAY BE USED WHERE GROUPS OF CONDUITS RUN PARALLEL. DO NOT SUPPORT CONDUITS FROM PIPING, DUCTWORK, OR OTHER SUCH FACILITIES. UNLESS OTHERWISE INDICATED, SUPPORT CONDUITS ONLY FROM STRUCTURE. PROVIDE A SUPPORT AT EACH ELBOW OR CONDUIT BODY.

C. LUMINAIRE SUPPORTS

FOR LUMINAIRE SUPPORTS, EMPLOY MATERIALS WHICH ARE SUITABLE FOR USE IN SEISMIC ZONE 2 AND CAPABLE OF SUPPORTING THE WEIGHT OF THE LUMINAIRE.

SUPPORT LUMINAIRES AS INDICATED IN SECTION 13120.

16400.06 CONDUIT SYSTEMS

A. GENERAL

USE RIGID, GALVANIZED THREADED STEEL CONDUIT WITH ALL CAST FERROUS METAL CONDUIT BODIES, EXCEPT AS OTHERWISE INDICATED.

EXCEPT FOR UNDERGROUND WORK, INTERMEDIATE METAL CONDUIT MAY BE SUBSTITUTED FOR RIGID STEEL CONDUIT.

CUT CONDUITS SQUARE AND CAREFULLY REAM ENDS. BRING JOINTS TO A SHOULDER. SECURELY FASTEN CONDUITS TO SHEET METAL BOXES AND ENCLOSURES WITH GALVANIZED DOUBLE LOCKNUTS AND INSULATING BUSHINGS, EXCEPT PROVIDE SUITABLE BONDING FITTINGS WHERE REQUIRED BY THE NEC. PROVIDE MYERS, OR APPROVED EQUAL, WATERTIGHT TYPE HUBS FOR CONDUIT CONNECTIONS TO SHEET METAL ENCLOSED DEVICES IN WET LOCATIONS. USE CARE SO THAT SUFFICIENT THREADS PROJECT THROUGH TO PERMIT BUSHING TO BE DRAWN TIGHTLY AGAINST END OF CONDUIT. DO NOT INSTALL CONDUIT WITH RUSTY THREADS.

WHERE CONDUIT SYSTEMS CANNOT OTHERWISE BE CONSTRUCTED, USE ERICKSON TYPE UNIONS, OR THREADED SPLIT COUPLINGS. WHERE SPLIT COUPLINGS ARE USED, ENSURE THREADS OF CONDUITS AND COUPLINGS ARE MATCHED PRIOR TO FINAL TIGHTENING.

RUN EXPOSED CONDUIT PARALLEL WITH, OR PERPENDICULAR TO, MEMBERS OF THE STRUCTURE.

RING PIPE OR TRAPEZE HANGERS MAY BE USED TO SUPPORT CONDUITS EXCEPT FOR THE FIRST AND LAST HANGERS OF THE CONDUIT RUN OR WHERE A VERTICAL OR HORIZONTAL DIRECTION CHANGE OCCURS. IN THESE CASES, RIGIDLY BRACE CONDUIT SUPPORTS SO THAT WIRE MAY BE PULLED WITHOUT DAMAGE TO THE CONDUIT SYSTEM. STUD WELDS MAY BE USED FOR FASTENING CLAMPS TO STEEL. DO NOT USE FLAT STRAPS TO SUPPORT CONDUIT OR BOXES.

SEAL CONDUITS STUBBED UP OR TERMINATING IN CABINETS, OUTLETS AND SIMILAR EQUIPMENT AGAINST ENTRANCE OF FOREIGN MATTER INTO SYSTEM BY USE OF APPROPRIATE CONDUIT PENNIES AND RETAINING BUSHINGS PRIOR TO SWABBING AND PULLING IN WIRE.

PROVIDE NYLON PULLING LINE IN ALL EMPTY CONDUITS PROVIDED UNDER THESE SPECIFICATIONS.

AVOID MOISTURE TRAPS WHERE POSSIBLE. WHERE UNAVOIDABLE, PROVIDE DRAIN FITTINGS AT LOW POINTS.

ELECTRICAL METALLIC TUBING MAY BE USED FOR BRANCH CIRCUIT WORK IN BUILDINGS A, B AND C ABOVE 13 FEET ABOVE FINISHED FLOOR.

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CONDUITS INSTALLED BELOW PADS OR IN GROUND BELOW THE BUILDINGS SHALL BE COATED RIGID STEEL. CONCRETE ENCASEMENT OF RIGID STEEL CONDUIT IS NOT REQUIRED.

ALL STEEL CONDUITS INSTALLED IN THE GROUND SHALL BE FIELD WRAPPED WITH 0.010 INCH THICK PIPE WRAPPING PLASTIC TAPE APPLIED WITH A 50 PERCENT OVERLAP OR SHALL HAVE A FACTORY APPLIED COATING WITH MINIMUM THICKNESS NOT LESS THAN ONE OF THE FOLLOWING:

HIGH-LOW DENSITY POLYETHYLENE, TAPE WITH NO CHLORIDES, KENDALL CO. POLYKEN NO. 930 WITH NO. 927 PRIMER, OR APPROVED EQUAL - 0.020 INCH

EPOXY RESIN - 0.008 INCH

COAT-TAR ENAMEL - 0.063 INCH

ZINC COATING MAY BE OMITTED FROM STEEL CONDUIT WHICH HAS A FACTORY APPLIED EPOXY RESIN COATING. FIELD-MADE JOINTS, FITTINGS, ABRASIONS, AND COATING HOLIDAYS SHALL BE COATED WITH MATERIAL EQUIVALENT TO MATERIAL SPECIFIED ABOVE.

UNDERGROUND CONDUIT INSTALLATIONS ARE FURTHER SPECIFIED IN SECTION 16480.

INSTALL CROUSE-HINDS TYPE EZS SEAL FITTINGS, OR EQUIVALENT APPLETON, OR APPROVED EQUAL, AT ALL POINTS WHERE CONDUITS PASS FROM HOT TO COLD LOCATIONS AND FROM INSIDE TO OUTSIDE OF BUILDING WALLS. PACK SEAL FITTINGS IN NONHAZARDOUS AREAS WITH NONHARDENING DUCT SEALING COMPOUND, GRAYBAR PERMAGUM, OR EQUAL.

DO NOT INSTALL CONDUITS CLOSER THAN 6 INCHES TO PARALLEL RUNS OF FLUES, STEAM LINES, HOT WATER PIPES OR OTHER PIPES CARRYING MATERIALS HOTTER THAN 200F.

LIQUIDTIGHT FLEXIBLE METAL CONDUIT WHERE FLEXIBILITY IS REQUIRED AND FOR ALL TRANSFORMER CONNECTIONS.

STANDARD FLEXIBLE METAL CONDUIT IN DRY LOCATIONS WHERE FLEXIBILITY IS REQUIRED, EXCEPT FOR TRANSFORMER CONNECTIONS.

MINIMUM CONDUIT SIZE 1/2 INCH.

B. RIGID STEEL CONDUIT

MANUFACTURERS (OR APPROVED EQUAL):

ALLIED TUBE AND CONDUIT
STEELDUCT
TRIANGLE - PWC
WHEATLAND TUBE

HOT-DIP GALVANIZED, THREADED, RIGID STEEL IN ACCORDANCE WITH UL 6 AND ANSI C80.1.

C. INTERMEDIATE CONDUIT

MANUFACTURERS:

ALLIED TUBE AND CONDUIT
TRIANGLE - PWC

HOT-DIP GALVANIZED, THREADED RIGID-TYPE STEEL IN ACCORDANCE WITH UL 1242.

ELECTRICAL METALLIC TUBING

MANUFACTURERS (OR APPROVED EQUAL):

ALLIED TUBE AND CONDUIT
TRIANGLE - PWC
WHEATLAND TUBE

HOT-DIP GALVANIZED OR ELECTRO-GALVANIZED STEEL IN ACCORDANCE WITH UL 797 AND ANSI C80.3.

STANDARD FLEXIBLE STEEL

MANUFACTURERS (OR APPROVED EQUAL):

TRIANGLE - PWC
AMERICAN FLEXIBLE CONDUIT

CONCAVE SINGLE STRIP, HELICALLY WOUND GALVANIZED STEEL STRIP INTERLOCKED AND TIGHTLY JOINTED IN ACCORDANCE WITH UL 1.

D. LIQUIDTIGHT FLEXIBLE CONDUIT

MANUFACTURERS (OR APPROVED EQUAL):

ANACONDA INDUSTRIES - SEALTITE TYPE UA
ELECTRI-FLEX LA
LIQUATITE LA
O-Z/GEDNEY FLEXI-GUARD TYPE UAG

UL LISTED, CONCAVE SINGLE STRIP, HELICALLY WOUND GALVANIZED STEEL STRIP INTERLOCKED AND TIGHTLY JOINTED, THE WHOLE COVERED WITH A CONTINUOUS LIQUIDTIGHT PVC JACKET. EXTRA-FLEXIBLE NON UL-LISTED TYPES WILL NOT BE ACCEPTABLE.

E. CONDUIT BODIES

MANUFACTURERS (OR APPROVED EQUAL):

- APPLETON
- CROUSE-HINDS
- PYLE-NATIONAL
- RACO

UNLESS OTHERWISE INDICATED, ALL CONDUIT BODIES FOR RIGID STEEL AND INTERMEDIATE METAL CONDUIT TO BE CAST FERROUS, THREADED. NEOPRENE GASKETED COVERS WITH BLIND TYPE CAPTIVE SCREWS. COVERS TO BE CAST TYPE IN WET OR DAMP LOCATIONS. COVERS MAY BE SHEET STEEL IN DRY LOCATIONS.

F. COUPLINGS, FITTINGS AND CONNECTORS

MANUFACTURERS (OR APPROVED EQUAL):

- APPLETON
- EFCOR
- O-Z/GEDNEY
- PYLE-NATIONAL
- RACO
- STEEL CITY
- THOMAS & BETTS

FOR LIQUIDTIGHT FLEXIBLE METAL CONDUIT, USE O-Z/GEDNEY "GROUND-TIGHT" TYPE 4QLT, OR APPROVED EQUAL, GROUNDING LIQUIDTIGHT CONNECTORS WITH INSULATED THROATS.

FOR ELECTRICAL METALLIC TUBING, USE STEEL OR MALLEABLE IRON GLAND COMPRESSION TYPE CONNECTORS WITH INSULATED THROATS, UL LISTED AS RAIN-TIGHT AND CONCRETETIGHT.

16400.07 RACEWAY MARKING

MARK RACEWAYS CONTAINING CIRCUITS OPERATING IN EXCESS OF 120V TO GROUND OR IN EXCESS OF 240V LINE-TO-LINE, ON GROUNDED OR UNGROUNDED SYSTEMS, AS FOLLOWS:

LOCATE RACEWAY MARKERS AT ORIGIN AND DESTINATION OF BRANCHES, AT INTERVENING ACCESSIBLE BOXES, FITTINGS WITH REMOVABLE COVERS, AT LEAST ONE IN EACH ROOM, COMPARTMENT OR VAULT, BOTH SIDES OF AND WITHIN 2 FEET OF THE WALL, FLOOR, OR CEILING PENETRATIONS, AND EVERY 20 FEET. MARK RACEWAYS PRIOR TO CABLE INSTALLATION. JUDICIOUS SELECTION OF MARKING LOCATIONS MAY SATISFY SEVERAL OF THE ABOVE REQUIREMENTS SIMULTANEOUSLY.

AS GENERAL EXCEPTIONS TO THE PRECEDING PARAGRAPH, EXPOSED RACEWAYS 20 FEET OR LESS IN LENGTH MAY BE MARKED IN ONLY ONE LOCATION.

IN SMALL BUILDINGS, ROOMS, ETC., WHERE VERY FEW RACEWAYS EXIST AND THE FUNCTION, ORIGINATION AND DESTINATION OF THE RACEWAY IS OBVIOUS, NO MARKING IS REQUIRED EXCEPT A VOLTAGE MARKING AT ACCESSIBLE TERMINAL, JUNCTION, OR SPLICE BOXES WITH REMOVABLE COVERS. EMBEDDED OR BURIED RACEWAYS NEED NOT BE MARKED WHERE BURIED OR EMBEDDED.

MARK RACEWAYS ENTERING SWITCH BOXES WITHIN 2 FEET OF THE BOX. WHERE THE RACEWAY IS NOT EXPOSED, MARK THE BOX COVER IN LIEU OF THE RACEWAY.

MARK WITH SELF-STICKING VINYL CLOTH LABELS, BLACK IDENTIFICATION ON AN ORANGE BACKGROUND, AS MANUFACTURED BY W. H. BRADY CO., OR APPROVED EQUAL, WITH LENGTH AS INDICATED BELOW, ENCIRCLING A MAJORITY OF THE VISIBLE PART OF THE RACEWAY.

IDENTIFICATION LETTER/NUMBER AND LABEL SIZE IN ACCORDANCE WITH THE FOLLOWING (NEAREST SIZE IS ACCEPTABLE):

<u>CONDUIT TRADE SIZE OR LARGEST DIMENSION, EXCEPT LENGTH OF OTHER RACEWAY</u>	<u>BAND LENGTH</u>	<u>LEGEND LETTER/ NUMBER SIZE</u>
1/2 TO 1-1/4	8	1/2
1-1/2 TO 2	8	3/4
2-1/2 TO 6	12	1-1/4
8 TO 10	24	2-1/2
OVER 10	32	3-1/2

(ALL DIMENSIONS IN INCHES)

LOCATE LABELS AND LETTERING IN THE MOST LEGIBLE AND PROMINENT POSITION. AFTER INSTALLATION, BRUSH COAT LABELS WITH CLEAR LACQUER, COVERING EDGES WELL. IN LIEU OF THE LABELS, A STENCILED IDENTIFICATION BAND IS PERMISSIBLE IF CONDUIT IS TREATED TO ACCEPT PAINT.

IDENTIFICATION TO INCLUDE CONDUIT NUMBERS, WHERE DESIGNATED, CABLE OR CIRCUIT NUMBER ON AN ORANGE BACKGROUND BAND, SUCH AS "R-50," "F4-67," OR "LP-6-15."

MARK SPARE RACEWAYS WITH A RACEWAY NUMBER SUCH AS "R-50" OR "C-109." WHERE SUCH RACEWAYS ARE NOT EXPOSED, MARK WITH ETCHED OR STAMPED NUMBERS ON ACCESSIBLE PLUGS OR CAPS OR ON METAL TAGS ATTACHED TO THE STUBS, CAPS, OR PLUGS.

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16400.08 LUMINAIRE OUTLETS AND JUNCTION BOXES

PROVIDE IN ACCORDANCE WITH MOUNTING METHOD SPECIFIED IN SECTION 13120.

16400.09 RECEPTACLE AND SPECIAL BOXES

CROUSE-HINDS, APPLETON, OR APPROVED EQUAL, FS OR FD SERIES BODIES FOR EXPOSED WORK. BOXES THREADED FOR RIGID CONDUIT.

16400.10 PULL BOXES AND JUNCTION BOXES

PULL BOXES AND JUNCTION BOXES FOR INTERIOR WORK, 6 INCHES BY 6 INCHES BY 4 INCHES DEEP MINIMUM, CODE GAGE GALVANIZED STEEL, COVERS FASTENED WITH BRASS SCREWS. SUPPORT BOXES INDEPENDENT OF RACEWAY SYSTEMS.

16400.11 EXPANSION FITTINGS

O-Z/GEDNEY TYPE AX, CROUSE-HINDS TYPE XD, APPLETON TYPE XJ, OR APPROVED EQUAL, WEATHERTIGHT EXPANSION FITTING AT BUILDING EXPANSION JOINTS AND AT MIDPOINT IN LONG, STRAIGHT RUNS IN EXCESS OF 150 FEET. PROVIDE FITTING WITH FLAT, BRAIDED BONDING JUMPER, COMPLETE WITH CLAMPS FOR ATTACHMENT TO CONDUITS AT EACH END OF FITTING.

16400.12 WIRE AND CABLE

A. 600 VOLTS OR LESS

USE NO WIRE SMALLER THAN NO. 12 AWG, RATED AT 600 VOLTS, FOR POWER AND LIGHTING CIRCUITS AND NO SMALLER THAN NO. 14 FOR CONTROL WIRING, UNLESS OTHERWISE SPECIFIED OR INDICATED.

ALL WIRE, REGARDLESS OF SIZE, TO BE STRANDED COPPER.

NO REDUCTION IN WIRE SIZES BASED ON AMPACITY OR OTHER REASON WILL BE PERMITTED.

DETERMINE, FOR EACH ITEM OF EQUIPMENT FURNISHED, WHETHER SPECIAL WIRING IS REQUIRED, AND PROVIDE THAT TYPE OF WIRING.

PROVIDE UL LISTED COPPER BUILDING WIRE AND CABLE AS MANUFACTURED BY AMERICAN, ANIXTER, ESSEX, ROYAL, PHELPS-DODGE, PIRELLI, ROME, TRIANGLE - PWC, OR APPROVED EQUAL, TYPES AS INDICATED BELOW.

FOR LIGHTING, POWER AND CONTROL:

FOR ALL SIZES, TYPE THHN/THWN.

DO NOT INSTALL CONDUCTORS OF MORE THAN 4 WIRE GAGE DIFFERENCES IN THE SAME CONDUIT.

B. PREASSEMBLED AERIAL CABLE

BRAND-REX TYPE VN-TC, OR APPROVED EQUAL, 3-CONDUCTOR, 600 VOLT, ROUND CABLE WITH TYPE THHN/THWN STRANDED COPPER CONDUCTORS, BLACK PVC, HYPALON OR NEOPRENE JACKET MEETING UL 1277 REQUIREMENTS FOR FLAME RETARDANCE, COLD BEND AND SUNLIGHT RESISTANCE.

PREASSEMBLE CABLE TO NO. 8A COPPERWELD/COPPER (3-STRAND) MESSENGER WITH POLYETHYLENE-COATED COPPER BINDING STRIP. CABLE ASSEMBLY TO MEET NEC REQUIREMENTS FOR TYPE TC CABLES, OUTDOOR USE.

16400.13 GROUNDING

A. GENERAL

GROUNDING MATERIALS AND HARDWARE - BURNDY, CHANCE, ITT BLACKBURN, ITT WEAVER, JOSLYN, MCGRAW EDISON, O-Z/GEDNEY, THOMAS AND BETTS, OR APPROVED EQUAL.

EXOTHERMIC WELDING - HEAVY-DUTY CADWELD OR HEAVY-DUTY THERMOWELD, OR APPROVED EQUAL.

GROUND THE FOLLOWING AS REQUIRED BY THE NEC AND AS SPECIFIED:

DERIVED SYSTEM NEUTRALS
ALL EQUIPMENT ENCLOSURES
RECEPTACLES
LUMINAIRES
OTHER ELECTRICAL DEVICES AS INDICATED OR REQUIRED BY NEC

PROVIDE NEW BUILDING GROUNDING SYSTEM FOR BUILDINGS A, B AND C AS SPECIFIED IN SECTION 13120.

CLEAN SURFACES TO BRIGHT METAL BEFORE MAKING GROUND CONNECTIONS AND RESTORE ORIGINAL FINISH AFTER MAKING CONNECTIONS.

INSTALL A SEPARATE INSULATED METALLIC GROUND CONDUCTOR IN ALL CONDUITS CONTAINING CIRCUITS OPERATING AT 120 VOLTS OR HIGHER. SIZE GROUND CONDUCTOR IN ACCORDANCE WITH NEC TABLE 290-95.

B. GROUNDING SYSTEM

COPPER-CLAD STEEL GROUND RODS IF REQUIRED, WITH COPPER GROUND CONDUCTORS. MAKE UNDERGROUND GROUND GRID CONNECTIONS AND CONNECTIONS TO GROUND RODS BY AN EXOTHERMIC WELD PROCESS. MAKE ABOVEGROUND CONNECTIONS BY AN EXOTHERMIC WELD PROCESS OR WITH NONTURNING PRESSURE TYPE GROUNDING CONNECTORS.

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16400.14 WIRING DEVICES AND PLATES

A. GENERAL

PROVIDE SPECIFICATION GRADE UL LISTED DEVICES AS INDICATED, OR EQUIVALENT ARROW-HART, BRYANT, GENERAL ELECTRIC, HUBBELL, LEVITON, PASS AND SEYMOUR, SLATER, OR APPROVED EQUAL. ALL WIRING DEVICES TO HAVE SELF-GROUNDING FEATURE.

ALL CONVENIENCE RECEPTACLES IN BROWN FINISH.

B. RECEPTACLES

DUPLEX TYPE - HUBBELL NO. 5362, OR APPROVED EQUAL, 20 AMPERES, 125 VOLTS, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA CONFIGURATION 5-20R.

C. PLATES

PROVIDE CAST METAL PLATES FOR RECEPTACLES.

DIVISION 16

16480 - EXTERIOR ELECTRICAL WORK

16480.01 OVERHEAD ELECTRICAL SYSTEM

A. POLE

SOUTHERN YELLOW PINE POLE, TREATED FULL LENGTH WITH CREOSOTE CONFORMING TO ANSI STANDARD 05.1, OF CLASS AND LENGTH SHOWN.

METHOD OF TREATMENT, PRESERVATIVE AND TREATMENT TESTS TO CONFORM TO FEDERAL SPECIFICATION TT-W-571G AND AMERICAN WOOD PRESERVERS ASSOCIATION SPECIFICATIONS. PRESSURE TREAT FOR FINAL RETENTION OF TREATMENT MATERIAL.

BEFORE TREATMENT, PERMANENTLY AND LEGIBLY BRAND ALL POLES WITH MANUFACTURER'S NAME OR SYMBOL, CLASS, LENGTH, AND YEAR OF TREATMENT ON BUTT OF POLE AND 5 FEET ABOVE STANDARD GROUND LINE. CUT FIELD GAINS WITH POLE LYING ON THE GROUND BEFORE SETTING. THOROUGHLY TREAT HOLES BORED AND GAINS CUT IN FIELD WITH HOT CREOSOTE BEFORE HARDWARE IS INSTALLED. PLACE POLE STORED FOR MORE THAN 2 WEEKS ON CREOSOTED OR DECAY-RESISTING SKIDS ARRANGED TO SUPPORT POLE WITHOUT PRODUCING NOTICEABLE DISTORTION, AND TO PERMIT FREE CIRCULATION OF AIR.

DO NOT DRAG TREATED POLE ALONG GROUND. IN HANDLING POLE USE NO TONGS, CANT HOOKS, OR OTHER POINTED TOOLS CAPABLE OF PRODUCING INDENTATIONS OF MORE THAN 1 INCH IN DEPTH. DO NOT APPLY TOOLS TO GROUND LINE SECTION OF POLE BETWEEN 1 FOOT ABOVE AND 2 FEET BELOW GROUND LINE.

SET POLE TO THE DEPTH INDICATED. SET POLE PLUMB. WHERE POLE IS CURVED, SET POLE SO THAT CURVATURE IS IN LINE OF THE SPAN. DIG HOLE OF AMPLE SIZE TO PERMIT ALIGNMENT OF POLE AND TO PROVIDE FOR TAMPING ALL THE WAY AROUND POLE. USE MINIMUM OF 3 TAMPERS TO EACH SHOVELER WHEN BACKFILLING HOLES TO INSURE PROPER COMPACTION. THROW EARTH NO DEEPER THAN 6 INCHES WITHOUT TAMPING HARD BEFORE NEXT LAYER.

ALL EXCAVATION, BACKFILLING AND RESURFACING TO BE PROVIDED UNDER DIVISIONS 2 AND 3.

B. HARDWARE

ALL POLE LINE HARDWARE, HOT DIP GALVANIZED. INSTALL SUITABLE WASHERS UNDER BOLT HEADS AND NUTS ON WOOD SURFACES. WASHERS ON THROUGH-BOLTS PROPERLY SIZED WITH CURVED WASHERS ON THROUGH-BOLTS FITTING AGAINST POLE. DIAMETER OF HOLES IN WASHERS OF STANDARD SIZE FOR BOLT ON WHICH THEY ARE TO BE INSTALLED.

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C. CONDUCTORS

AERIAL CABLE AS SPECIFIED IN ARTICLE 16400.12.B.

16480.02 CONDUCTOR INSTALLATION

USE EQUIPMENT AND METHODS SUCH THAT SAFETY OF ALL PERSONNEL IS MAINTAINED AND THAT MATERIAL USED IN CONSTRUCTION IS NOT DAMAGED. TAKE CARE THAT CONDUCTORS ARE NOT SCRATCHED, ABRADED, KINKED OR TWISTED DURING INSTALLATION. EMPLOY FREE-TURNING STRINGING BLOCKS OF SUFFICIENT SIZE AND DIAMETER FOR THE CONDUCTORS. IN NO CASE ARE STRINGING BLOCKS TO HAVE SMALLER RADII THAN CABLE MANUFACTURER'S MINIMUM ALLOWABLE BEND RADIUS.

16480.03 UNDERGROUND ELECTRICAL SYSTEMS

A. GENERAL

PROVIDE EMPTY UNDERGROUND CONDUIT SYSTEMS CONNECTING BUILDINGS A, B AND C AS INDICATED.

PROVIDE RIGID STEEL CONDUIT AS SPECIFIED IN SECTION 16400. PROTECT CONDUIT PENDING INSTALLATION TO PREVENT DAMAGE. DO NOT INSTALL DAMAGED CONDUIT.

CONDUIT TO BE THOROUGHLY CLEANED AND ENDS CAPPED DURING CONSTRUCTION AND AFTER INSTALLATION IS COMPLETE.

DIRECT BURY CONDUIT ON A BED OF SAND 3 INCHES DEEP MINIMUM. TOP OF CONDUIT TO BE NOT LESS THAN 30 INCHES BELOW THE ESTABLISHED GRADE OR CONCRETE SLAB.

PROVIDE A NYLON CORD IN EACH EMPTY CONDUIT TO FACILITATE FUTURE WIRE INSTALLATION.

B. EXCAVATION, BACKFILLING AND RESURFACING

ALL NECESSARY EXCAVATING, BACKFILLING AND RESURFACING REQUIRED FOR WORK WILL BE PROVIDED UNDER DIVISIONS 2 AND 3.

DIVISION 16

16500 - LUMINAIRES AND LIGHTING

16500.01 LUMINAIRES - GENERAL

LUMINAIRES ARE TO BE OF THE TYPE INDICATED BELOW IN QUANTITIES AND AT LOCATIONS AS REQUIRED TO MEET DESIGN REQUIREMENTS SPECIFIED IN SECTION 13120.

16500.02 HIGH PRESSURE SODIUM PENDANT REFLECTOR LUMINAIRE

THE LUMINAIRE SHALL BE EQUAL TO THE HOLOPHANE "BANTAM PRISMPACK" INDUSTRIAL HID SERIES AND SHALL CONSIST OF TWO SUBASSEMBLIES; THE OPTICAL ASSEMBLY AND THE BALLAST HOUSING CONTAINING THE ELECTRICAL COMPONENTS.

THE BALLAST ASSEMBLY SHALL BE COMPLETE WITH DIE CAST ALUMINUM HOUSING AND INTEGRAL SPLICE CHAMBER WITH DETACHABLE ACCESS COVER AND AN ADJUSTABLE HUB ENTRY ADAPTOR ASSURING PLUMB ALIGNMENT. THE HOUSING SHALL HAVE AN INTEGRAL MOUNTING PLATE FOR ATTACHING OPTICAL ASSEMBLY. THE SOCKET SHALL BE AN INTEGRAL PART OF THE BALLAST ASSEMBLY. THE BALLAST SHALL BE HPS, FUSED HIGH POWER FACTOR AUTOTRANSFORMER TYPE, SUITABLE FOR -20F STARTING. INDICATED LUMINAIRES SHALL BE EQUIPPED WITH AN INTERNAL RELAY AND QUARTZ TUNGSTEN HALOGEN LAMP FOR HOT RESTRIKE PROTECTION.

THE OPTICAL ASSEMBLY SHALL BE A SPUN PRISMATIC BOROSILICATE GLASS OPEN BOTTOM REFLECTOR WITH 1/8 INCH MINIMUM WALL THICKNESS AND WITH AN ALUMINUM COVER. THE REFLECTOR SHALL BE ATTACHED TO THE BALLAST ASSEMBLY BY ROTATING ONTO THE MOUNTING PLATE AND "SPRINGLOCK" SNAPPING INTO PLACE. THE LIGHT OUTPUT SHALL BE NO LESS THAN 65.1 IN THE 0 DEGREE TO 60 DEGREE ZONE AND NOT MORE THAN 5.1 IN THE 60 DEGREE TO 90 DEGREE ZONE AND PRODUCE A 1.9 SPACING CRITERIA DISTRIBUTION.

THE COMPLETE LUMINAIRE SHALL BE LISTED BY UL "SUITABLE FOR DAMP LOCATIONS" AND FOR 55C AMBIENT TEMPERATURE. THE LUMINAIRE SHALL NOT EXCEED 14 INCHES HEIGHT OR 24-1/2 POUNDS WEIGHT.

ATTACHMENT 5

**HEALTH AND SAFETY PLAN
FOR
PLANT 1 PAD
CONTINUING RELEASE**

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ATTACHMENT 5

HEALTH AND SAFETY PLAN

For The

PLANT 1 PAD

CONTINUING RELEASE

REMOVAL ACTION

November 1990

APPROVAL:



S. W. Coyle, Manager
Environmental Management
Westinghouse Materials Company of Ohio

CONCURRENCE:



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HEALTH AND SAFETY PLAN
for
PLANT 1 PAD

1.0 TASKS TO BE PERFORMED

The work to be performed involves providing temporary sealed curbing for stormwater runoff control at the north and west edges of Plant 1 Pad, upgrade of the pad, installation of control structures, and the operation and maintenance of the pad and control measure.

Task 1: Site Survey - Soil and concrete pad sampling for uranium or other constituents and mapping of pad elevations. This task involves movement of loose or contained materials for the purpose of obtaining samples of water or soils for characterization or certification.

Task 2: Temporary Controls - Install temporary curb along north and west areas of the pad to hold down the polymeric cover over the adjacent soil which will prevent stormwater from entraining soil contaminants. This will involve site clearing and removal and replacement of the cover during the progress of construction.

Task 3: Pad Modifications - Cut, break, or remove concrete, and remove soil. Install utilities and new concrete pad. This involves the use of heavy construction equipment for placing contaminated material in either containers or stockpiles. Trenching and sampling will also be required.

Task 4: Control Structures - Install control structures over pad. This involves the erection of fabric covered structures on portions of the newly constructed pad modifications.

Task 5: Operations and Maintenance - Perform periodic sampling of runoff, adjacent soils, and groundwater. Perform maintenance of the pad, structures, and controls. Perform routine waste management operations.

2.0 SITE HISTORY

Plant 1 is the "sampling plant" for the FMPC and is therefore the location for sampling of large amounts of uranium metal process residues and waste materials. The concrete storage pad associated with Plant 1, which has been designated as a Hazardous Waste Management Unit (HWMU), has been used as a drum storage location to support these operations since 1952. The Plant 1 Pad and adjacent unpaved area comprises approximately 12 acres on the northwest side of the process area as shown in Figure 1.

Low level wastes (LLW) include drummed uranium residues, miscellaneous drummed materials such as dirt, concrete and asbestos and scrap pallets. The low level wastes are intended to be stored on the pad until planned processing and disposal actions are completed.

The approximately 45,000 drums of unevaluated waste stored on the Plant 1 Pad will fall into one of three categories once a RCRA evaluation is completed per the schedules set forth in the proposed Amended Consent Decree. The wastes will either be classified as RCRA wastes, mixed RCRA wastes or LLW. The majority of these containers are drums which contain various uranium residues from FMPC processes.

The 1,375 tons of copper scrap stored on the Plant 1 Pad are included as part of the DOE Oak Ridge Metals Management Program. The copper scrap is planned to be removed from the Plant 1 Pad at some future date, when the implementation phase of the vendor contract is finalized.

Construction rubble containers, including sea/land, boxes, and drums, are staged on the Plant 1 Pad prior to disposal. The containers primarily contain dirt, concrete, metal, and asbestos. This practice will continue as it minimizes handling/transportation of the waste on-site prior to disposal.

Recoverable materials, such as enriched residues with high uranium content and solid uranium metal, are primarily stored on the Plant 1 Pad. The FMPC is currently evaluating off-site shipment or indoor long term storage of this material.

CERCLA waste currently stored on the Plant 1 Pad includes drums of soil cuttings from RI/FS well borings that have been determined not to be hazardous wastes.

Drummed materials containing varying amounts of uranium (U metal, UO_3 , UF_4 , and UO_2), thorium, and other hazardous substances are stored on the Plant 1 Pad. Some of the carbon steel drums used to store wastes on the pad have deteriorated as a result of extended exposure to the elements, thereby increasing the risk of release of hazardous material to the environment. Sections of the pad have no curbs for containment and; therefore, some portion of the pad drains onto the adjacent grassed area, nor are there sumps for collecting and controlling the stormwater runoff from the pad. In addition, a portion of the drums are being evaluated for containing RCRA constituents and are undergoing characterization pursuant to 40 CFR 261. RCRA materials identified so far include drums of barium salts and drums of waste oils contaminated with 1,1,1-trichloroethane and lead. Drummed materials containing quantities of solvents (1,1,1-trichloroethane, tetrachloroethylene, methylene chloride, and xylene) have also been identified on the pad.

3.0 TASK SPECIFIC HAZARD ASSESSMENT

A preliminary review of the pad area in Plant 1 indicated the potential hazards identified below. Prior to the initiation of the activities, a formal walk-through survey of the conditions in the proposed work area in the Plant 1 complex will be conducted to ensure that conditions are such that a safe working environment can be provided for personnel within the defined exclusion area. All identified hazards will be addressed with the Industrial, Radiological, Safety and Training (IRS&T) representative(s) to determine the degree of hazard and if any additional requirements need to be included in the safety plan.

3.1 Physical Hazards

- o Noise
- o Heat/cold stress
- o Overhead (Construction only)

3.2 Radiation Hazards

The soil data from the Plant 1 Pad area indicates areas where uranium is being introduced into the environment through surface deposition. The surface deposition does not appear to be contributing to the subsurface contamination as the uranium concentration decreases significantly below the depth of 1.5 feet.

The potential radiation hazards are from uranium (ranging from depleted to 2% enriched in U-235) and short lived decay products. Direct radiation measurements have been observed at less than 2 mrem/hr. Uranium is the controlling element and was observed at concentrations up to 1220 ppm. Gross activity levels will be referred to uranium. Thorium was also found at concentrations up to 113 ppm total in the soil.

Uranium has an exposure route through inhalation or ingestion. The background level in ambient air is less than 2×10^{-12} uCi/cc. Action levels are further described in Notes 4 and 5 under Section 3.3.

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3.3 Chemical Hazards

<u>Contaminant</u>	<u>Primary Hazard</u>	<u>Limit</u>	<u>Action Level</u>	<u>Background Level in Ambient Air</u>
Asbestos ¹	Inhalation	0.2 f/cc ²	0.1 f/cc	ND ³
Volatile Organic Compounds (VOC's)	Inhalation	Varies ⁶	1.0 ppm	ND ⁷
Magnesium Fluoride	Inhalation	2.5 mg F/M ³	1.3 mg/M ³	ND ⁷
Inorganic Lead ⁸	Inhalation/ Ingestion	50 ug/M ³	30 ug/M ³	ND ⁷
Methyl ethyl ketone (MEK) ⁹	Inhalation	TWA 200 ppm STEL 300 ppm	100 ppm	ND ⁷
Xylenes ¹⁰	Inhalation	100 ppm	50 ppm	ND ⁷
Stoddard Solvent ¹¹	Inhalation	100 ppm	50 ppm	ND ⁷
Calcium Carbonate ¹²	Inhalation	15 mg/M ³ total 5 mg/M ³ respirable	5 mg/M ³ 2.5 mg/M ³	ND ⁷
Crystalline silica ¹²	Inhalation	0.1 mg/M ³	0.05 mg/M ³	ND ⁷
Barium, soluble compounds ¹³	Inhalation	0.5 mg/M ³	0.25 mg/M ³	ND ⁷

3.3 Chemical Hazards (cont.)

Information on health risks, exposure routes, and first aid is given in Section 7.0 of the Health and Safety Plan.

- 1) These requirements include personal protective equipment and training. Asbestos hazard present if insulation, insulated lines or transite is damaged or disturbed such as that in the scrap copper pile (special permit required for asbestos work).
- 2) Based on 8 hour time weighted average.
- 3) Not detectable, <0.01 fibers per cubic centimeter (f/cc).
- 4) The action level for uranium is 5×10^{-12} uCi/ml which is based on the DOE derived air concentration limit of 2×10^{-11} uCi/ml.
- 5) Not expected to be present at levels exceeding 10% of DOE limit.
- 6) Limit will vary depending on which, if any, VOC is found. At the present, none exist on the Plant 1 Pad above detection levels.
- 7) Not detectable per methods described in Section 4.0.
- 8) If grit blast material is encountered, it should be considered potentially lead contaminated. A Chemical/Hazardous Material Work Permit shall be obtained from IH&S and the indicated requirements followed.
- 9) This is 80% of the rubber cement used to seal herculite panels.
- 10) This is a major component of the polyurethane concrete sealant and possibly the epoxy sealant.
- 11) This is a component in the naphtha solvent of the polyurethane concrete sealant.
- 12) This is produced when jack hammering out old concrete.
- 13) This is stored in some of the drums on the Plant 1 Pad.

4.0 MONITORING

4.1 Goals

During the site survey task, air monitoring will be performed as determined to be necessary at the time of issuance of the work permit(s) to ensure that exposure levels do not exceed established exposure limits.

4.2 Monitoring Equipment and Frequency of Monitoring

4.2.1 Airborne Radioactivity

During the site survey and installation of the control measure tasks, Breathing zone (BZ) and/or general area (GA) air samples will be collected as necessary with filters which will be counted for long-lived alpha activity. Radioactive surface contamination shall be monitored whenever soil is disturbed by drilling or digging.

4.2.2 Radioactive Surface Contamination

During the site survey and installation of the temporary control measure tasks and the pad upgrade tasks, weekly surveys for removable radioactive surface contamination will be performed in Plant 1 Pad area. Contamination surveys will be performed on potentially contaminated surfaces to ensure that adequate protective clothing is being worn and to verify radiological postings.

4.2.3 Radiation Surveys

Area radiation surveys will be monthly.

4.2.4 Chemical Hazard

An MIE RAM-1 forward light metering photometer, calibrated by the factory to Arizona road dust, or similar instrument shall be used to monitor for the following particulate contamination if necessary:

<u>Contaminant</u>	<u>Concentration Range (mg/M³)</u>	<u>MDA Conc. (mg/M³)</u>
Magnesium Fluoride } Calcium Carbonate } Barium, soluble compounds }	0-2, 0-20, 0-200	0.1

Breathing zone filter samples analyzed by specific ion electrode (NIOSH-7902) may also be collected to quantify TWA employee exposures to MgF₂.

If asbestos containing materials (e.g. Copper scrap pile) will be disturbed, then supervision will obtain an Asbestos Work Permit.

Among other things, this permit will specify that BZ filter samples will be collected and optically counted for fibers by NIOSH-7400 to determine TWA employee exposures to asbestos fibers.

As part of the Chemical/Hazardous Material Work Permit for the lead mentioned in Section 3.3, BZ filter samples for inorganic lead may be collected, if it is felt that TWA employee exposures while performing the work will be different than similar situations previously sampled.

4.2.5 Thermoluminescent Dosimetry (TLD)

TLDs will be worn by all workers.

4.2.6 Volatile Organic Vapors

An HNU-101 broad spectrum photoionization instrument will be used periodically to test for volatile organic compounds using a 10.2 eV lamp and an active sampling probe. If organic vapors are detected, they will be treated as unknowns. The Breathing Zone action levels are listed in Section 4.3.

<u>Contaminant</u>	<u>Concentration Range(ppm)</u>	<u>MDA Conc.(ppm)</u>
Volatile Organic Compounds	0-600	1

Note: The HNu response may be reduced if high levels of methane or humidity are present, such as sewers or wet sumps.

Colorimetric indicating detector tubes (i.e., Drager) may also be used to measure the levels of specific organic vapors. Monitoring will be provided by IRS&T as needed.

4.2.7 Noise

A Type 1 sound level meter, calibrated acoustically before each use, shall be used if necessary to measure noise levels. For jobs exceeding 85 dBA for any length of time, e.g., concrete breaking, hearing protection shall be used.

4.2.8 Heat/Cold Stress

Supervision will observe workers for signs and symptoms of heat/cold stress and adjust work schedules as required. Monitoring for heat (wet bulb globe temperature) and cold stress will be performed by IRS&T as needed to ensure compliance with American Conference of Governmental Industrial Hygienists limits established in the most recent edition of the TLV booklet.

4.3 Action Levels

<u>Measurement</u>	<u>Level</u>	<u>Action</u>
Removable contamination on open surfaces	20,000 dpm/100 cm ² (average)	Note 1
Airborne radioactivity (long lived)	5 x 10 ⁻¹² uCi/ml	Note 1
HNU Meter (Breathing Zone)	Detection to 10 ppm (Note 2)	Note 3
	10-25 ppm	Supplied Air Respirator(SAR)
	25 ppm	Withdraw
MIE RAM-1 dust photometer ⁴	0.25 mg/M ³ 10.0 mg/M ³	Note 1 SAR
Soil being disturbed	2,000 cpm Beta-Gamma	Note 1 (Workers in close prox.)
Soil being disturbed	10,000 cpm Beta-Gamma	Note 5

Notes

- 1 Full-face air purifying respirators with magenta HEPA filter cartridges.
- 2 1 ppm above background is considered detection.
- 3 Full-face air purifying respirators with magenta and yellow combination cartridges for dusts, mists, fumes, and acid gases and organic vapors.
- 4 This would be used to measure Magnesium Fluoride, Calcium Carbonate, and Barium dust. Respiratory protection is specified based on barium.
- 5 Anti-contamination clothing to be worn over controlled area clothing. Full set of clothing or less if specified by IRS&T representative overseeing work.

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5.0 PERSONAL PROTECTIVE EQUIPMENT

All employees in the task exclusion area will wear the following personal protective equipment while performing the required tasks. See Note 1 in Section 3.3 for additional requirements.

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5.1 Site Survey

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Air Purifying Respirator	No (yes)	Required if action levels are exceeded or during concrete cutting/coring or as specified by IRS&T representative.
Cartridges: Magenta HEPA or Magenta and yellow if volatile organic compounds are detected	No (yes)	Required if action levels are exceeded or during concrete cutting/coring or as specified by IRS&T representative. (see 4.3 HNu meter)
Hard Hat	No	
Hearing Protection	No (yes)	Required during concrete cutting/coring and whenever operations produce continuous noise levels over 85 dBA.
Safety Glasses	Yes	Minimum Requirement
Safety Goggles or Face Shields	No (yes)	As needed to prevent contact with splash or particulates
Inner Gloves	No (yes)	PVC inner gloves shall be used beneath leather palm gloves as needed to prevent contact with liquids.
Leather-Palm Gloves	Yes	As needed for physical hand protection.
Rubber/Nitrile Gloves	Yes	As needed to prevent contact with liquids.
PVC Gloves	No	
Anti-contamination Coveralls	No	

5.1 Site Survey (cont.)

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Process Coveralls	Yes	Minimum Site Requirement
Chemically Resistant contamination Coveralls	No (yes)	As shown in Section 3.1, current airborne levels of contaminants are well below PEL and action levels. Periodic monitoring, as described in Section 4.0, will allow a check on contaminant levels as work proceeds and allow switching to Saranex or equivalent coated disposable clothing if warranted.
PVC Rain Suit	No (yes)	For operations where splashing or skin contact with wet materials is probable, face shields, PVC splash suits, rubber gloves, and boots shall be used.
SAR	No	
Safety Shoes	Yes	Minimum Requirement
Shoe Covers	No	
Rubber/Latex Boots	Yes	As needed to prevent contact with liquids.

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5.2 Installation of Temporary Curbing and Herculite

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Air Purifying Respirator	No (yes)	Required if action levels are exceeded or as specified by IRS&T representative.
Cartridges: Magenta HEPA or Magenta and yellow if volatile organic compounds are detected	No (yes)	Required for MEK or if action levels are exceeded or as specified by IRS&T representative. (see 4.3 HNu meter)
Hard Hat	Yes	
Hearing Protection	No (yes)	Whenever operations produce continuous noise levels over 85 dBA.
Safety Glasses	Yes	Minimum Requirement
Safety Goggles or Face Shields	No (yes)	As needed to prevent contact with splash or particulates
Inner Gloves	No (yes)	PVC inner gloves shall be used beneath leather palm gloves as needed to prevent contact with liquids.
Leather-Palm Gloves	Yes	As needed for physical hand protection.
Rubber/Nitrile Gloves	Yes	As needed to prevent contact with liquids.
PVC Gloves	No	
Anti-contamination Coveralls	No	

5.2 Installation of Temporary Curbing and Herculite (cont.)

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Process Coveralls	Yes	Minimum Site Requirement
Chemically Resistant Anti-contamination Coveralls	No (yes)	As shown in Section 3.1, current airborne levels of contaminants are well below PEL and action levels. Periodic monitoring, as described in Section 4.0, will allow a check on contaminant levels as work proceeds and allow switching to Saranex or equivalent coated disposable clothing if warranted.
PVC Rain Suit	No (yes)	For operations where splashing or skin contact with wet materials is probable, face shields, PVC splash suits, rubber gloves, and boots shall be used.
SAR	No	
Safety Shoes	Yes	Minimum Requirement
Shoe Covers	No	
Rubber/Latex Boots	Yes	As needed to prevent contact with liquids.

5.3 Installation of the Pad Modifications

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Air Purifying Respirator	No (yes)	Required if action levels are exceeded or during concrete cutting/coring/breaking or as specified by IRS&T representative.
Cartridges: Magenta HEPA or Magenta and yellow if volatile organic compounds are detected	No (yes)	Required during concrete cutting/coring/breaking or for sealants containing naphtha or xylene or if action levels are exceeded or as specified by IRS&T representative. (see 4.3 HNu meter)
Hard Hat	Yes	
Hearing Protection	No (yes)	Required during concrete cutting/coring/breaking and whenever operations produce continuous noise levels over 85 dBA.
Safety Glasses	Yes	Minimum Requirement
Safety Goggles or Face Shields	No (yes)	As needed to prevent contact with splash or particulates.
Inner Gloves	No (yes)	PVC inner gloves shall be used beneath leather palm gloves as needed to prevent contact with liquids.
Leather-Palm Gloves	Yes	As needed for physical hand protection.
Rubber/Nitrile Gloves	Yes	As needed to prevent contact with liquids.
PVC Gloves	No	
Anti-contamination Coveralls	No	

5.3 Installation of the Pad Modifications (cont.)

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Process Coveralls	Yes	Minimum Site Requirement
Chemically Resistant Anti-contamination Coveralls	No (yes)	As shown in Section 3.1, current airborne levels of contaminants are well below PEL and action levels. Periodic monitoring, as described in Section 4.0, will allow a check on contaminant levels as work proceeds and allow switching to Saranex or equivalent coated disposable clothing if warranted.
PVC Rain Suit	No (yes)	For operations where splashing or skin contact with wet materials is probable, face shields, PVC splash suits, rubber gloves, and boots shall be used.
SAR	No	
Safety Shoes	Yes	Minimum Requirement
Shoe Covers	No	
Rubber/Latex Boots	Yes	As needed to prevent contact with liquids.

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5.4 Installation of Control Structure

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Air Purifying Respirator	No (yes)	Required during drilling of concrete or if action levels are exceeded or as specified by IRS&T representative.
Cartridges: Magenta HEPA or Magenta and yellow if volatile organic compounds are detected	No (yes)	Required for concrete drilling or for epoxy cements or if action levels are exceeded or as specified by IRS&T representative.(see 4.3 HNu meter)
Hard Hat	Yes	
Hearing Protection	No (yes)	Required during drilling of concrete and whenever operations produce continuous noise levels over 85 dBA.
Safety Glasses	Yes	Minimum Requirement
Safety Goggles or Face Shields	No (yes)	As needed to prevent contact with splash or particulates.
Inner Gloves	No (yes)	PVC inner gloves shall be used beneath leather palm gloves as needed to prevent contact with liquids.
Leather-Palm Gloves	Yes	As needed for physical hand protection.
Rubber/Nitrile Gloves	Yes	As needed to prevent contact with liquids.
PVC Gloves	No	
Anti-contamination Coveralls	No	

5.4 Installation of Control Structure (cont.)

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Process Coveralls	Yes	Minimum Site Requirement
Chemically Resistant Anti-contamination Coveralls	No (yes)	As shown in Section 3.1, current airborne levels of contaminants are well below PEL and action levels. Periodic monitoring, as described in Section 4.0, will allow a check on contaminant levels as work proceeds and allow switching to Saranex or equivalent coated disposable clothing if warranted.
PVC Rain Suit	No (yes)	For operations where splashing or skin contact with wet materials is probable, face shields, PVC splash suits, rubber gloves, and boots shall be used.
SAR	No	
Safety Shoes	Yes	Minimum Requirement
Shoe Covers	No	
Rubber/Latex Boots	Yes	As needed to prevent contact with liquids.

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5.5 Operation/Maintenance of the Pad and Control Structures

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Air Purifying Respirator	No (yes)	Required if action levels are exceeded or as specified by IRS&T representative.
Cartridges: Magenta HEPA or Magenta and yellow if volatile organic compounds are detected	No (yes)	Required if action levels are exceeded or as specified by IRS&T representative. (see 4.3 HNu meter)
Hard Hat	No	
Hearing Protection	No (yes)	Whenever operations produce continuous noise levels over 85 dBA.
Safety Glasses	Yes	Minimum Requirement
Safety Goggles or Face Shields	No (yes)	As needed to prevent contact with splash or particulates.
Inner Gloves	No (yes)	PVC inner gloves shall be used beneath leather palm gloves as needed to prevent contact with liquids.
Leather-Palm Gloves	Yes	As needed for physical hand protection.
Rubber/Nitrile Gloves	Yes	As needed to prevent contact with liquids.
PVC Gloves	No	
Anti-contamination Coveralls	No	

5.5 Operation/Maintenance of the Pad and Control Structures (cont.)

<u>ITEM</u>	<u>NEED</u>	<u>JUSTIFICATION</u>
Process Coveralls	Yes	Minimum Site Requirement
Chemically Resistant Anti-contamination Coveralls	No (yes)	As shown in Section 3.1, current airborne levels of contaminants are well below PEL and action levels. Periodic monitoring, as described in Section 4.0, will allow a check on contaminant levels as work proceeds and allow switching to Saranex or equivalent coated disposable clothing if warranted.
PVC Rain Suit	No (yes)	For operations where splashing or skin contact with wet materials is probable, face shields, PVC splash suits, rubber gloves, and boots shall be used.
SAR	No	
Safety Shoes	Yes	Minimum Requirement
Shoe Covers	No	
Rubber/Latex Boots	Yes	As needed to prevent contact with liquids.

6.0 SITE CONTROL

6.1 Key Personnel

Project Manager
Supervisor-in-charge
FMPC Site Safety and Health Officer

The Project Manager is responsible for assuring that the project documents for safe implementation of the project are approved and available.

The Supervisor-in-charge is responsible for compliance with all elements of this Health and Safety Plan.

The FMPC Site Safety and Health Officer is the Manager of Industrial, Radiological, Safety and Training (IRS&T). The Manager of IRS&T is responsible for verifying compliance with this Health and Safety Plan through the performance of inspections during the conduct of this project. These inspection duties are carried out by IRS&T personnel from the Industrial Hygiene, Radiological Safety, and Safety and Fire Protection Services groups. IRS&T personnel are also involved in work permit issuance and various monitoring tasks as identified in this Health and Safety Plan.

6.2 Access

The work associated with this removal action will be within the FMPC controlled area. In addition, the work area related to this removal action will be posted as "RWP Required for Entry". The Exclusion and Contamination Reduction zones are shown on Figure 1 for each distinct phase of the planned work.

The Exclusion Zone is the zone of high potential hazard due to physical or chemical dangers. Access to the Exclusion Zone will be restricted by Radiological Safety to trained and certified personnel, who are required to enter in order to perform their job functions. There will be different Exclusion Zones for the various tasks. The Exclusion Zone will be marked with easily recognizable devices. The zone may be expanded if airborne hazards are detected. All areas requiring the use of respiratory protection are included in the Exclusion Zone. Entrance shall be limited to one area and controlled by the supervisor in charge.

Radiological Safety will established a Contamination Reduction Zone, consisting of step-off pads, at the exit to the Exclusion Zone. This zone will be used for removal of disposable personal protective equipment and for cleaning of contaminated equipment.

6.2.1 Radiological Postings

Radiological areas will be posted in accordance with DOE Order 5480.11. The following is a brief summary of posting requirements based on uranium:

Regulated Area	> 1000 dpm/100 cm ² removable > 5000 dpm/100 cm ² fixed and removable
Contaminated Area	> 10,000 dpm/100 cm ² removable > 50,000 dpm/100 cm ² fixed and removable
Airborne Radioactivity Area	> 2 x 10 ⁻¹² uCi/ml
Respirator Area	> 5 x 10 ⁻¹² uCi/ml

In addition, special postings may be added for access to areas: "RWP Required for Entry".

6.3 Medical Monitoring

In accordance with 29 CFR 1910.120 OSHA requirements, all WMCO and WMCO subcontractor personnel are required to participate in a medical monitoring program which includes:

- o A baseline medical examination
- o Annual medical examination
- o Medical examinations may be required after potential exposures.
- o Annual WMCO respirator medical approval of users or offsite medical approval validated by WMCO Industrial Hygiene.

Prior to start of work, personnel involved in this project shall be identified by name and badge number. Each individual shall be subject to a medical surveillance approval by the Director, Medical Services. The approval statement shall certify that each individual is medically qualified to perform the work and is physically fit to wear PPE.

6.4 Bioassay Samples

WMCO personnel involved in this project are required to participate in a monthly urinalysis program for uranium. In addition to this routine bioassay program, any circumstance which could have resulted in any intake of radioactive materials of fluoride chemicals by inhalation, ingestion, or skin absorption requires the affected employee to immediately report it to his/her supervisor, and then to Medical at the end of that shift in order to submit an incident type urine sample and fill out an Incident Investigation Report. The involved employee shall also submit another followup sample at the start of the next shift. Employees exposed to

fluoride chemicals shall check "fluoride analysis" on their urine sample request card.

6.5 Training Requirements

All WMCO and WMCO subcontractor personnel assigned to the tasks will, as a minimum, meet the following Hazardous Waste Operations training requirements:

- o Documented safety meeting to review this health & safety plan including site specific hazards and procedures
- o WMCO radiation safety training
- o Annual WMCO respiratory training and quantitative fit-test or off-site equivalent approved by WMCO Industrial Hygiene
- o 40-hour OSHA training
- o 8-hour annual refresher training
- o 8-hour supervisory training (for supervisors)
- o 24-hour supervised field experience

6.6 Safety Meetings

A safety meeting, which must be documented, shall be conducted prior to the start of each day's work during the site survey, the installation of the temporary curbing, and the construction work on the pad tasks. The meeting will cover the following applicable subjects:

- review of this health and safety plan
- work operations
- review of all physical and chemical hazards inherent in this job including MSDS's for chemicals used
- personnel protective equipment
- all monitoring data
- monitoring tests and results
- decontamination
- task organization
- physical stress
- emergency procedures including spill procedures
- communications
- general safety
- housekeeping

7.0 **EXPOSURE SYMPTOMS**

Exposure to low levels of radioactivity do not produce acute exposure symptoms. Such exposures may cause delayed effects such as cancer. Exposures are to be kept as low as reasonably achievable. No treatment is anticipated for the predicted contaminants and concentrations. See Section 11 for contingency plans.

Exposure symptoms for chemical hazards are described as follows:

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Uranium

Health Risks:

High level exposures to soluble uranium compounds causes respiratory irritation and temporary kidney dysfunction. Lower level chronic exposure is believed to increase the risk of cancer of the lungs, lymph system, and hemopoietic system.

Exposure Routes: Broken skin and respiratory tract

First Aid:

Inhalation - Remove person to fresh air. If trouble breathing, give oxygen, or if exposed to soluble compounds. Start bioassay urinalysis surveillance program to quantify dose.

Skin Contamination - Call RST's, perform decontamination per FMPC SOP.

Broken Skin - Report to FMPC Medical.

Asbestos:

Health Risks:

Has no acute adverse health effects. Chronic exposures to high dust levels causes a pneumoconiosis called asbestosis. Chronic exposures to low levels (especially in smokers) increases the risk of lung cancer. A rare cancer of the lung lining, mesothelioma, is also increased in incidence in asbestos workers.

Exposure Route: Inhalation

First Aid: None.

Magnesium Fluoride:

Health Risks:

A moderately soluble fluoride material which is moderately toxic by ingestion. Acute effects from large doses include nausea, vomiting, diarrhea, abdominal burning and cramps. Irritating to eyes and mucous membranes. Chronic intake of low levels can cause fluorosis of bones and ligaments and mottling of teeth in the young.

Exposure Route: Inhalation, Ingestion.

First Aid:

Remove victim to fresh air. Administer oxygen if victim has breathing difficulty. Remove dusty clothing, being careful not to resuspend dust. Wash skin and eyes.

Inorganic Lead:

Health Risks:

Chronic exposure during pregnancy may increase risk of birth defects (teratogenesis). Acute exposures to high levels causes tumors, paralysis, hallucinations, unconsciousness, and death. Chronic low level exposure can cause loss of appetite, malaise,

tremor, insomnia, headache, anemia, and dark line on gums (lead line). Suspected lung and kidney carcinogen.

Exposure Route: Inhalation, Ingestion.

First Aid:

Remove person to fresh air and provide oxygen if has difficulty in breathing. Remove contaminated clothing using care not to resuspend dust. Wash hands and face when done to prevent lead ingestion.

Volatile Organic Compounds:

Health Risks:

Will vary depending on the identity of the chemical. At present, none have been detected on the Plant 1 Pad. If any are found, the expected level may barely exceed the odor threshold and would not pose any acute or chronic adverse health effects.

Exposure Route: Inhalation, Ingestion.

First Aid:

Remove person to fresh air if inhaled. Flush eyes with water, then treat for irritation. Wash skin with soap and water after removing chemically contaminated clothing.

Methyl Ethyl Ketone

Health Risks:

Repeated skin contact causes a dry, scaly, and fissured dermatitis. Vapor concentrations > 350 ppm irritate the conjunctiva of the eyes and mucous membranes of the nose and throat. High concentrations produce narcotic effects on the arterial nervous system, including: headache, nausea, light headedness, incoordination, and unconsciousness.

Exposure Route: Skin, eyes, inhalation

First Aid:

For skin, remove solvent soaked clothing and dry the skin. For inhalation, remove person to fresh air and provide oxygen if breathing is difficult.

Xylenes

Health Risks:

Acute high exposure to the vapor causes irritation to the eyes, nose, and throat. Acute inhalation of high vapor levels causes central nervous system depression including dizziness, staggering, drowsiness, and unconsciousness. Repeated or prolonged skin contact causes drying and defatting of the skin which may lead to dermatitis.

Exposure Route: Skin, eyes, inhalation

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First Aid:

For skin, remove solvent soaked clothing and wash with soap and water. For inhalation, remove person to fresh air and provide oxygen if breathing is difficult.

Stoddard Solvent

Health Risks:

Acute inhalation of high concentrations of vapor causes arterialnervous system depression. Lower concentrations are irritating to the eyes and respiratory tract. Liquid contact with skin or eyes causes irritation. No listed chronic effects.

Exposure Route: Skin, eyes, inhalation

First Aid:

For skin, remove solvent soaked clothing and wash with soap and water. For inhalation, remove person to fresh air and provide oxygen if breathing is difficult.

Calcium Carbonate

Health Risks:

This is a very low toxicity nuisance dust having no reported acute or chronic adverse health effect.

Exposure Route: Inhalation

First Aid:

For inhalation, remove person to fresh air.

Crystalline Silica

Health Risks:

Chronic inhalation of silica flour over 2 to 30 years causes silicosis of lungs, which is the chief cause of pulmonary dust diseases.

Exposure Route: Inhalation

First Aid:

For inhalation, remove person to fresh air.

Barium, soluble compounds

Health Risks:

High level acute exposures by inhalation or ingestion of soluble barium causes an increase in contractility of all muscles including smooth muscles. This results in increased peristalsis of intestines, vascular constriction, bladder contraction, and increased voluntary muscle tension. The heart rate is slowed and may stop. Low level chronic inhalation of insoluble barium may result in "baritosis", a benign darkening of the lungs when X-Rayed.

Exposure Routes: Inhalation.

First Aid:

Remove person to fresh air. If trouble breathing, give oxygen. If symptoms of acute poisoning are evident, get medical attention.

8.0 SITE ENTRY PROCEDURES

During the site survey and installation of control measure tasks, the following procedures apply:

- o Identify exclusion zone, contamination reduction zone, and break area.
- o Only personnel on the approved roster to be admitted to exclusion zone.
- o Perform daily safety meeting to familiarize team with site specific hazards.
- o Discuss alternate communications signals (if applicable).
- o Perform respirator inspection and negative/positive pressure fit check prior to use.
- o Use buddy system. Teams of at least two individuals will be used for all activities within and exclusion zone.

Prior to the initiation of these work tasks, the following permits are required:

- Radiation Work Permit
- Penetration Permit
- Flame Permit prior to cutting or welding
- Chemical/Hazardous Material Permit
- Work Permit
- Asbestos Work Permit for work around scrap copper pile

All personnel entering the Exclusion Zone shall be trained and certified to perform their assigned task as defined by 29 CFR 1910.120. Entrance to the Exclusion Zone shall be controlled and at the approval of the supervisor in charge.

9.0 DECONTAMINATION

Equipment for decontamination of radiological or chemical hazards shall be kept available in the area surrounding the Exclusion Zone (or Contamination Reduction Zone). Upon leaving Exclusion Zone covered by Radiation Work Permits (see Section 6.1), workers are told by posted signs how to remove disposable clothing, how to frisk, in which containers to place disposable and reconditionable equipment, and what to do if personal radioactive contamination is detected.

Review of MSDS information on the materials given in Section 3.0 did not reveal the need for any chemical decontamination solutions besides soap

and water. Safety showers and restrooms in Plant 1 shall be used for removing any contamination which gets through disposable clothing, gloves, rainsuit, and coveralls to the skin. Portable eyewashes filled with a saline and preservative solution shall be kept near the on-going work on the Plant 1 Pad. The eyewash solution shall have been changed within the last 6 months. Any contamination on worker's coveralls will be discarded when worker showers and changes to street clothes in the Services Building prior to going to lunch or home.

10.0 WASTES

Wastes include, but are not limited to:

- o Disposable PPE
- o Excess materials such as soil or concrete

All potentially contaminated waste materials resulting from site activities will be collected and placed in drums or other containers. Disposable protective clothing will be placed in plastic bags and disposed of as compactible, potentially contaminated waste.

Drums or containers shall meet DOE 49 CFR Parts 171-178, EPA, 40 CFR Parts 264-265 and 300, and OSHA requirements. Hazard warning shall be immediately applied to all drums as specified by WMCO management/supervisors and WMCO Solid Waste Compliance.

11.0 CONTINGENCY PLANS

11.1 Incidents or Injuries

Incidents or injuries involving potential intake of any hazardous substances shall be reported to supervisor and the WMCO Medical Section by the involved employee and an Incident Investigation Report completed by the involved employee. See Section 6.2 for details on bioassay procedure.

11.2 Pre-Emergency Planning

During the training and pre-work safety meetings, all employees involved in this task shall be trained and reminded of the provisions of the plant emergency procedure, alarm signals and communications, evacuation routes (See Figure 2) and emergency reporting.

11.3 Lines of Authority

The supervisor in charge has the primary responsibility for the prevention of emergency conditions. In the event that an emergency does occur, the individual involved or observing the condition shall immediately notify a supervisor, the communications center or the WMCO Assistant Emergency Duty Officer (AEDO). The AEDO is responsible for ensuring that corrective actions have been

implemented, the appropriate personnel notified, and initial reports completed as required.

11.4 Spill Containment

Methods shall be employed to minimize the potential for and consequences of spills during the course of the project. All assigned workers shall be trained as appropriate in the existing procedures for handling spills connected with this project.

11.5 Evacuation

In the event of an emergency which necessitates an evacuation of an exclusion area, the 2-2, 2-2 shall be sounded over the plant alarm system; a voice message will follow over the Emergency Message System and radios instructing employees to go to their designated Rally Point. Personnel shall immediately proceed to the Rally Point and participate in the accountability process. Personnel will follow instructions given by the Rally Point Coordinator. When an all-clear condition has been achieved, personnel will be released from the Rally Point.

11.6 Emergency Equipment

The following safety equipment, locations to be identified at safety meetings, is available for employee usage:

- fire extinguisher (required for flame cutting or welding)
- manual fire alarm (locations in Plant 1, Bldg 66, Bldg 71)
- portable eye wash (near on-going work)
- two-way radio (supervisor equipment)
- telephone (located in Plant 1, Bldg 66)
- local evacuation alarm (located in Plant 1)
- respirators (located in cabinets in Plant 1, Bldg 66)
- safety shower (located in Plant 1, Bldg 66)
- emergency SCBA units (located in Plant 1)
- spill drums (to be available at Plant 1 Pad)
- clean-up materials (to be available in Plant 1)
- absorbent (to be available in Plant 1)

11.7 Emergency Notification

All emergencies shall be reported immediately. Emergencies can be reported by telephone dialing extension (ext.) 6511; by contacting the communications center via two-way radio; or by pulling a manual fire alarm.

11.8 Fire, Explosion, or Medical Emergency

In the event of a fire, explosion or medical emergency, the communication center shall be notified immediately by manual fire

alarm, two-way radio, or by calling ext. 6511. The communication center operator will activate the emergency response team and dispatch them to the appropriate location. Personnel in the immediate area should evacuate to a safe position and await instructions if a hazardous condition exists. The route from the project area to the WCO Medical Facility is shown in Figure 2.

11.9 Additional Information

11.9.1 Hospitals

The WCO Medical Facility (Building 53) is the primary choice for on-site injuries. The WCO ambulance will transport the injured to the nearest hospital if necessary. WCO maintains an emergency response capability which includes an ambulance and Emergency Medical Technicians.

11.9.2 Emergency Telephone Numbers

Ambulance: ext. 6511
Hospital: ext. 6511
Fire: ext. 6511

<u>Name</u>	<u>Work</u>	<u>Radio</u>
EMERGENCY RESPONSE	6511 or 6295	
Industrial Hygiene	6207	357
Radiation Safety	6889	355
Fire Services	6235	303
Assistant Emergency Duty Officer (AEDO)	6431 or 6295	202

12.0 **CONFINED SPACE ENTRY**

There are no confined spaces on Plant 1 Pad nor will any be created by installation of the control measures.

13.0 AMENDMENTS

- A. This Project/Task Specific Health and Safety Plan is based on information available at the time of preparation. Unexpected conditions may arise which require reassessment of safety procedures. It is important that personnel protective measures be thoroughly assessed by the supervisor in charge and IRS&T representative prior to and during the planned task activities. Unplanned activities and/or changes in the hazard status shall require a review of and may require changes in this plan.
- B. Changes in the anticipated hazard status or unplanned activities are to be submitted as an amendment to this Project/Task Specific Health and Safety Plan.
- C. Amendments must be approved by the plan author and IRS&T prior to implementation of the amendment.

14.0 APPROVAL AND COMPLIANCE STATEMENT

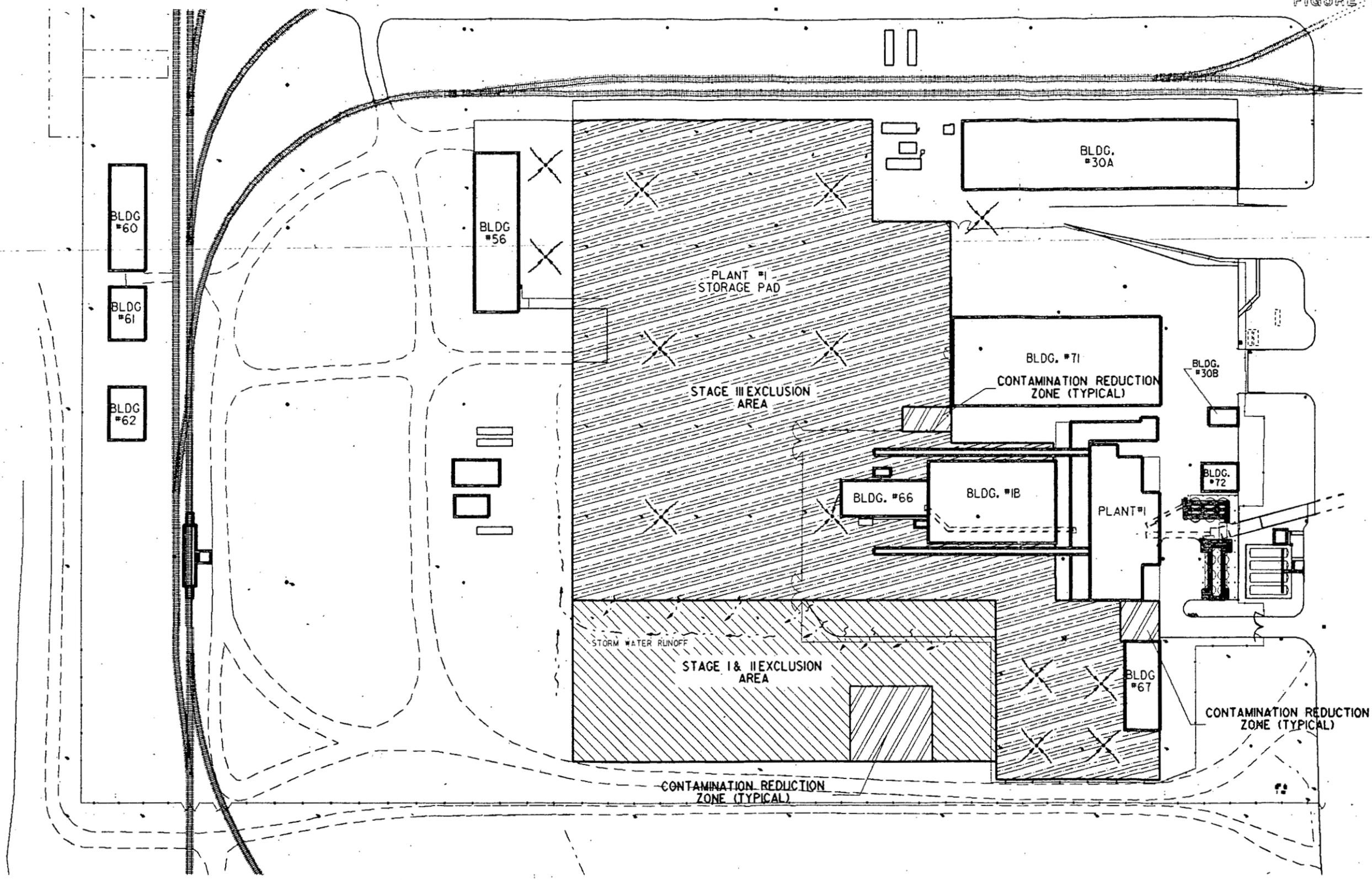
This Health and Safety Plan was produced for the use of WMCO employees and WMCO subcontractors. It was intended for the FMPC and specifically for the following activities related to the Plant 1 Pad removal action:

- Site Survey
- Construction Modifications to the Pad (3 phases)
- Operations/Maintenance of Control Structures and Pad

The undersigned personnel have read and understood this Health and Safety plan and agree to follow its provisions:

Name (lettered)	Signature	Date
SUPERVISOR-IN-CHARGE	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

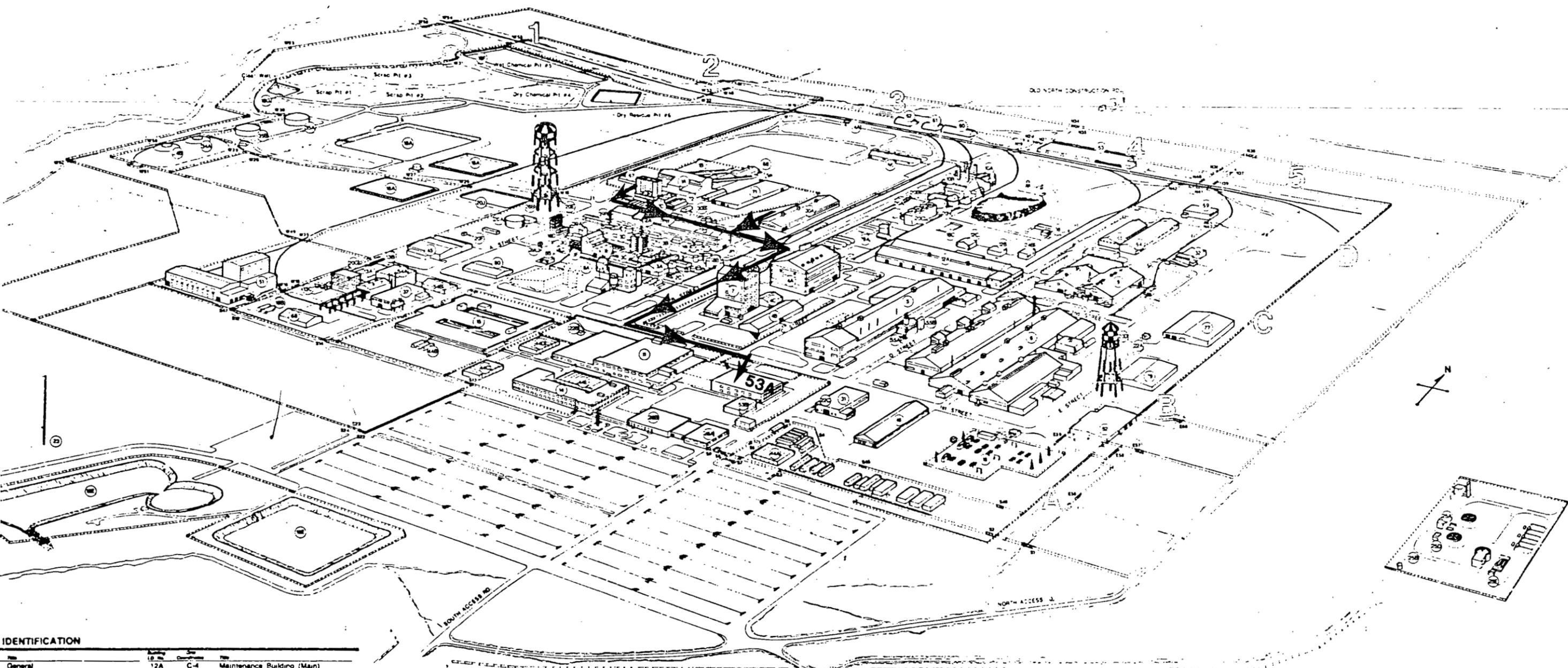
1. Compliance with the provisions of the Health and Safety Plan may be audited through announced or unannounced site visits. Be sure that the provisions of this safety plan are implemented and document the reasons for field actions/changes when they are necessary. Site visits may be performed by the DOE or WMCO personnel.



<table border="1"> <tr> <th>NO.</th> <th>REVISIONS</th> <th>DATE</th> <th>DWN. BY</th> <th>APPD.</th> <th>NO.</th> <th>REVISIONS</th> <th>DATE</th> <th>DWN. BY</th> <th>APPD.</th> <th>REF. DWG. NO.</th> </tr> <tr> <td> </td> </tr> </table>				NO.	REVISIONS	DATE	DWN. BY	APPD.	NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.												<p>NOTE: WMCO C.A.D. DRAWING NOT TO BE REVISED MANUALLY</p>	<table border="1"> <tr> <td>DESIGNED BY</td> <td> </td> </tr> <tr> <td>CHECKED BY</td> <td> </td> </tr> <tr> <td>APPROVED BY</td> <td> </td> </tr> </table>	DESIGNED BY		CHECKED BY		APPROVED BY		<table border="1"> <tr> <th colspan="2">APPROVALS</th> </tr> <tr> <td>CHEMICAL</td> <td> </td> </tr> <tr> <td>CIVIL & STR.</td> <td> </td> </tr> <tr> <td>ELECTRICAL</td> <td> </td> </tr> <tr> <td>ENGINEER</td> <td> </td> </tr> <tr> <td>INSTRUMENT</td> <td> </td> </tr> <tr> <td>MECHANICAL</td> <td> </td> </tr> <tr> <td>CHECKED</td> <td> </td> </tr> <tr> <td>APPROVED</td> <td> </td> </tr> </table>	APPROVALS		CHEMICAL		CIVIL & STR.		ELECTRICAL		ENGINEER		INSTRUMENT		MECHANICAL		CHECKED		APPROVED		<p>WESTINGHOUSE MAT'L.S.CO.OF OHIO</p> <p>FERNALD, OHIO</p> <p>FEED MATERIALS PRODUCTION CENTER U.S. DEPARTMENT OF ENERGY</p>	<p>PLANT #1 STORAGE AREA STORAGE PAD LAYOUT EXCLUSION AREA (TYP.) SCALE - 1" = 50'-0"</p> <p>DATE: 10-11-90 DRAWN: MJE, LDD</p> <p>FILE NO: OIX-5500-G-01336</p>
NO.	REVISIONS	DATE	DWN. BY	APPD.	NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.																																												
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MECHANICAL																																																						
CHECKED																																																						
APPROVED																																																						

FMPC SITE

FIGURE 2



IDENTIFICATION

Building ID No.	General Description	Notes
12A	C-4	Maintenance Building (Main)
12B	C-4	Cylinder Storage Building
12C	C-4	Lumber Storage Building
13A	A-3	Pilot Plant Wet Side
13B	A-3	Pilot Plant Maintenance Building
13C	A-3	Sump Pump House
14	A-4	Administration Building
15	A-3	Laboratories
16	A-5	Main Electrical Substation
18	C-2	Surge Lagoon
18B	B-3	Server Room
18C	C-4	Coal Pile Runoff Basin
18D	B-3	Biodenitrification Towers
18E	-	Storm Water Retention Basin
18F	D-1	Pit 5 Sluice Gate
18G	C-1	Cleanwell Pump House
19A	C-4	Metal Tank Farm
19B	A-3	Pilot Plant Ammonia Tank Farm
20A	C-3	Valve/Control Building
20B	D-4	Filter Chemical Building
20C	C-4	Cooling Towers
20D	B-5	Elevated Storage Tank (Potable H ₂ O)
20E	B-3	Well House
20F	B-3	Well House
20G	A-3	Well House
20H	D-4	Process Water Storage Tank
20J	B-2	Lime Slurry Pits
22A	B-5	Gas Meter Building

Building ID No.	General Description	Notes	Building ID No.	General Description	Notes	Building ID No.	General Description	Notes
22B	A-3	Storm Sewer Lift Station	35B	B-1	Metal Oxide Storage Tank - South	60	D-3	Quonset Number 1
22C	A-5	Truck Scale	37	A-3	Pilot Plant Annex	61	D-3	Quonset Number 2
23	-	Metallurgical Tower	38	D-4	Propane Storage	62	D-3	Quonset Number 3
24A	D-3	Rainwater Scale House	39A	B-3	Incinerator Building	63	D-4	K-C-2 Warehouse
24B	C-4	Railroad Engine Building	39B	B-3	Warehouse	64	D-5	Plant 9 Warehouse
25A	-	Chlorination House	39C	B-3	Incinerator Building Sprinkler Riser House	65	D-5	Plant 5 Warehouse
25B	-	MH #175	44A	A-5	Trailer Complex - 6-Plex - East	66	C-3	Drum Reconditioning Building
25C	A-5	Sewage Lift Station Building	44B	A-3	Trailer Complex - 3-Plex	67	C-3	Plant 1 Storage Building
25D	-	UV Disinfection Building	44C	A-3	Trailer Complex - 7-Plex - South	68	A-3	Pilot Plant Warehouse
25E	-	Diester Control House	44D	A-3	Trailer Complex - 7-Plex - North	69	D-5	Decontamination Building
26A	T-3	Pump House - H.P. Fire Protection	44E	A-4	Trailer Complex - 10-Plex	71	C-3	General In-Process Storage Warehouse
26B	B-3	Fire Protection Storage Tank	45	B-3	Building 45	72	C-3	Drum Storage Building
26A	A-4	Security Building	46	A-5	Heavy Equipment Garage	73	-	Fire Brigade Training Center Building
26B	A-4	Human Resources Building	51	A-2	UF ₆ to UF ₄ Reduction Facility II	77	C-5	Finished Products Warehouse
26C	A-4	Chemical Warehouse	53A	A-4	Health, Safety & Production Control Building	78	-	New D&D Facility (On Hold)
26D	C-3	Drum Storage Warehouse	53B	A-4	In-Vivo Building	79	-	Plant 8 Warehouse
26E	C-3	Engine House - Garage	54A	A-3	UF ₆ to UF ₄ Reduction Facility I	80	B-5	Plant 8 Warehouse
26F	D-5	Magnesium Storage	54B	A-3	Warehouse-Weather Shelter	81	C-3	Plant 9 Warehouse
26G	B-1	K-65 Storage Tank - North	55A	B-4	Slag Recycling Plant	82	B-5	Receiving & Incoming Materials Inspection Area
26H	B-1	K-65 Storage Tank - South	55B	B-4	Slag Recycling Pit Elevator	-	-	Outside of Perimeter Security Fence
26I	C-1	Metal Oxide Storage Tank - North	56	D-3	CP Storage Warehouse	-	-	

COVERED CONTROLLED STORAGE PAD - PLANT 1

(WBS 1.1.2.1.01)

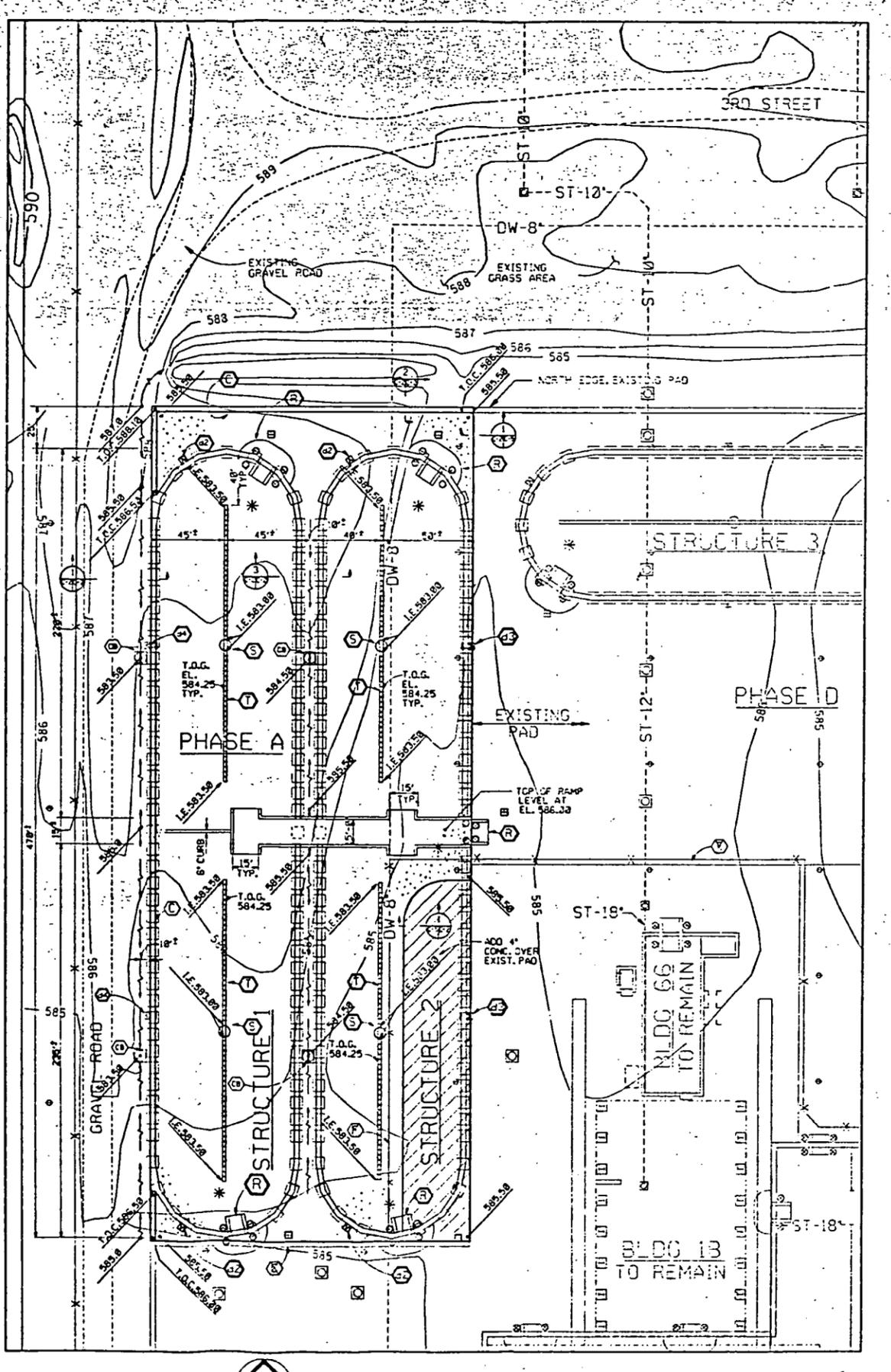
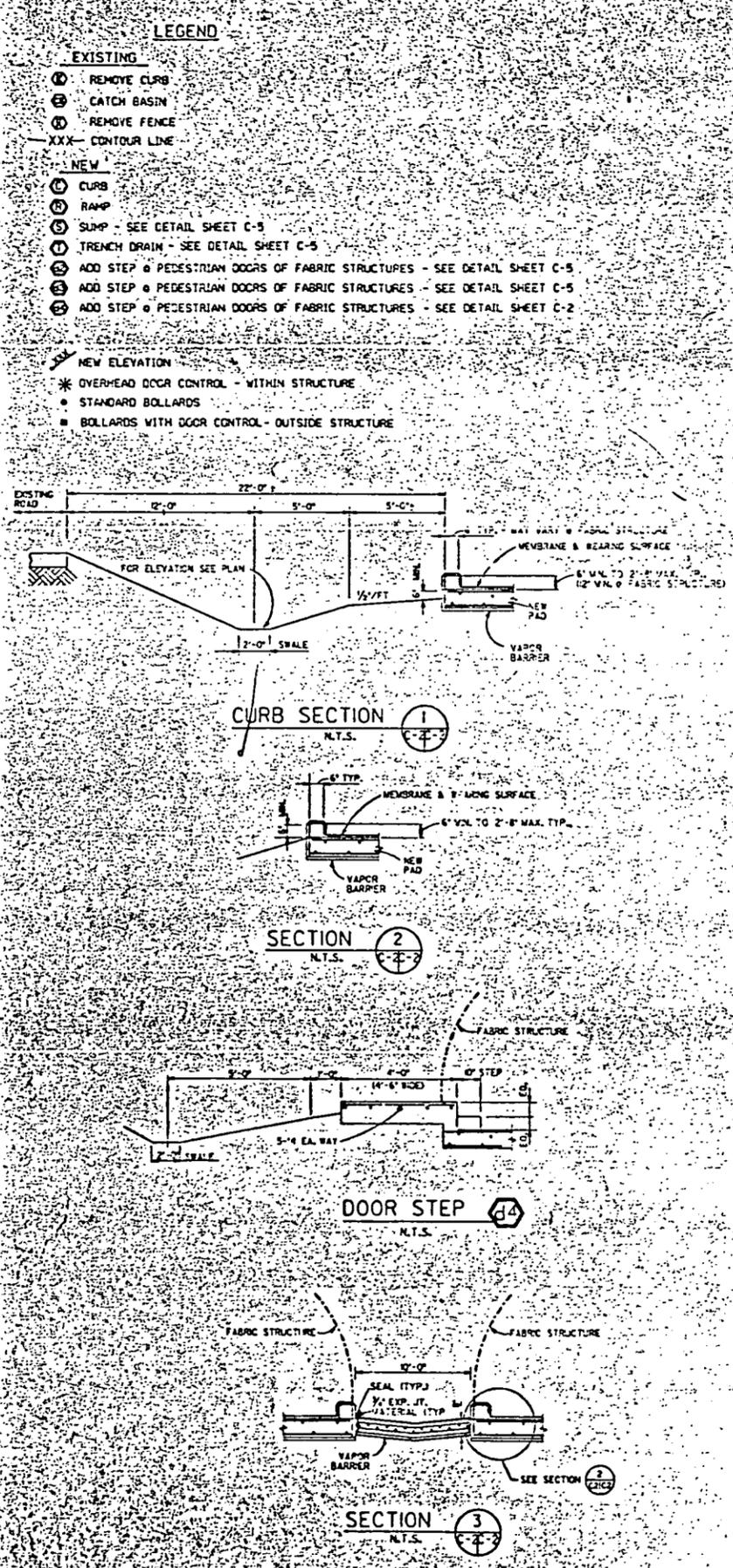
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS, PHASE 3
 FEED MATERIALS PRODUCTION CENTER,
 FERNALD, OHIO

UNITED STATES DEPARTMENT OF ENERGY

DRAWING INDEX

FMPC DRAWING NO.	A.M.K. SHEET NO.	REV.	DATE	TITLE
74B-4445-X-00063	X-1	1	11-26-90	COVER SHEET
74B-4445-C-00064	C-1	1	11-26-90	CONSTRUCTION PHASING
74B-4445-C-00065	C-2	1	11-26-90	PHASE A - PAD EXTENSION
74B-4445-C-00066	C-3	1	11-26-90	PHASE B - FABRIC STRUCTURES
74B-4445-C-00067	C-4	1	11-26-90	PHASE C, D, & E
74B-4445-C-00068	C-5	1	11-26-90	SITE DETAILS
74B-4445-E-00069	E-1	1	11-26-90	ELECTRICAL POWER AND LIGHTING
74B-4445-E-00070	E-2	1	11-26-90	ELECTRICAL DEMOLITION
74B-4445-E-00071	E-3	0	07-14-89	ELECTRICAL DETAILS
74B-4445-P-00072	P-1	1	11-26-90	SITE DRAINAGE

1	GENERAL REVISIONS		
2	KFC		
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 COVER SHEET			
DATE	BY	CHECKED BY	PCW
87-0-159	0087502	74B-4445-X-00063(X-1)	1
WBS 1.1.2.1.01			



- NOTES**
1. SEE SHEET C-1 FOR SCOPE OF PHASE A CONSTRUCTION.
 2. SEE SHEET P-1 FOR STORM SEWER AND CATCH BASIN DETAILS.
 3. SEE SHEET C-5 FOR DETAILS OF FOUNDATIONS, TRENCHES AND SLABS.
 4. LIGHT POLES TO BE REMOVED BY ELECTRICAL CONTRACTOR. SEE SHT. E-2.

TO CORRELATE REFERENCED "ANK SHEET No's" TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 74B-4445-Y-00063

1	GENERAL REVISIONS		
8	CFC		

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

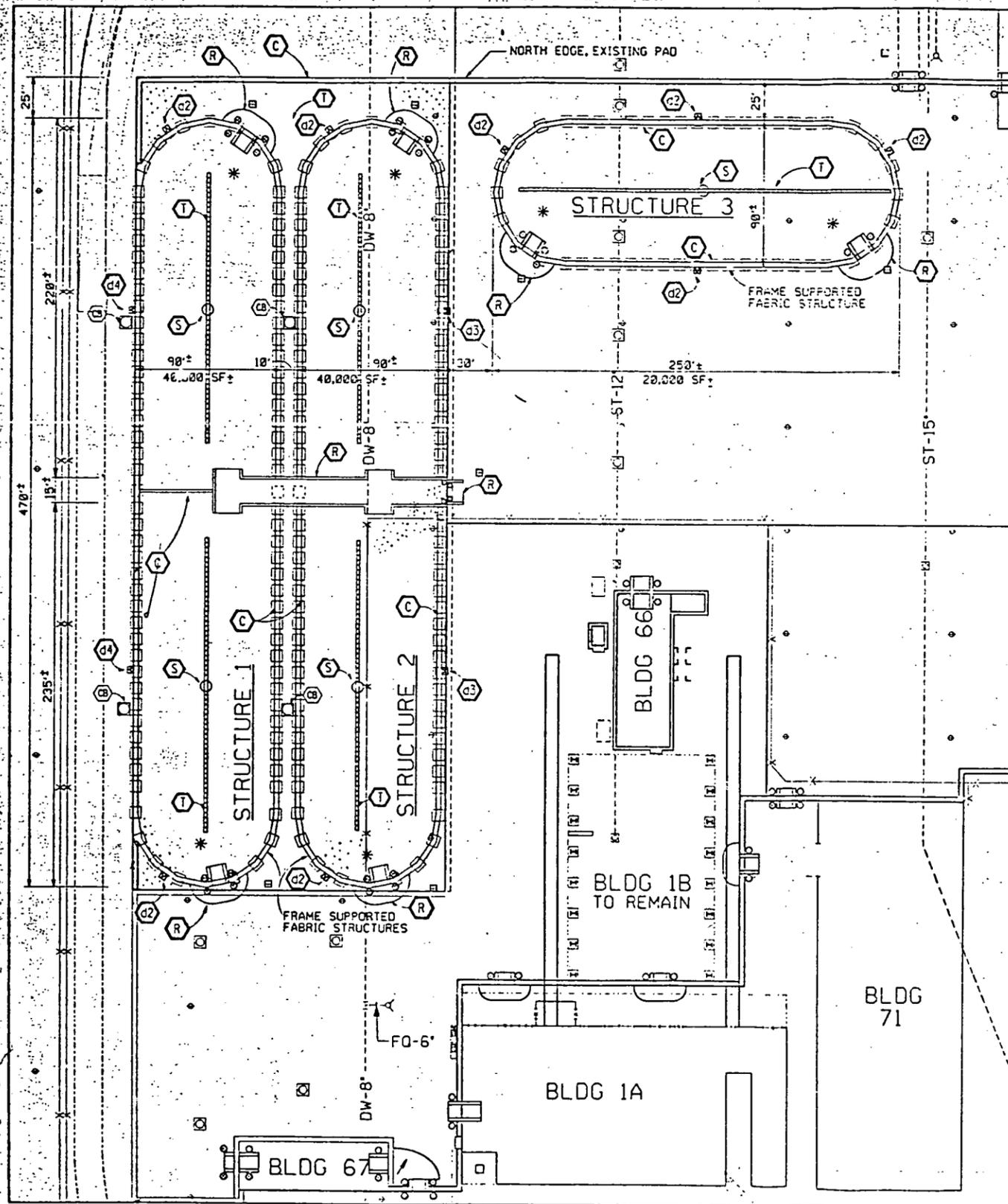
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CHICAGO, ILL. 60604

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

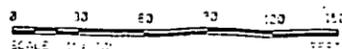
COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASE A - PAD EXTENSION

DATE	BY	REVISIONS	DATE
MEC	3-89	EBW	6-89
PLANT 1		LMP	6-89

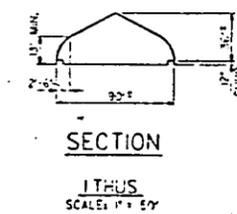
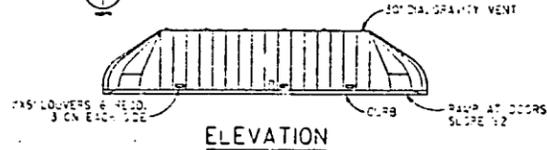
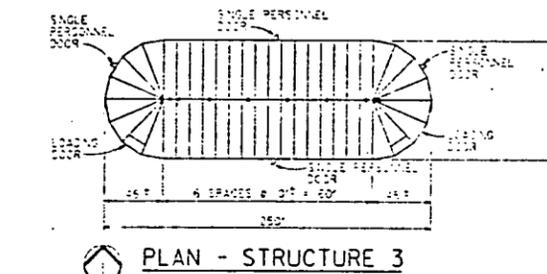
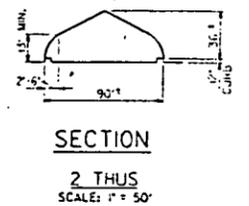
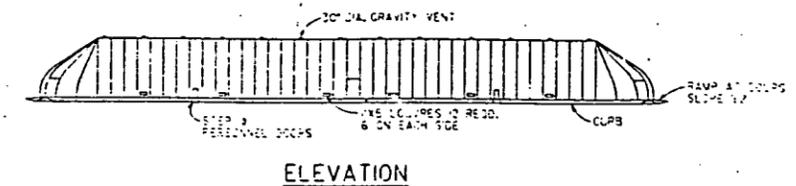
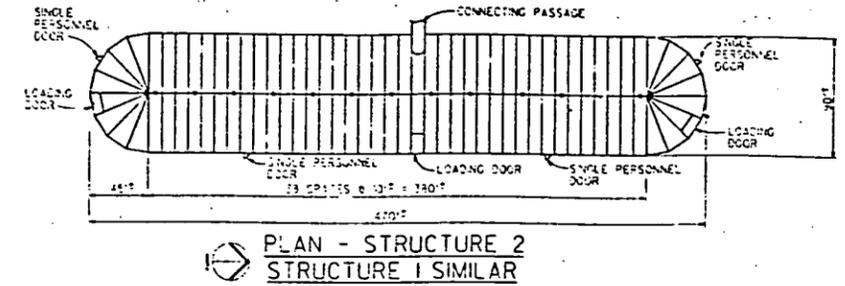
87-D-159 0087502 74B-4445-C-2828-65 C-2 1



SITE PLAN
SCALE: 1" = 30'



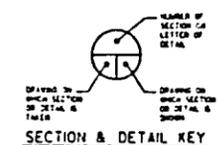
DO NOT SCALE - REDUCED DRAWING



FRAME SUPPORTED FABRIC STRUCTURE

LEGEND

- EXISTING
- CATCH BASIN
- NEW
- CATCH BASIN
- CLRB
- RAMP
- SUMP
- TRENCH DRAIN
- PREFABRICATED TRENCH DRAIN SEE DWG. 01
- 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



NOTES

- SEE DRAWING C-5 FOR DETAILS OF FOUNDATION, Sumps AND TRENCH DRAINS.
- PERSONNEL DOORS AND FRAMES TO BE HOLLOW METAL, OUT SWINGING, NOMINAL 3 FOOT BY 6 FOOT 8 INCH SIZE, AND TO INCLUDE HARDWARE, VEHICLE DOORS TO PROVIDE 10 FOOT WIDE BY 12 FOOT HIGH CLEAR OPENINGS, AND TO BE EITHER HORIZONTAL SLIDING OR VERTICAL ROLL-UP TYPE. VEHICLE DOORS TO BE POWER OPERATED WITH PUSHBUTTON CONTROLS POST MOUNTED OUTSIDE AND OVERHEAD DOOR CONTROLS INSIDE OF THE STRUCTURES.

TO CORRELATE REFERENCED "AMK SHEET No." TO FMPC DRAWING NUMBERS, SEE "FMPC DRAWING No." 748-4445-K-C0063

NO.	DATE	DESCRIPTION	BY	CHECKED
1	11-28-88	GENERAL REVISIONS	EBW	LMP
2	7-14-89	CFC	EBW	LMP

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

CONSULTING ENGINEERS
A. M. KINNEY, INC.
CHICAGO, ILL.

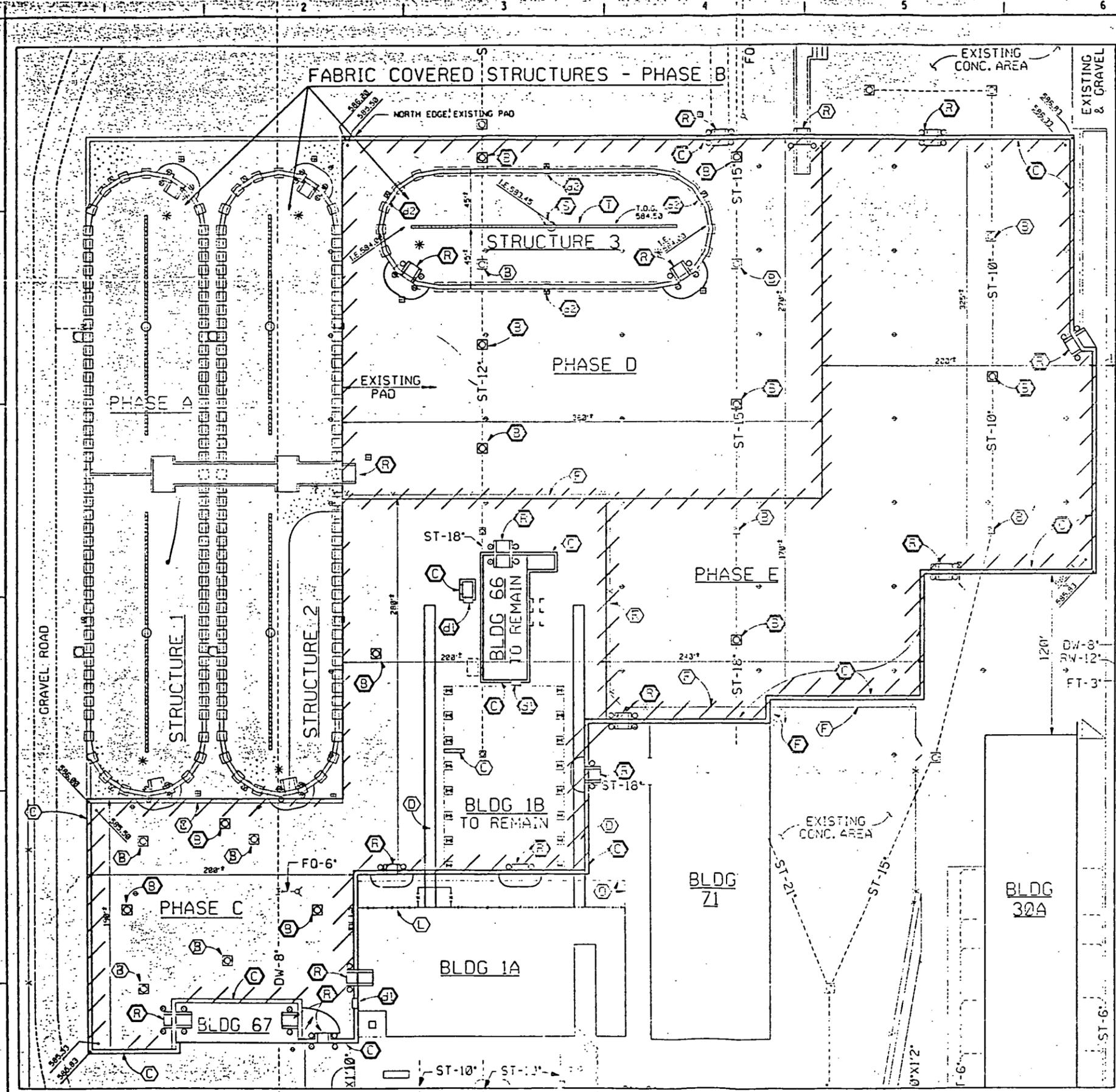
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT I
PHASE B - FABRIC STRUCTURES

DATE	NO.	BY	NO.	BY	NO.
4-89	4-89	EBW	4-89	LMP	6-89

PLANT I AS NOTED

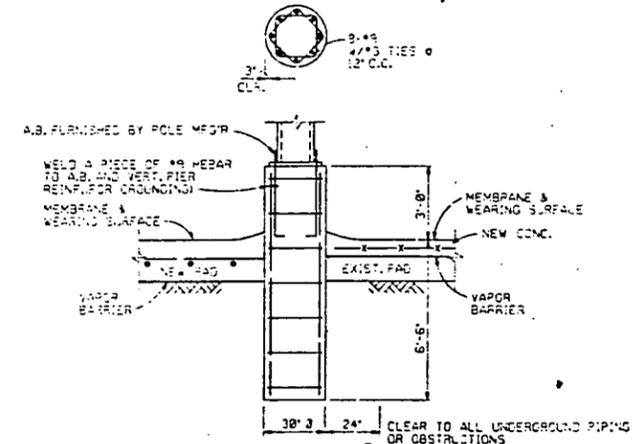
87-D-159 0087502 748-4445-C-20265 [C-3] 1



NOTES

- SEE SHEET C-4 FOR SCOPE OF PHASE C, D & E CONSTRUCTION.
- SEE SHEET P-1 FOR STORM SEWER DETAILS.
- SEE SHEET C-5 FOR DETAILS OF FOUNDATIONS, TRENCHES AND SLUMPS.
- LIGHT POLES TO BE REMOVED BY ELECTRICAL CONTRACTOR. SEE SHT. E-2.

- LEGEND**
- EXISTING**
- (B) CATCH BASIN ADJUSTED TO GRADE - SEE SHT. P-1
 - (C) EXISTING CATCH BASIN - ABANDON & COVER W/ VAPOR BARRIER, CONCRETE, ETC.
 - (D) RAISE CURB
 - (E) CA. CH. BASIN
 - (F) CONVEYOR GALLERY STRUCTURE TO BE DEMOLISHED AND REMOVED
 - (G) FENCE TO REMAIN
 - (H) REMOVE FENCE AND GATES
 - (I) WALL LINE OF BLDG. 1A
 - (J) EXTENT OF BLDG. 1A ROOF OVERHANG
 - (K) EXIST. RAMP - ADD 4" CONC. ETC. BACK TO LINE OF NEW CURB & FEATHER TOWARDS PLANT 56. RAISE EXIST. RAMP CURB AS REQ'D.
- NEW**
- (L) CATCH BASIN - SEE SHT. P-1
 - (M) CURB
 - (N) NEW FENCE
 - (O) RAMP
 - (P) SUMP
 - (Q) TRENCH DRAIN
 - (R) ADD STEP @ EXIST. PEDESTRIAN DOORS. SEE DETAIL SHT. C-5
 - (S) ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES
- NEW ELEVATION**
- * OVERHEAD COOR CONTROL
 - BOLLARDS WITH DOOR CONTROL
 - STANDARD BOLLARDS



PIER FOR LIGHT POLE
SEE ELECTRICAL DWG. FOR LOCATION
SCALE: 3/4" = 1'-0"

TO CORRELATE REFERENCED TANK SHEET NO. 110, FMPC DRAWING NUMBERS, SEE FMPC DRAWING NO. 749-4445-X-00063

1	GENERAL REVISIONS	DATE	BY
2	CFC	12-1-89	EDW

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

DESIGNED BY
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CHICAGO, ILL. 60606

PROJECT TITLE
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

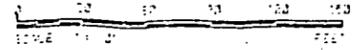
DRAWING TITLE
COVERED CONTROLLED STORAGE PAD - PLANT I
PHASE C, D, & E

DATE	BY	DATE	BY	DATE	BY
4-89	EDW	4-89	LHP	6-89	

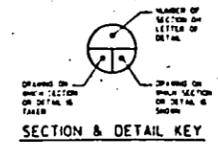
NOTES: 75 NOTED

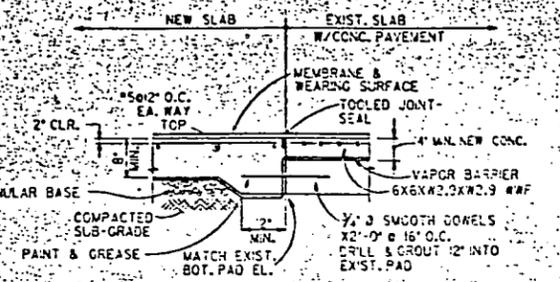
87-D-159 0087502 749-4445-C-00267 C-4 I

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

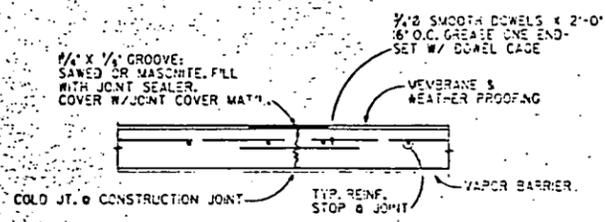


DO NOT SCALE REDUCED DRAWING

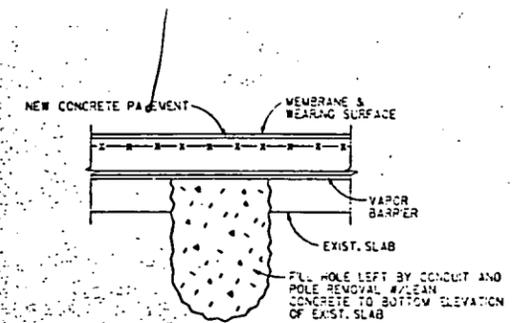




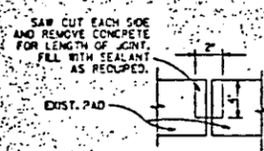
TYP. PAD SECTION 1
N.T.S.



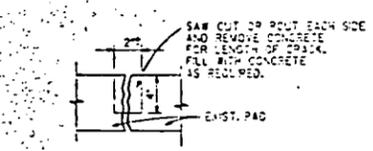
CONSTRUCTION OR CONTROL JOINT (C.J.)
N.T.S.
JOINTS TO BE SPACED AT 20'-0" ± EA. WAY



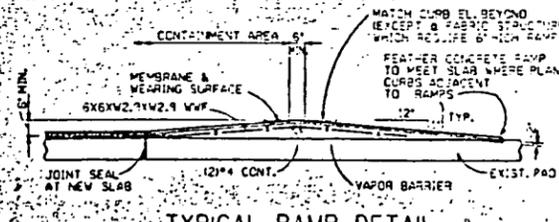
LIGHT POLE REMOVAL



EXIST. JOINT TREATMENT
N.T.S.

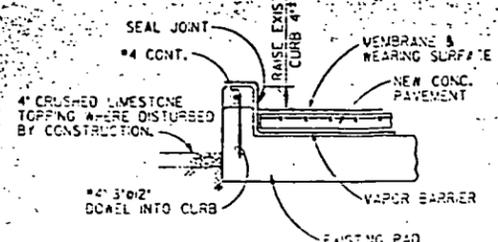


EXIST. CRACK TREATMENT
N.T.S.

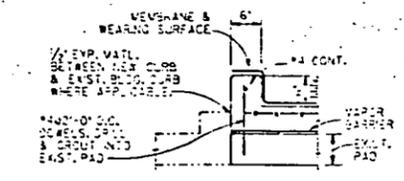


TYPICAL RAMP DETAIL
SCALE: 1/2" = 1'-0"

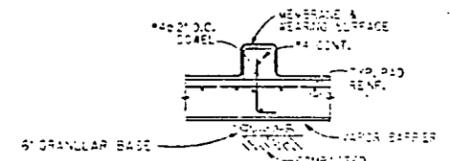
NOTE: ALL RAMPS 12" WIDE (INSIDE FACE TO INSIDE FACE OF CURB) EXCEPT THOSE WHICH ENTER BUILDINGS (10" WIDE) AND THOSE SPECIFICALLY NOTED.



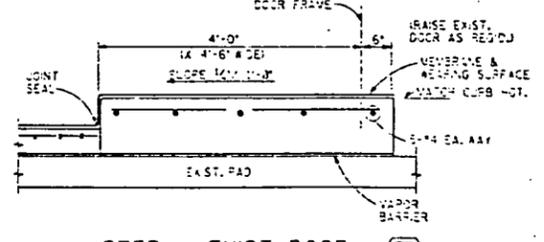
RAISED CURB DETAIL
SCALE: 1/2" = 1'-0"



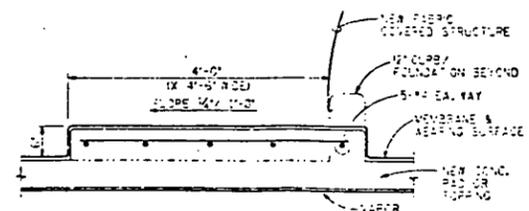
CURB ON EXIST. PAD
SCALE: 1/2" = 1'-0"



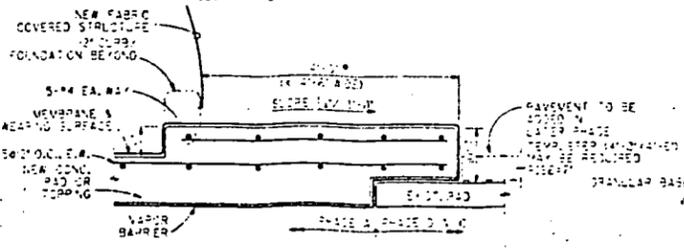
CURB ON NEW PAD - INTERIOR
SCALE: 1/2" = 1'-0"



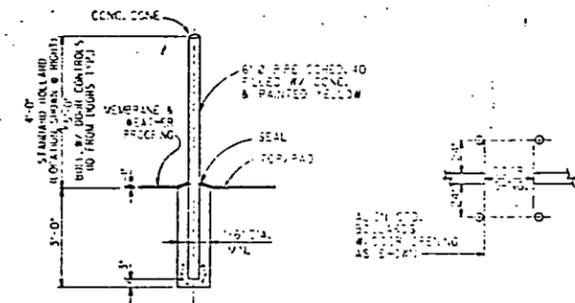
STEP @ EXIST. DOOR
SCALE: 1/2" = 1'-0"



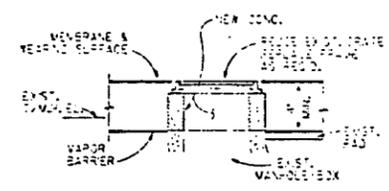
STEP @ NEW FABRIC STRUCTURE DOORS
SCALE: 1/2" = 1'-0"



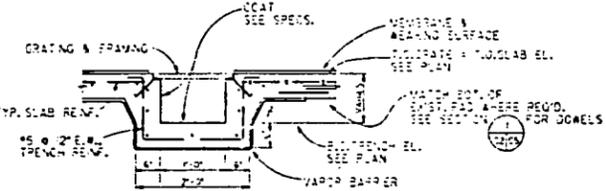
STEP @ NEW FABRIC STRUCTURE DOORS
SCALE: 1/2" = 1'-0"



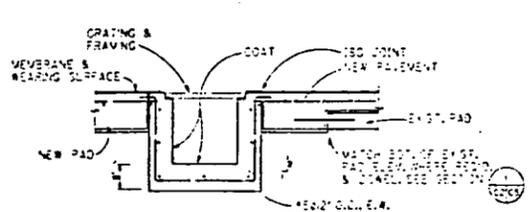
BOLLARD DETAIL
SCALE: 1/2" = 1'-0"



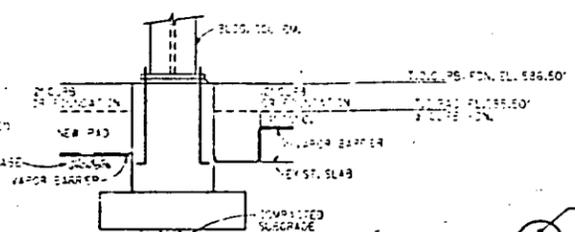
RAISED CATCH BASINS
N.T.S.



NEW TRENCH SECTION
SCALE: 1/2" = 1'-0"



SUMP DETAIL
N.T.S.



TYP. FTC. TO BE DESIGNED BY STRUCTURE FABRICATOR
NOT TO SCALE

DO NOT SCALE: REDUCED DRAWING

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

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

TO CORRELATE REFERENCED DRAWING SHEET NO. TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING NO. 743-4445-X-00063

NO.	DATE	BY	CHKD.	APP'D.	DESCRIPTION
1	5-89	EBW	LMP		GENERAL REVISIONS
2	5-89	EBW	LMP		CFC

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

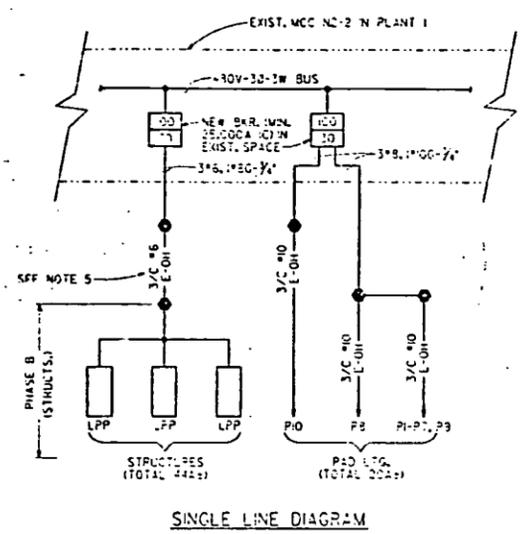
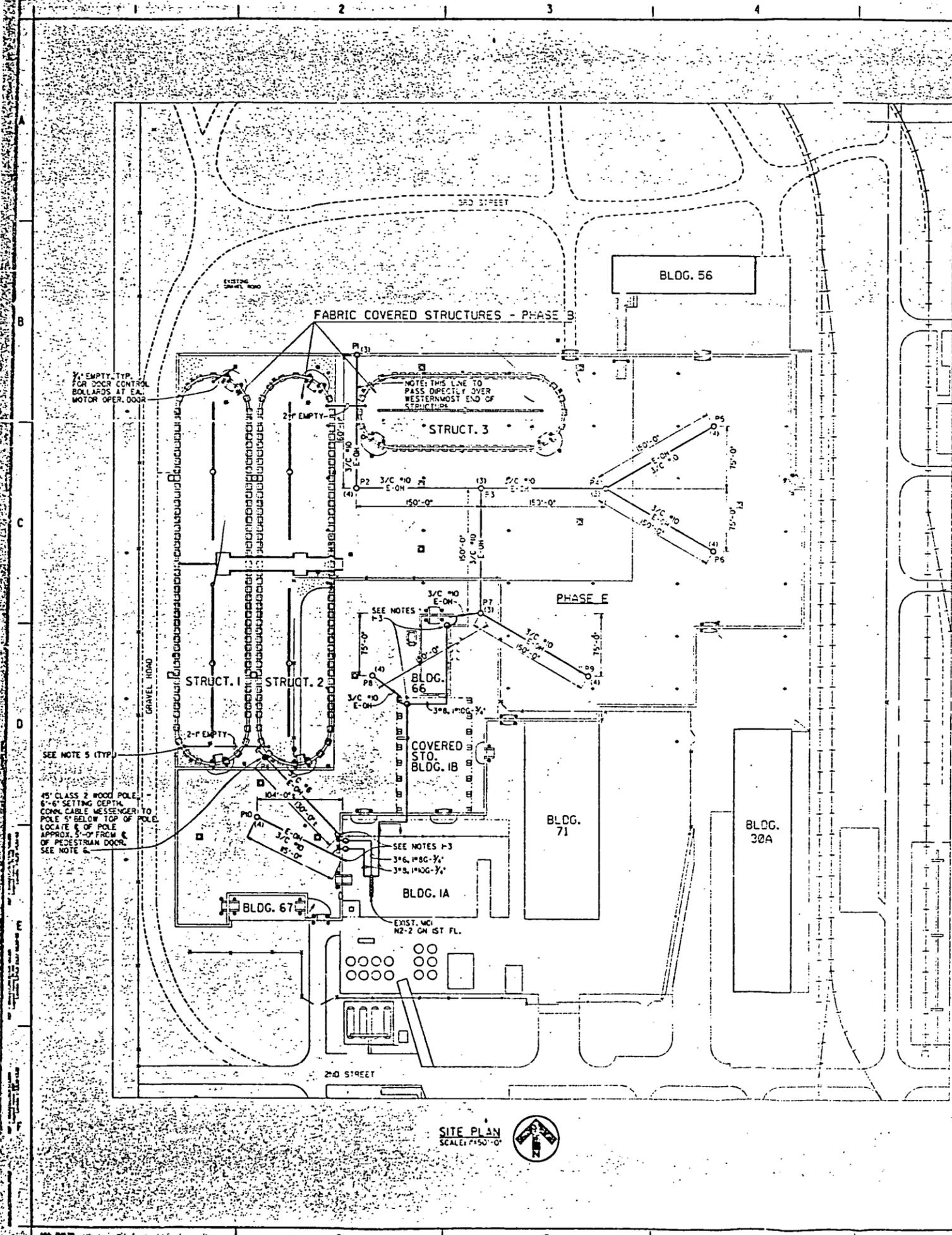
A. M. KINNEY, INC.
 CONSULTING ENGINEERS
 CINCINNATI, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT 1
 SITE DETAILS

REVISED BY	DATE	REVISIONS	SCALE
MEC	5-89	CONCRETE	LMP
PLANT 1		AS NOTED	

87-D-159 0087502 743-4445-C-00068 [C-5] 1



POLE-MTD. LUMINAIRE CONNS.

POLE NO.	QUAN. LUMINAIRE FEET/PHASE		
	BA-B	CB-C	DC-A
P1	1	1	1
P2	1	1	2
P3	1	1	1
P4	1	1	1
P5	1	2	1
P6	2	1	1
P7	1	1	1
P8	1	2	1
P9	1	1	2
P0	2	1	1

- NOTES
- ANCHOR OVERHEAD SPAN MESSengers TO BLDG. STEEL, AS FOLLOWS:
 - APPROX. 40'-0" MIN. 38'-0", OR HIGHER, ABOVE GRADE ON BLDG. 1A.
 - MIN. 17'-0" ABOVE GRADE ON BLDGS. B & 66. PROVIDE 3" GALV. STL. PIPE MAST, IF NECESSARY.
 - BOND OVERHEAD SPAN MESSengers TO CONDUIT SYSTEM AT POINTS OF CONNECTION BETWEEN OVERHEAD CABLE & CONDUIT SYSTEM (MESSengers ARE EQUIP. GROUNDING MESSengers).
 - PROVIDE 1-HOLE WEATHERHEAD & CONDUIT FOR ENTRY OF 3/4" OVERHEAD CABLE INTO BLDG. DO NOT STRIP JACKET FROM 3/4" CABLE UNTIL CABLE IS EXTENDED INTO JCT. BOX IN BLDG.
 - BALANCE POLE-MTD. LUMINAIRE AS EQUALLY AS POSSIBLE ON ALL 3 PHASES OF SUPPLY IN ACCORDANCE W/CONN. SCHEDULE, THIS SHEET.
 - COORDINATE LOCATIONS & STUBUPS OF EMPTY CONDUITS UNDER SLABS W/STRUCTURE SHOP DROS. FOR OPTIMUM TERMINATIONS. CAP CONDUITS UNTIL USED, INCLUDING CONDUITS FOR DCCR CONTROL BOLLARDS. STUB UP ALL SUCH CONDUITS 6" ABOVE SLAB & PROTECT FROM DAMAGE UNTIL EXTENDED FOR USE.
 - THE MESSenger IN THE AERIAL SERVICE FROM BLDG. 1A TO TERMINAL POLE P1 AT STRUCT. 2 IS AN EQUIPMENT GPOG. CONDUCTOR, NOT A NEUTRAL, AND MAY NOT BE USED AS A NEUTRAL.
 - SEE SHEET E-3 FOR DETAILS, LUMINAIRE AMOUNT DATA & ON LINE STRINGING DATA.

- LEGEND
- 1-LINE PLAN
- CONDUIT RUN EXPOSED
 - CONDUIT RUN IN OR UNDER CONC. SLAB
 - 3/4" E-OH OVERHEAD PREASSEMBLED AERIAL CABLE ON MESSenger WIRE SIZE INDICATED
 - (1) NEW STEEL LTG. POLE (AS NUMBERED) ON CONC. BASE (SEE THIS DRAWG. FOR BASE NUMBER IN PARENTHESES INDICATES QUANTITY OF LUMINAIRE ON POLE)
 - (3) NEW WOOD TERMINAL POLE, W/CLY
 - JUNCTION BOX
 - WEATHERHEAD & JCT. BOX
 - MOLDED CASE SKR., FRAME TRIP
 - LTG. & PWR. FIXTD. (W/MAIN SKR.)
 - INTERRUPTING CAPACITY
 - 3-C 3-C 3-CONDUCTOR
 - G GROUND

TO CORRELATE REFERENCED "ANY" SHEET No.'s TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 74B-4445-X-00063

NO.	DATE	BY	DESCRIPTION
1	6/89	PCD	GENERAL REVISIONS
0		CFC	

UNITED STATES DEPARTMENT OF ENERGY
 FEED MATERIALS PRODUCTION CENTER

A. M. KINNEY, INC.
 CONSULTING ENGINEERS
 CINCINNATI, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

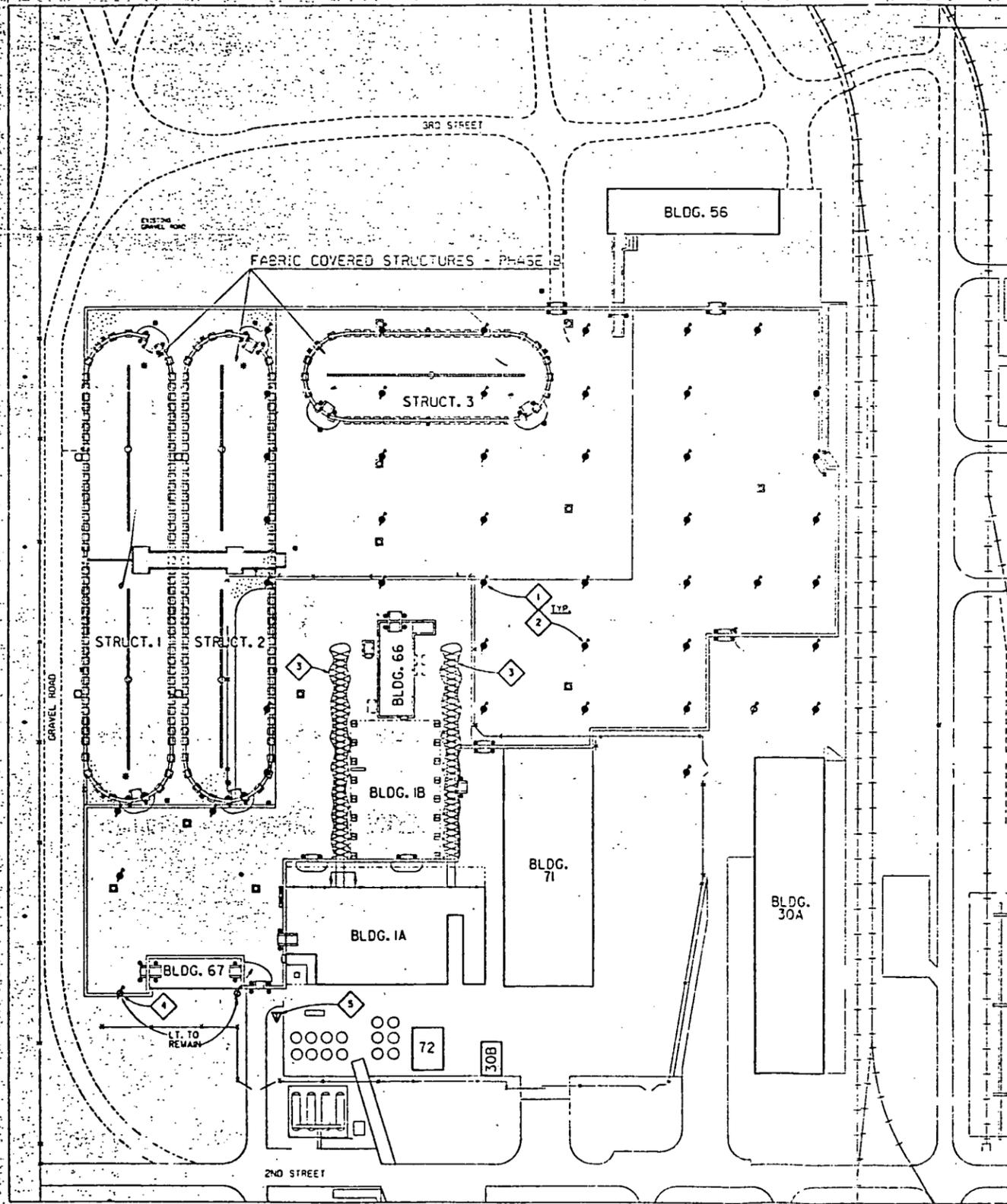
COVERED CONTROLLED STORAGE PAD - PLANT I
 ELECTRICAL POWER AND LIGHTING

SCALE: 1"=50'-0"

DO NOT SCALE

SECTION & DETAIL KEY

87-D-159 0087502 74B-4445-E-00069 E-1



SITE PLAN
SCALE: 1"=50'-0"



SCALE: 1"=50'-0"
0 25' 50' 100' 150'



SECTION & DETAIL KEY

- ELECTRICAL DEMOLITION NOTES
- 1 REMOVE WOOD POLE & LT.
 - 2 CUT OFF EXIST. CONDUIT MIN. 1' BELOW TOP OF EXIST. PAD
 - 3 REMOVE ELEC. WORK ON CONVEYOR GALLERIES (BEING REMOVED UNDER THIS SLAB PROJECT)
 - 4 DISCONN. BRANCH CKT. AT THIS LOC. FOR PHASE C AREA LTG. DEMOLITION
 - 5 DISCONN. & INSULATE PPL & SEC. WIRING AT EXIST. CONSTANT CURRENT TRANSF.

- LEGEND
- EXIST. WOOD POLE & LT. TO BE REMOVED
 - EXIST. WOOD POLE TO REMAIN, LT. TO BE REMOVED, EXCEPT AS NOTED.
 - DEMOLITION AREA
 - EXIST. CONSTANT CURRENT TRANSF. TO REMAIN

TO CORRELATE REFERENCED MARK SHEET No. 1 TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 74B-4445-Y-00063

1	GENERAL REVISIONS	DATE	BY
0	CFC	5/27/89	WBS

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

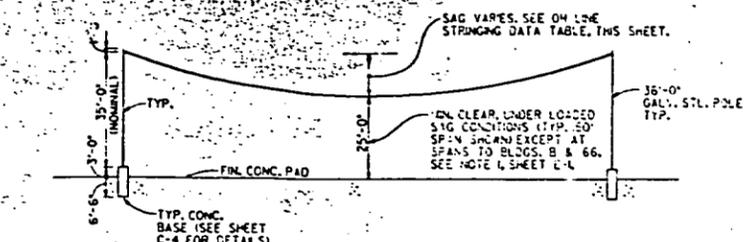
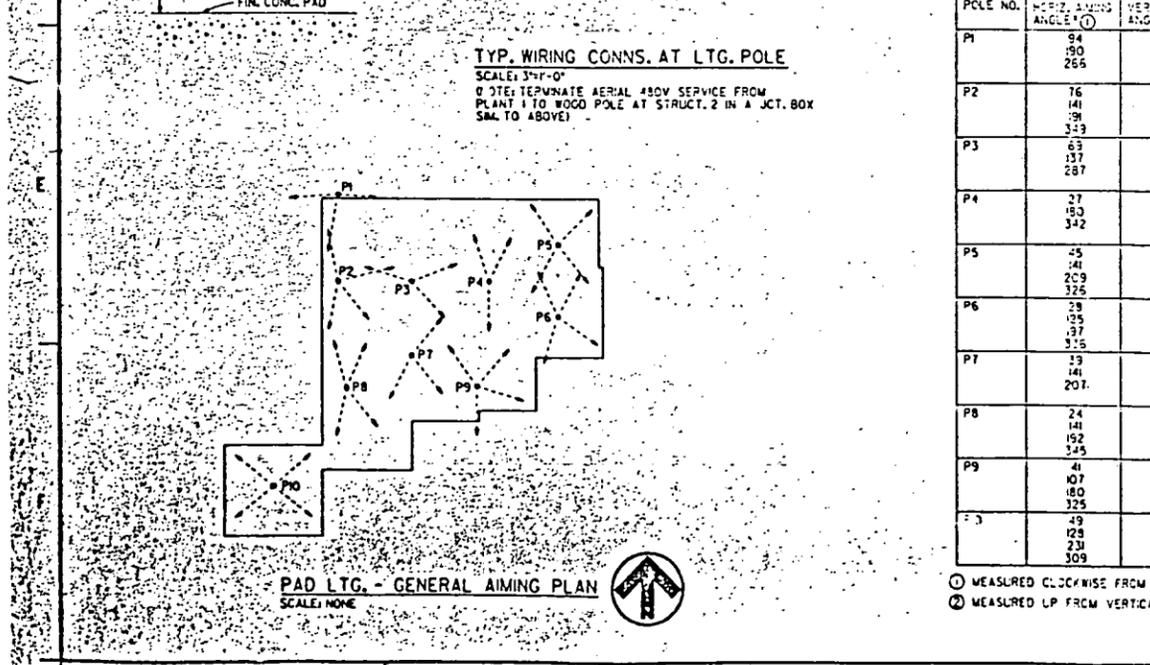
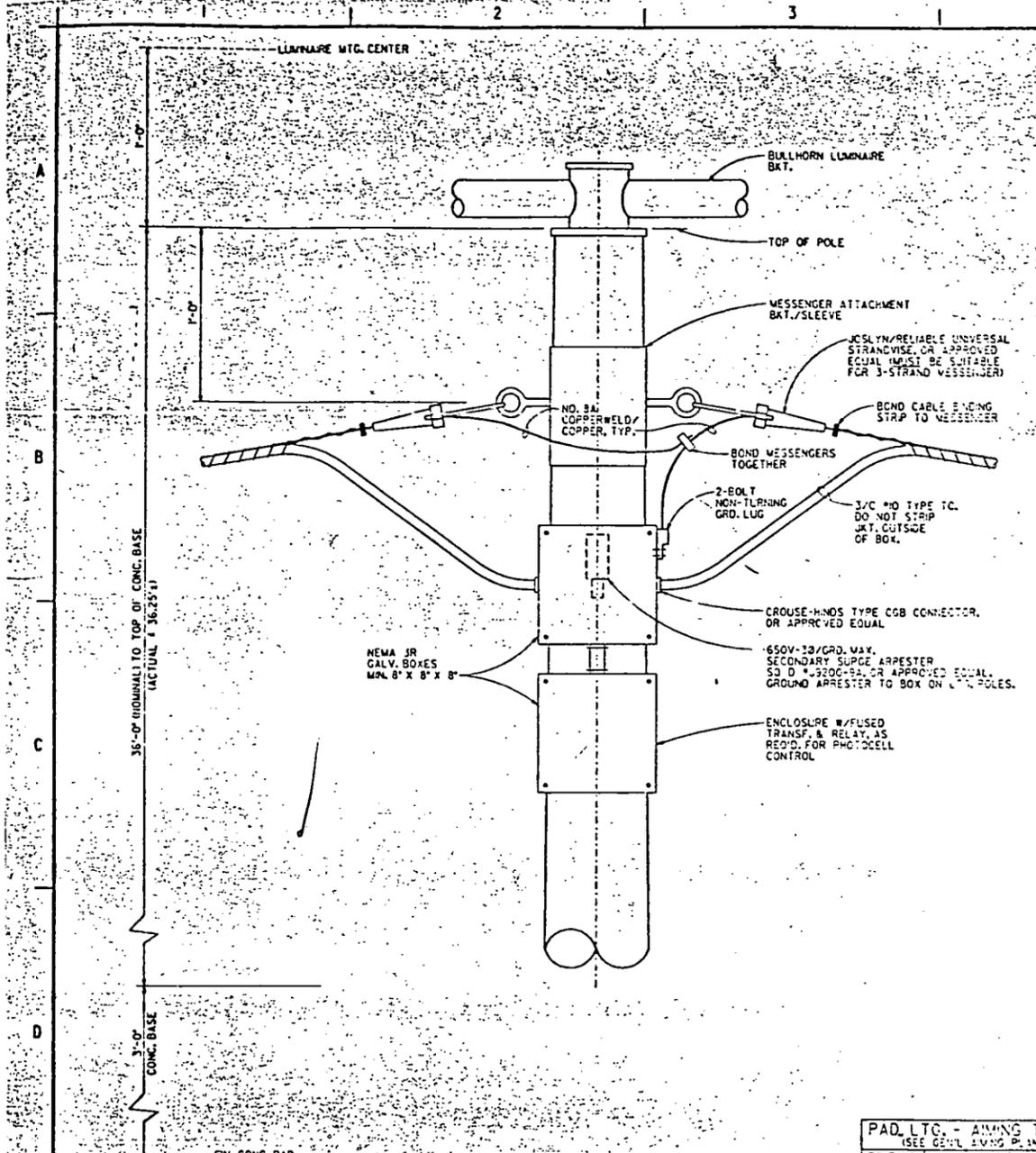
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT I
ELECTRICAL DEMOLITION

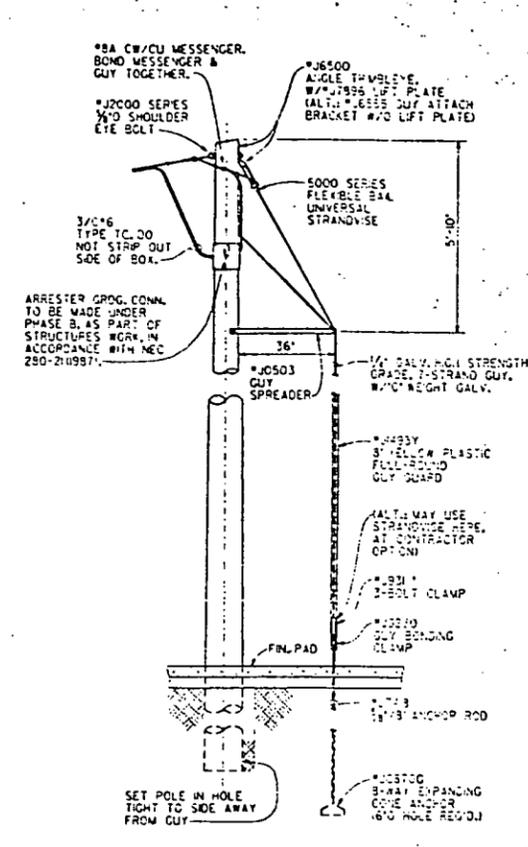
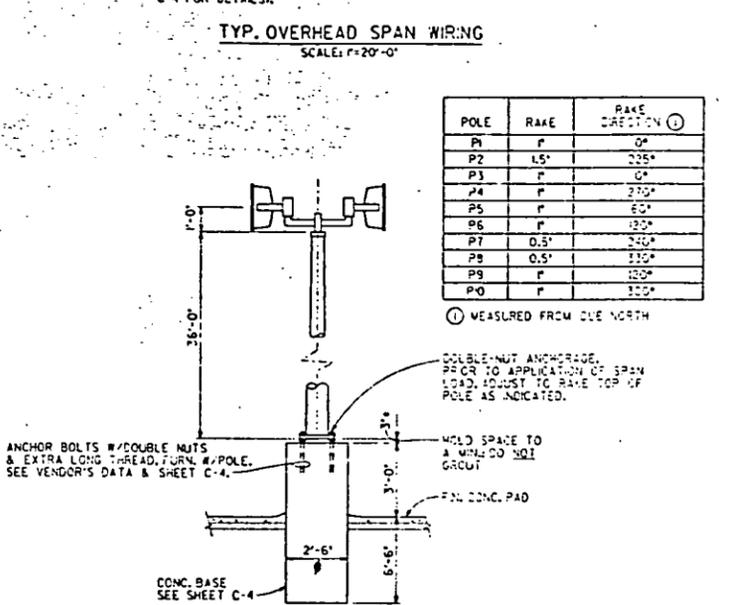
PROJECT NO.	DATE	PROJECT NO.	DATE
74B-4445-Y-00063	6-89	74B-4445-E-00070	6-89
PROJECT NAME	SCALE	PROJECT NAME	SCALE
PLANT I	1"=50'-0"	PLANT I	1"=50'-0"
PROJECT NO.	DATE	PROJECT NO.	DATE
87-0-159	0087502	74B-4445-E-00070	6-89
PROJECT NO.	DATE	PROJECT NO.	DATE
WBS 142,101	74B-4445-E-00070	WBS 142,101	74B-4445-E-00070

DO NOT SCALE REDDED DRAWING



POLE	RAKE	RAKE DIRECTION (1)
P1	0'	0°
P2	15'	225°
P3	0'	270°
P4	0'	270°
P5	0'	60°
P6	0'	120°
P7	0.5'	225°
P8	0.5'	120°
P9	0'	120°
P10	0'	120°

(1) MEASURED FROM DUE NORTH



OH LINE STRINGING DATA

SPAN	LENGTH, FT. (NOTE 1)	STRINGING TEMPERATURE (W/PE TEMP.)						PRESTRESSING TENSION, LBS.
		60° F		90° F		120° F		
		d	T	d	T	d	T	
P1-P2	160	12.06	12.25	12.25	12.34	12.44	550	
P2-P3	150	12.08	12.17	12.25	12.33	12.44	500	
P3-P4	150	12.08	12.17	12.25	12.33	12.44	500	
P4-P5	150	13.01	13.09	13.18	13.26	13.34	450	
P4-P6	150	13.01	13.09	13.18	13.26	13.34	450	
P3-P7	150	12.08	12.17	12.25	12.33	12.44	500	
P7-P9	150	12.08	12.17	12.25	12.33	12.44	500	
P7-BLDG. 66	38'	ISLACK SPAN, d=125 FT.						300
P8-BLDG. 66	40'	ISLACK SPAN, d=125 FT.						350
P10-BLDG. 1A	95	6.05	6.13	6.25	6.35	6.44	550	
P11-BLDG. 1A	130'	8.57	8.93	12.00	12.07	12.33	550	

OH STRINGING DATA NOTES

- OH SPANS MAY BE STRING TO EITHER SAG OR TENSION FIGURES, BUT MUST BE PRE-STRESSED BEHFLY TO INDICATED VALUES.
- DATA IS SUITABLE FOR STRINGING UNDER WIND CONDITIONS OF 15 MPH OR LESS. DO NOT STRING WHEN WIND EXCEEDS 15 MPH.

10 CORRELATE REFERENCED DRAWING SHEET NO. 1 TO ENPC DRAWING NUMBERS, SEE ENPC DRAWING NO. 74B-4445-X-20063

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

SCALE: 1/2"=20'-0"

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

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

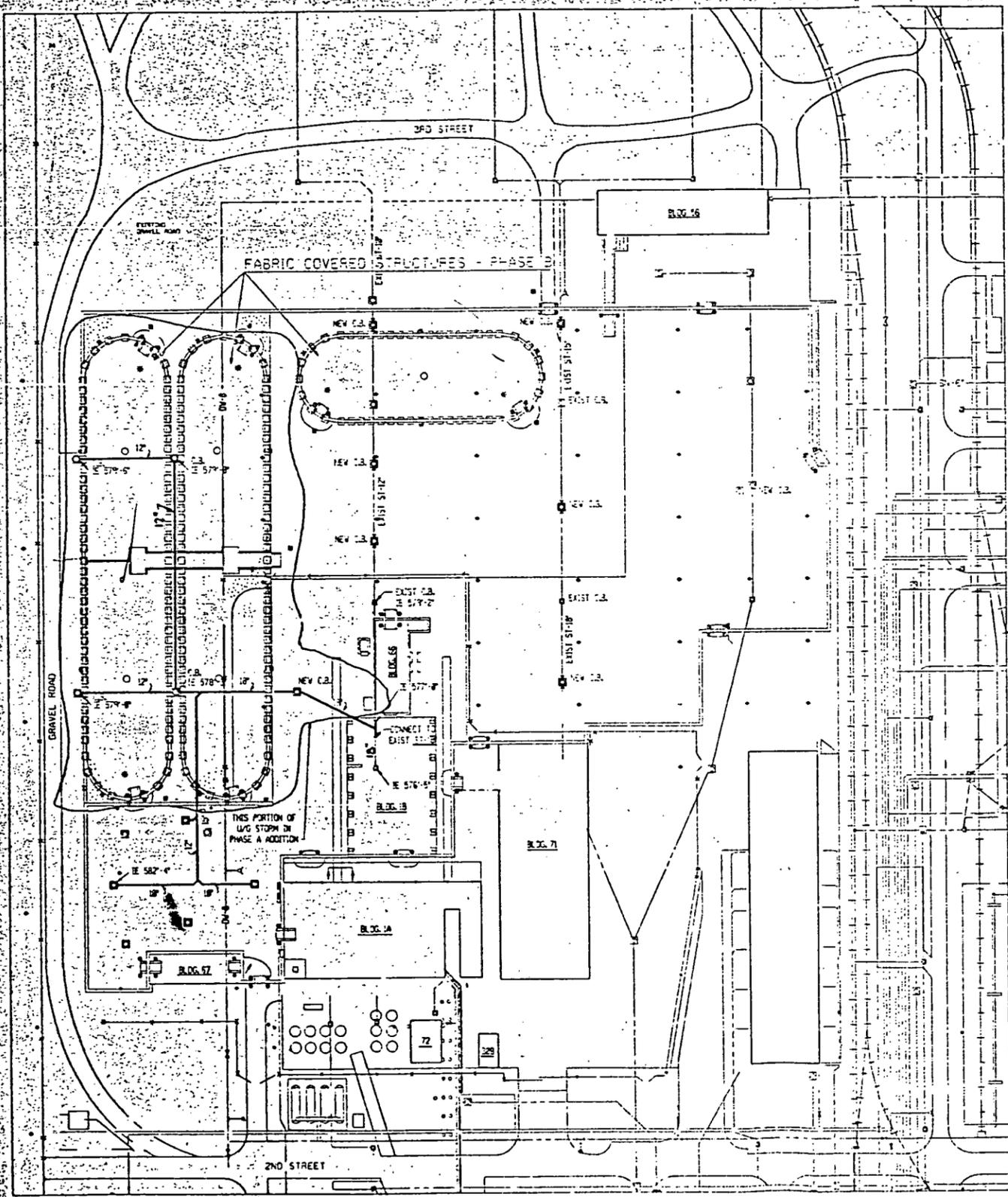
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CONTRACT NO. 74B-4445-X-20063

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

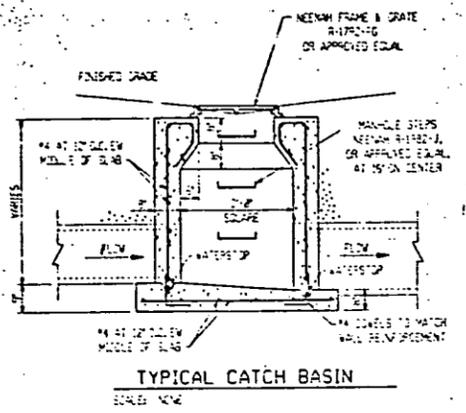
COVERED CONTROLLED STORAGE PAD - PLANT 1
ELECTRICAL DETAILS

DATE: 6-89
BY: REB
CHECKED: AS NOTED

0087502
74B-4445-E-C0071 E-3



SITE PLAN
SCALE: 1" = 50'



TYPICAL CATCH BASIN
SCALE: 1/4" = 1'-0"

NOTES
1) FIELD VERIFY ALL OVER ELEVATIONS

TO CORRELATE REFERENCED 'AMK' SHEET, No. 'A' TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 748-4445-K-00263

1	GENERAL REVISIONS	DATE	BY
0	CFC		

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

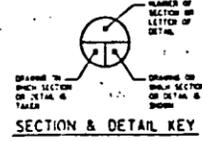
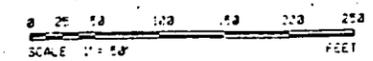
DESIGNED BY
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CHICAGO, ILL.

PROJECT NAME
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

DRAWING TITLE
COVERED CONTROLLED STORAGE PAD - PLANT I
SITE DRAINAGE

DATE	BY	DATE	BY	DATE	BY
05-89	DMC	05-89	RCW	6-99	
PROJECT: FMPC - PLANT I			SCALE: NOTED		

87-D-159 0087502 WBS LL2LO 748-4445-P-00072 P-1



DO NOT SCALE FROM THIS DRAWING

COVERED CONTROLLED STORAGE PAD - PLANT 1

(WBS 1.1.2.1.01)

**ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS, PHASE 3
FEED MATERIALS PRODUCTION CENTER,
FERNALD, OHIO**

UNITED STATES DEPARTMENT OF ENERGY

DRAWING INDEX

FMPC DRAWING NO.	A.M.K. SHEET NO.	REV.	DATE	TITLE
748-4445-X-00063	X-1	1	11-26-90	COVER SHEET
748-4445-C-00064	C-1	1	11-26-90	CONSTRUCTION PHASING
748-4445-C-00065	C-2	1	11-26-90	PHASE A - PAD EXTENSION
748-4445-C-00066	C-3	1	11-26-90	PHASE B - FABRIC STRUCTURES
748-4445-C-00067	C-4	1	11-26-90	PHASE C, D, & E
748-4445-C-00068	C-5	1	11-26-90	SITE DETAILS
748-4445-E-00069	E-1	1	11-26-90	ELECTRICAL POWER AND LIGHTING
748-4445-E-00070	E-2	1	11-26-90	ELECTRICAL DEMOLITION
748-4445-E-00071	E-3	0	07-14-89	ELECTRICAL DETAILS
748-4445-P-00072	P-1	1	11-26-90	SITE DRAINAGE

NO.	DESCRIPTION	DATE	BY
1	GENERAL REVISIONS		
0	CFC		
SCALE OR REVISION PURPOSE - OCCUPATION			
DATE	BY	DATE	BY
11-26-90	FCM	11-26-90	FCM
APPROVAL SIGNATURES			
DATE			
11-26-90			

**UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER**

A. M. KINNEY, INC.
ENGINEERS
CINCINNATI, OHIO

PROJECT NAME: ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
DRAWING TITLE: COVERED CONTROLLED STORAGE PAD - PLANT 1
COVER SHEET

DATE: 11-26-90
BY: FCM
CHECKED BY: FCM
DATE: 11-26-90

PROJECT NO.: 87-D-159
SHEET NO.: 0087502
WBS: 1.1.2.1.01
748-4445-X-00063 X-1

SCOPE OF PHASE A CONSTRUCTION

- REMOVAL OF FENCE
- EXCAVATION AND INSTALLATION OF APPROX. 85,000 SQ. FT. OF NEW PAD WITH CURBS, RAMPS, MEMBRANE & WEARING SURFACE.
- RELOCATION OF EXISTING ROAD
- TRENCH DRAINS & SUMPS.
- FOUNDATIONS FOR FRAME SUPPORTED FABRIC STRUCTURES. ERECTION OF 2 STRUCTURES.
- INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT, & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

SCOPE OF PHASE B CONSTRUCTION

- FABRICATION & DELIVERY OF FRAME SUPPORTED FABRIC STRUCTURES.

SCOPE OF PHASE C CONSTRUCTION

- DEMOLITION OF CONVEYOR GALLERIES
- CURBS AND RAMPS
- CATCH BASINS
- INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT, & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

SCOPE OF PHASE D CONSTRUCTION

- REMOVAL OF FENCE
- TRENCH DRAIN AND SUMP
- FOUNDATIONS FOR FRAME SUPPORTED FABRIC STRUCTURE. ERECTION OF 1 STRUCTURE.
- CURBS AND RAMPS
- CATCH BASINS
- INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT, & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

SCOPE OF PHASE E CONSTRUCTION

- REMOVAL OF FENCE
- CURBS AND RAMPS
- CATCH BASINS
- INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT, & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

TO CORRELATE REFERENCED *BANK SHEET Nos. 1 TO 605 DRAWING NUMBERS, SEE FMPC DRAWING Nos. 748-4445-K-00063

NO.	DATE	DESCRIPTION
1	7-14-83	GENERAL REVISIONS
2	7-14-83	CFC

UNITED STATES DEPARTMENT OF ENERGY FEED MATERIALS PRODUCTION CENTER

PROJECT NAME: ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

CONTRACTOR: A. M. KINNEY, INC.

DATE: 7-14-83

SCALE: 1" = 50'

LEGEND

EXISTING

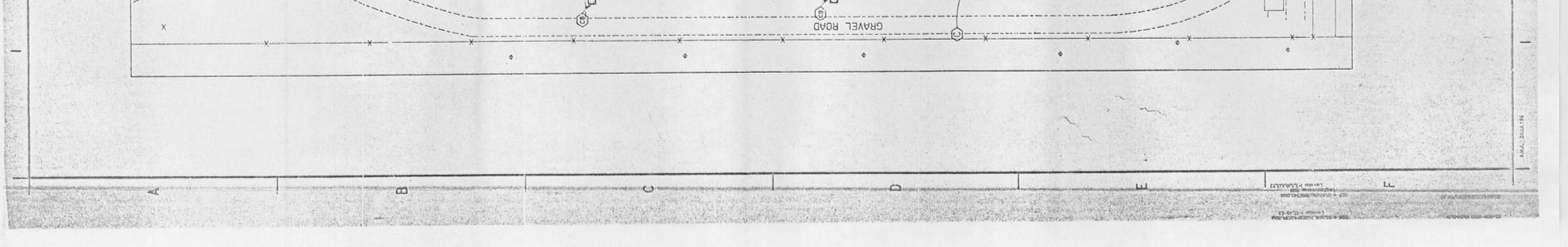
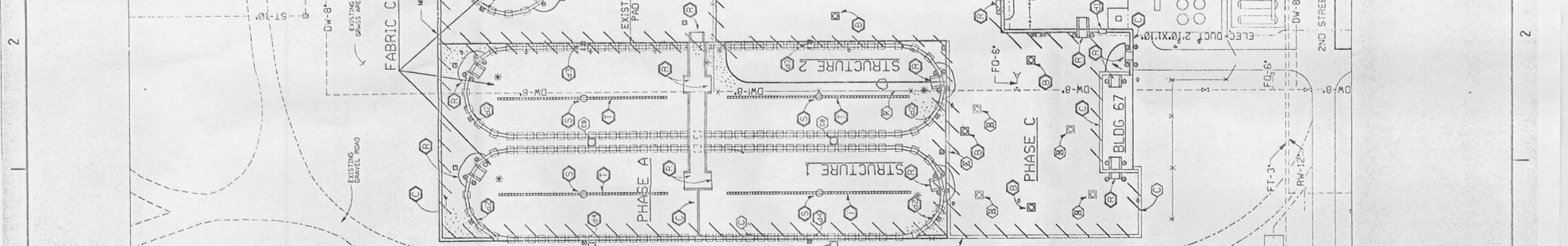
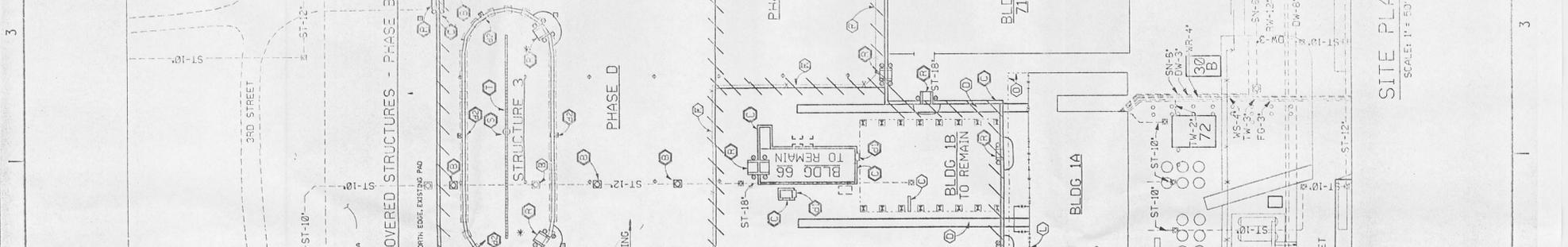
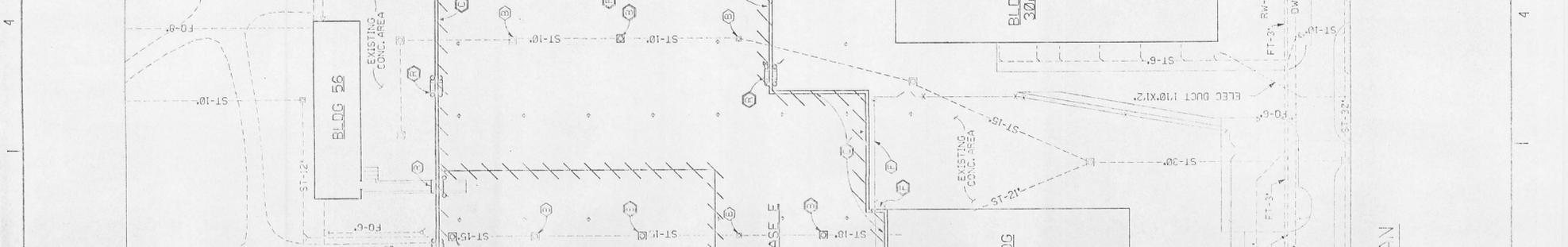
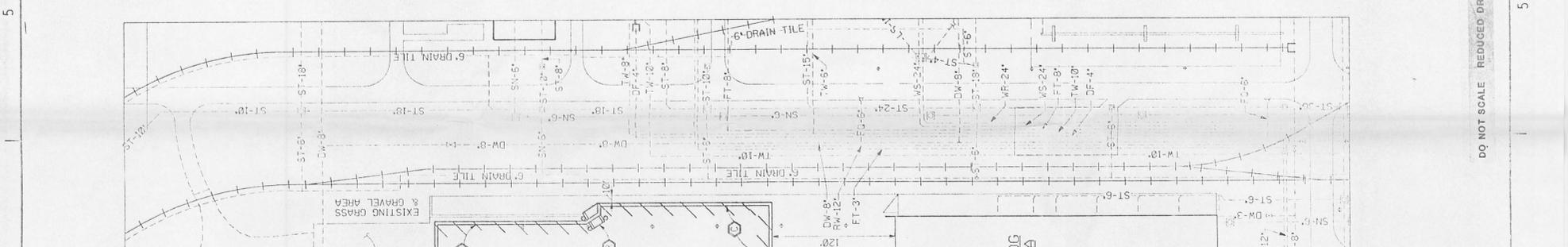
- CATCH BASIN ADJUSTED TO GRADE
- EXISTING CATCH BASIN - ABANDON & COVER W/ VAPOR BARRIER, CONCRETE, ETC.
- RAISE CURB
- REMOVE CURB
- CATCH BASIN
- CONVEYOR GALLERY STRUCTURE TO BE DEMOLISHED AND REMOVED
- FENCE TO REMAIN
- REMOVE FENCE AND GATES
- WALL LINE OF BLDG 1A
- EXTENT OF BLDG 1A ROOF OVERHANG
- EXIST. RAMP - ADD 4" CONC. ETC. BACK TO LINE OF NEW CURB & FEATHER TOWARDS PLANT 56. RAISE EXIST. RAMP CURB AS FEED.
- LIGHT POLE SEE E-2
- REMOVE TREE

NEW

- CATCH BASIN - SEE SHT. P-1
- CURB
- FENCE
- RAMP
- SUMP
- TRENCH DRAIN
- ADD STEP & EXIST. PEDESTRIAN DOORS. SEE DETAIL SHT. C-5
- ADD STEP & PEDESTRIAN DOORS OF FABRIC STRUCTURES. SEE DETAIL SHT. C-5
- ADD STEP & PEDESTRIAN DOORS OF FABRIC STRUCTURES. SEE DETAIL SHT. C-5
- ADD STEP & PEDESTRIAN DOORS OF FABRIC STRUCTURES. SEE DETAIL SHT. C-2
- PREFABRICATED TRENCH DRAIN SEE DWG. P1
- OVERHEAD DOOR CONTROL
- BOLLARDS WITH DOOR CONTROL
- STANDARD BOLLARDS

NOTES

- ALL DIMENSIONS AND ELEVATIONS PERTAINING TO EXISTING CONSTRUCTION TO BE FIELD VERIFIED BEFORE STARTING ANY WORK OR FABRICATION.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE FABRIC STRUCTURES WITH THE MANUFACTURER, OBTAIN CERTIFIED DRAWINGS BEFORE PROCEEDING WITH CONSTRUCTION.
- ALL CONCRETE HAS BEEN DESIGNED AND THE DETAILING, FABRICATION AND CONSTRUCTION TO BE IN ACCORDANCE WITH THE AREA DEPARTMENT OF TRANSPORTATION (ACT SP-66) LATEST EDITION.
- UNLESS OTHERWISE NOTED, ALL CONCRETE IS TO BE NORMAL WEIGHT CONCRETE WITH MINIMUM 28 DAY COMPRESSIVE STRENGTH AS FOLLOWS:
FOOTINGS AND PIERS: 3000 PSI
SLABS ON GRADE: 4000 PSI
- ALL CONCRETE EXPOSED TO WEATHER SHALL BE AIR ENTRAINED.
- CHAMFER ALL EXPOSED EDGES 3/4" UNLESS OTHERWISE SHOWN OR NOTED.
- ALL REINFORCING STEEL TO BE ASTM A618 OR A616 (S1), GRADE 60 UNLESS OTHERWISE NOTED.
- WELDED WIRE FABRIC, WHERE SPECIFIED ON PROJECT SHALL BE ASTM A185 COLD DRAWN STEEL.
- GRANULAR FILL UNDER SLABS SHALL BE 6 INCH THICK COMPACTED CRUSHED STONE OR BANK RUN GRAVEL AS DEFINED BY THE SPECIFICATIONS.
- ALL STRUCTURAL STEEL ANCHOR BOLTS, AND MISCELLANEOUS IRON TO BE ASTM A-36.
- COLUMN ANCHOR BOLTS ARE TO BE FURNISHED BY THE STRUCTURAL FABRICATOR AND DELIVERED TO THE JOB SITE IN TIME FOR SCHEDULED INSTALLATION.
- DESIGN SLAB LOAD = 1000 PSF
- FOUNDATIONS FOR AN ALLOWABLE BEARING CAPACITY OF 3000 PSF.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SIZES OF EQUIPMENT FOUNDATIONS WITH THE EQUIPMENT MANUFACTURER, OBTAIN CERTIFIED DRAWINGS BEFORE PROCEEDING WITH CONSTRUCTION.
- UNDERGROUND PIPING AND CONDUIT AFFECTED BY FOUNDATIONS SHALL BE IN PLACE BEFORE PLACING CONCRETE. ALL FLOOR DRAINS SHALL BE IN PLACE BEFORE CONCRETE SLABS ARE PLACED. SEE ELECTRICAL & PIPING DWGS.

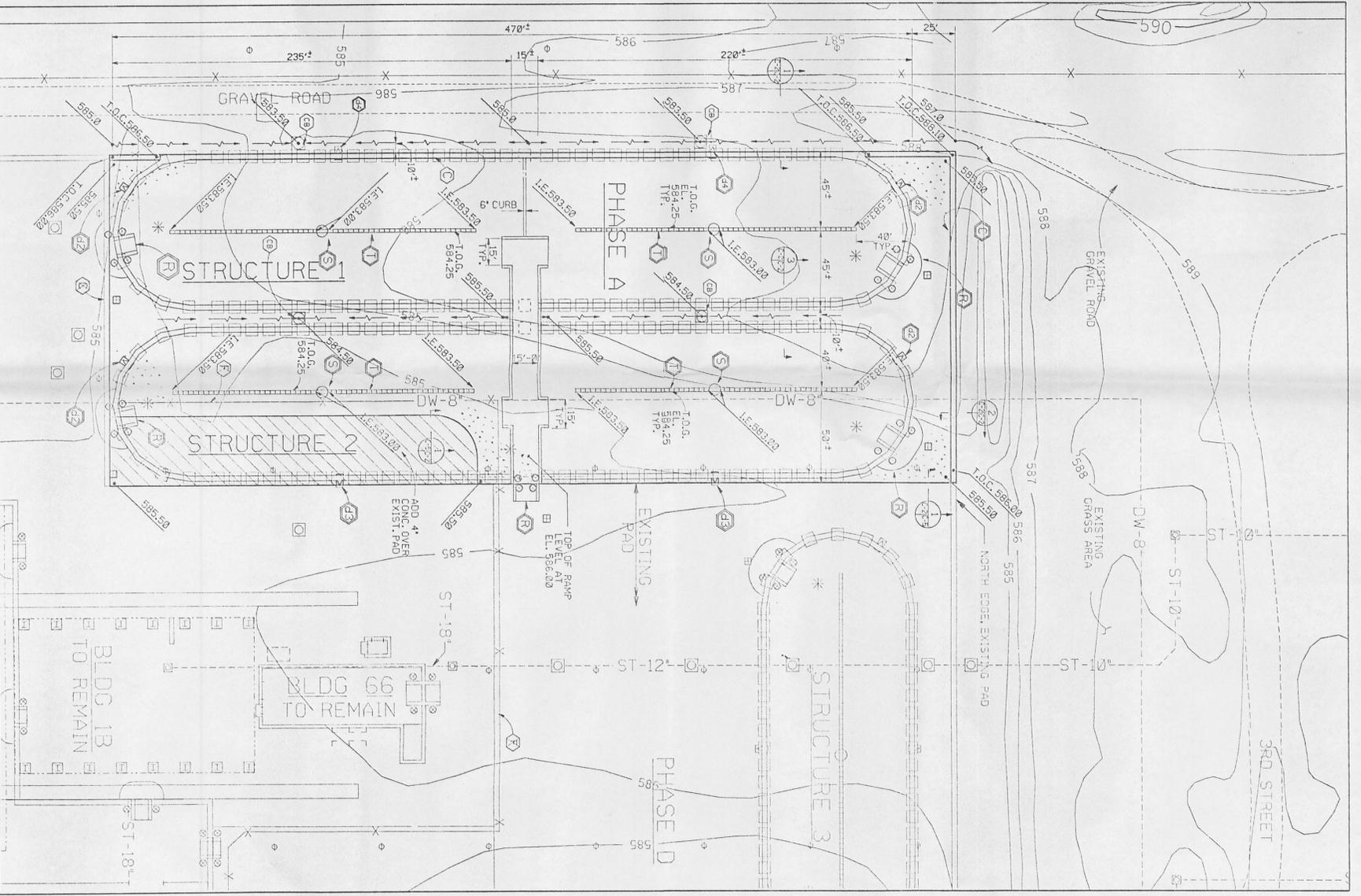
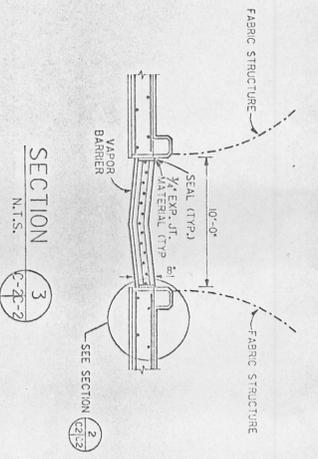
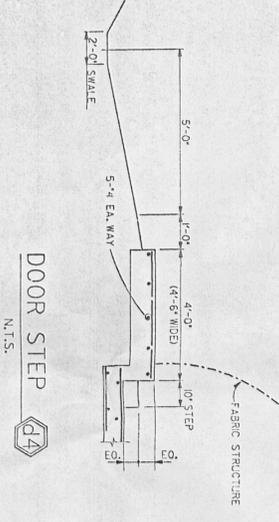
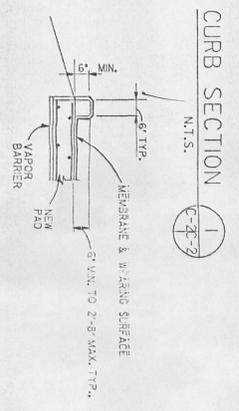
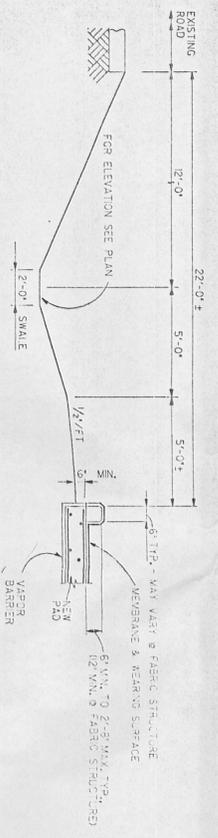


SITE PLAN
SCALE: 1" = 50'

DO NOT SCALE REDUCED DRAWING

LEGEND

- EXISTING**
- ⊗ REMOVE CURB
 - ⊗ CATCH BASIN
 - ⊗ REMOVE FENCE
 - XXX--- CONTOUR LINE
- NEW**
- ⊙ CURB
 - ⊙ RAMP
 - ⊙ SUMP - SEE DETAIL SHEET C-5
 - ⊙ TRENCH DRAIN - 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-5
 - ⊙ ADD STEP & PEDESTRIAN DOORS OF FABRIC STRUCTURES - SEE DETAIL SHEET C-2
- NEW ELEVATION**
- * OVERHEAD DOOR CONTROL - WITHIN STRUCTURE
 - STANDARD BOLLARDS
 - ◻ BOLLARDS WITH DOOR CONTROL - OUTSIDE STRUCTURE



- NOTES**
1. SEE SHEET C-1 FOR SCOPE OF PHASE A CONSTRUCTION.
 2. SEE SHEET P-1 FOR STORM SEWER AND CATCH BASIN DETAILS.
 3. SEE SHEET C-5 FOR DETAILS OF FOUNDATIONS, TRENCHES AND SUMPS.
 4. LIGHT POLES TO BE REMOVED BY ELECTRICAL CONTRACTOR. SEE SH. E-2.

DO NOT SCALE REDUCED DRAWING

TO CORRELATE REFERENCED * ANK SHEET N-3, TO FMPC DRAWING NUMBERS SEE FMPC DRAWING NO.: 749-4445-X-00063

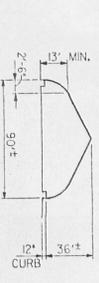
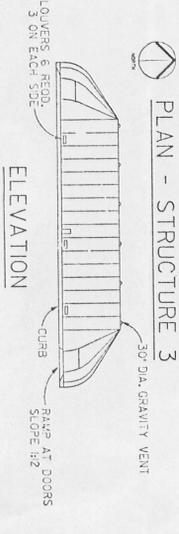
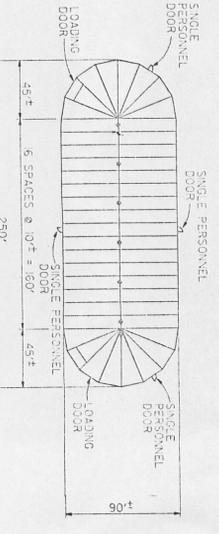
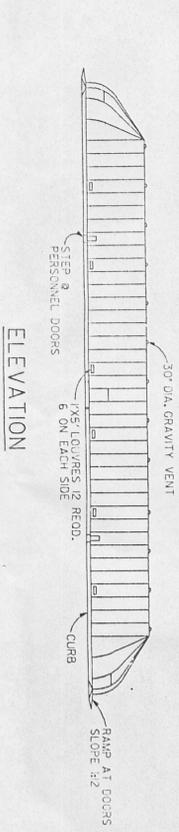
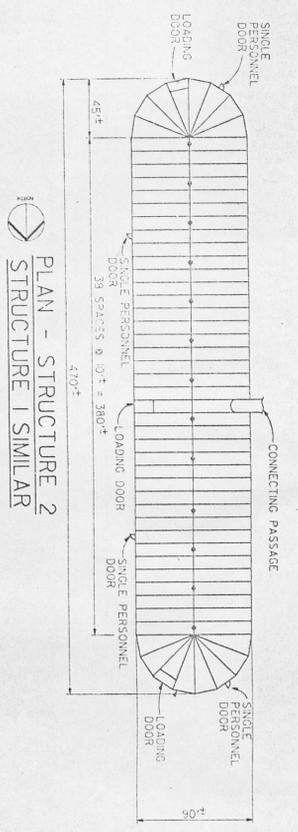
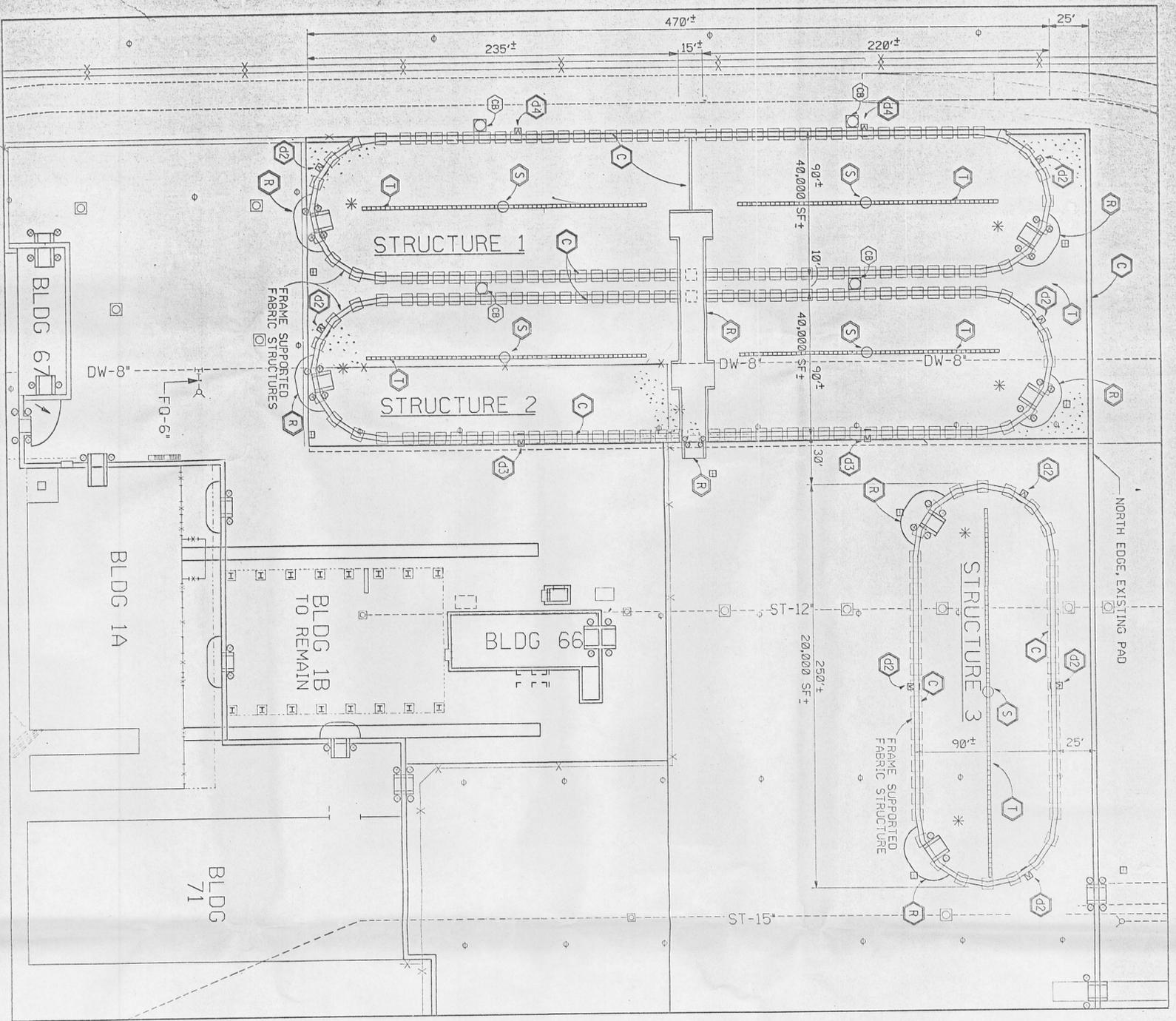
NO.	REVISIONS	DATE OF REVISION	DESCRIPTION
1	GENERAL REVISIONS	LMP 7-26-98	
0	CFC	EBW 7-14-98	

UNITED STATES DEPARTMENT OF ENERGY
FEDERAL ENERGY TECHNOLOGY CENTER
A. M. KINNEY, INC.
 CONSULTING ENGINEERS
 CHINCAGO, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT 1
 PHASE A - PAD EXTENSION

DATE	BY	CHKD	APP'D
5-89	LMP	5-89	AS NOTED
5-89	EBW	5-89	AS NOTED



FRAME SUPPORTED FABRIC STRUCTURE

- LEGEND**
- EXISTING
 - NEW
 - CATCH BASIN
 - CURB
 - RAMP
 - SUMP
 - TRENCH DRAIN
 - PREFABRICATED TRENCH DRAIN
 - ADD STEP & PEDESTRIAN DOORS OF FABRIC STRUCTURES
 - 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

- NOTES**
- SEE DRAWING C-5 FOR DETAILS OF FOUNDATION, SUMPS AND TRENCH DRAINS.
 - PERSONNEL DOORS AND FRAMES TO BE HOLLOW METAL, OIL SWINGING, NOMINAL 3 FOOT BY 6 FOOT 8 INCH SIZE AND TO INCLUDE HARMONIZED FOOT LECH DOOR OPENINGS AND TO BE EITHER HORIZONTAL SLIDING OR VERTICAL ROLL-UP TYPE. VEHICLE DOORS TO BE POWER OPERATED WITH PUSHBUTTON CONTROLS POST MOUNTED OUTSIDE AND OVERHEAD DOOR CONTROLS INSIDE OF THE STRUCTURES.

TO CORRELATE REFERENCED P.W.C. SHEET NO.'S TO P.W.C. DRAWING NUMBERS, SEE P.W.C. DRAWING NO. 748-4445-X-00063

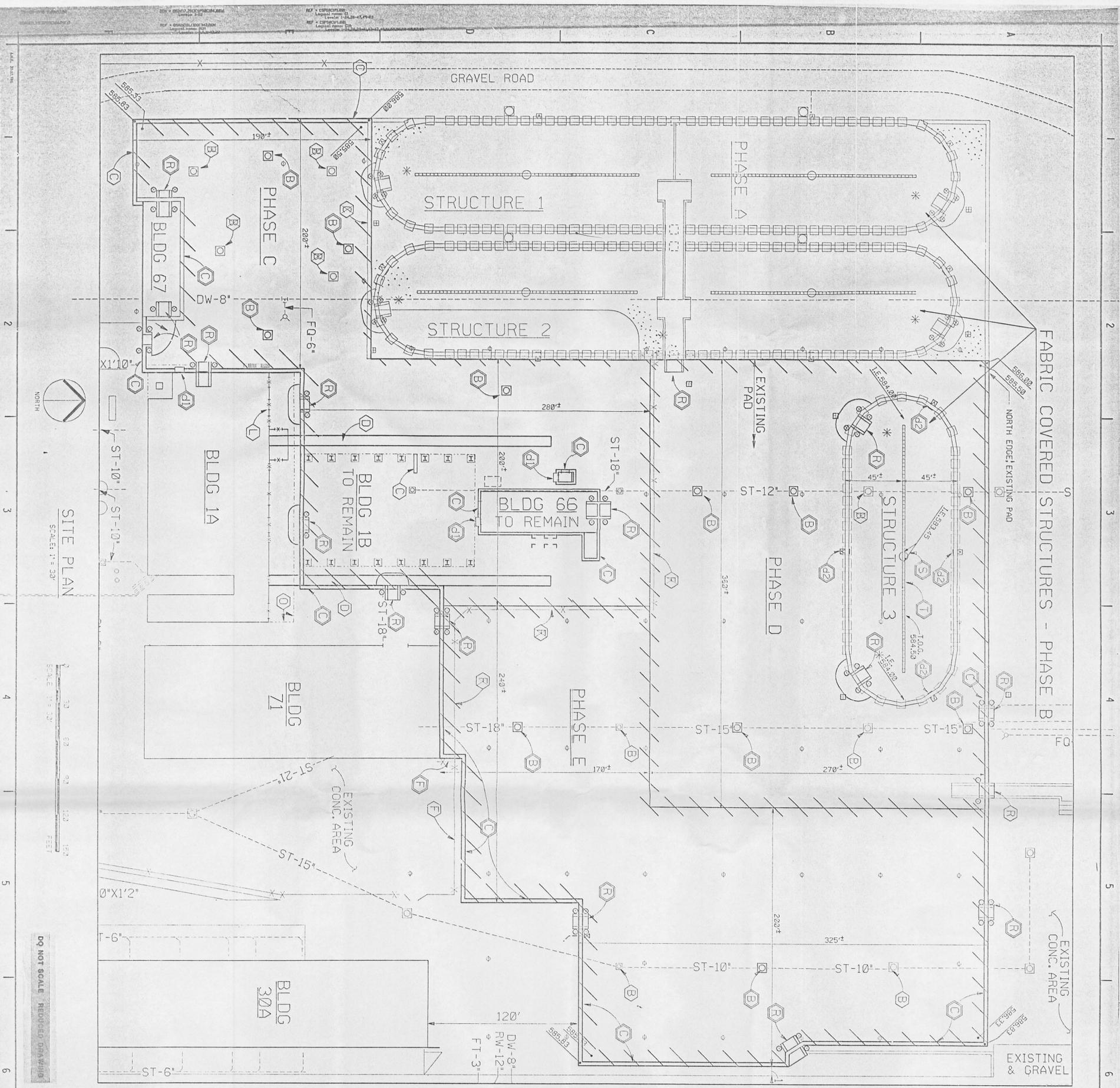
NO.	GENERAL REVISIONS	DATE	BY	DESCRIPTION
1	GENERAL REVISIONS	11-28-74
2	CFC	7-14-81

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
 THIS DRAWING PREPARED BY
A. M. KINNEY, INC.
 CONSULTING ENGINEERS
 CINCINNATI, OHIO

COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASE B - FABRIC STRUCTURES

DATE	BY	DESCRIPTION
4-8-79
1-8-81

PROJECT NO. 748-4445-C-00066
 SHEET NO. C-31.1



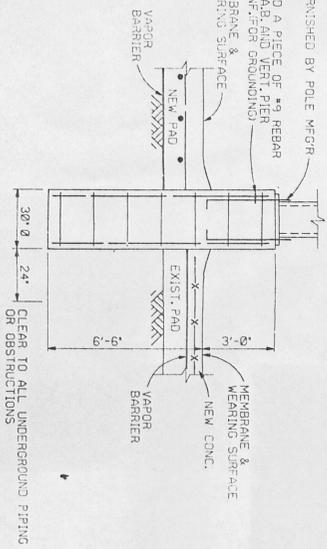
FABRIC COVERED STRUCTURES - PHASE B

LEGEND

- EXISTING
 - 1. CATCH BASIN ADJUSTED TO GRADE - SEE SHT. P-1
 - 2. EXISTING CATCH BASIN - ABANDON & COVER W/ VAPOR BARRIER, CONCRETE, ETC.
 - 3. RAISE CURB
 - 4. CATCH BASIN
 - 5. CONVEYOR GALLERY STRUCTURE TO BE DEMOLISHED AND REMOVED
 - 6. FENCE TO REMAIN
 - 7. REMOVE FENCE AND GATES
 - 8. WALL LINE OF BLDG. 1A
 - 9. EXTENT OF BLDG. 1A ROOF OVERHANG
 - 10. EXIST. RAMP - ADD 4" CONC. ETC. BACK TO LINE OF NEW CURB & FEATHER TOWARDS PLANT 56. RAISE EXIST. RAMP CURB AS REQ'D.
- NEW
 - 1. CATCH BASIN - SEE SHT. P-1
 - 2. CURB
 - 3. NEW FENCE
 - 4. RAMP
 - 5. SUMP
 - 6. TRENCH DRAIN
 - 7. ADD STEP & EXIST. PEDESTRIAN DOORS, SEE DETAIL SHT. C-5
 - 8. ADD STEP & PEDESTRIAN DOORS OF FABRIC STRUCTURES
 - 9. NEW ELEVATION
 - 10. OVERHEAD DOOR CONTROL
 - 11. BOLLARDS WITH DOOR CONTROL
 - 12. STANDARD BOLLARDS

- NOTES
1. SEE SHEET C-1 FOR SCOPE OF PHASE C, D & E CONSTRUCTION.
 2. SEE SHEET P-1 FOR STORM SEWER DETAILS.
 3. SEE SHEET C-5 FOR DETAILS OF FOUNDATIONS, TRENCHES AND SUMPS.
 4. LIGHT POLES TO BE REMOVED BY ELECTRICAL CONTRACTOR. SEE SHT. E-2.

PIER FOR LIGHT POLE
SEE ELECTRICAL DWG. FOR LOCATION
SCALE: 3/8" = 1'-0"



SITE PLAN
SCALE: 1/8" = 30'

SCALE: 1/8" = 30'
FEET

DO NOT SCALE REDUCED DRAWING



NO.	REVISIONS	DATE	BY	CHKD.	APP'D.
1	GENERAL REVISIONS				
2	CFC				

TO COMPLETE REFERENCED 44K SHEET NOS. 110, 509PC
DRAWING NUMBERS, SEE FIVE DRAWING NOS. 743-4445-C-00063

274

**UNITED STATES DEPARTMENT OF ENERGY
FEDERAL MATERIALS PRODUCTION CENTER**

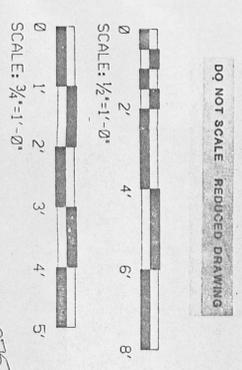
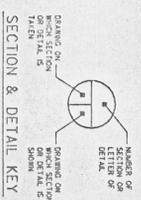
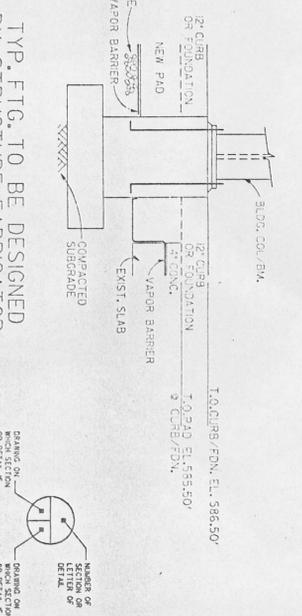
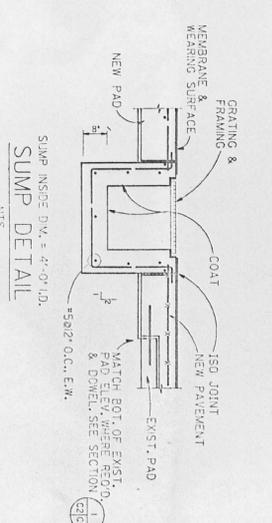
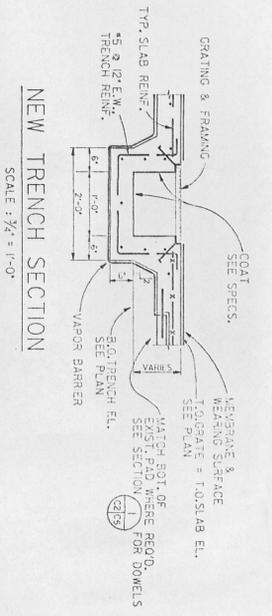
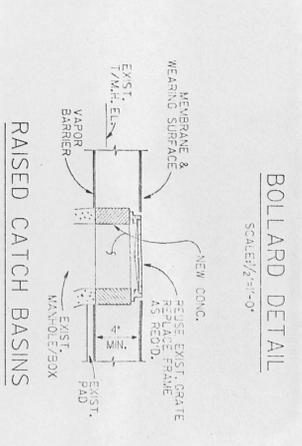
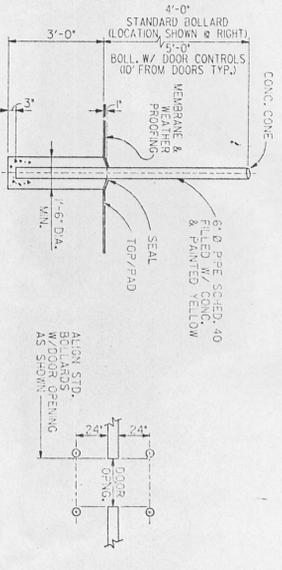
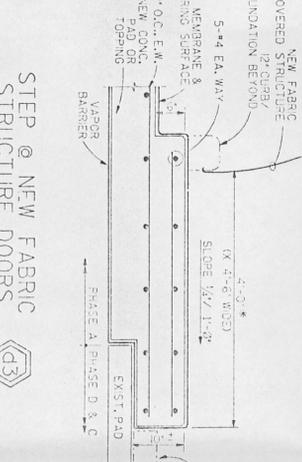
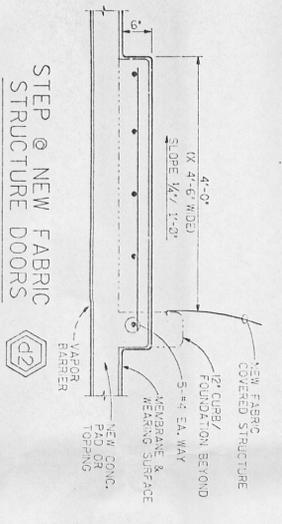
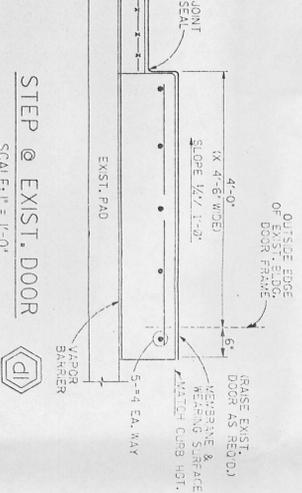
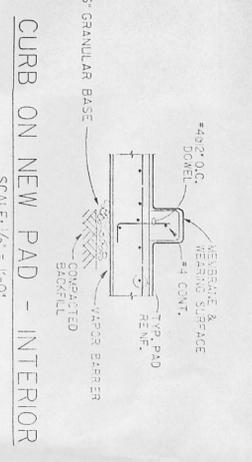
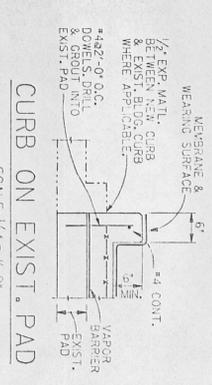
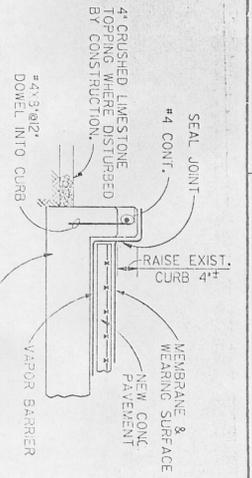
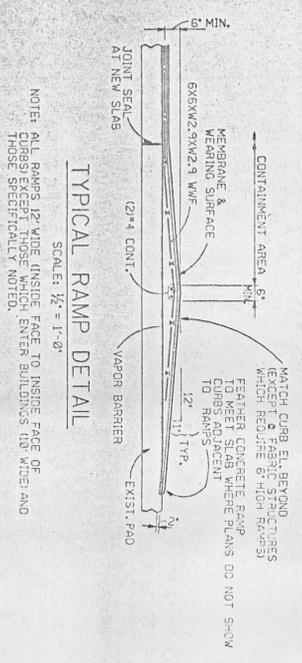
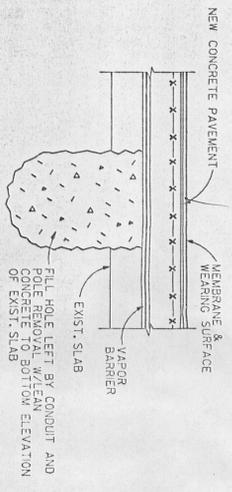
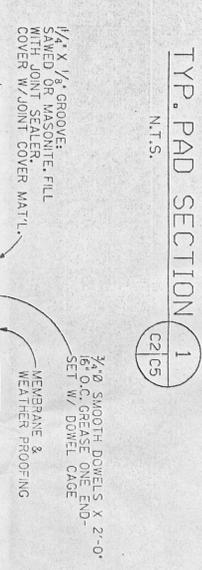
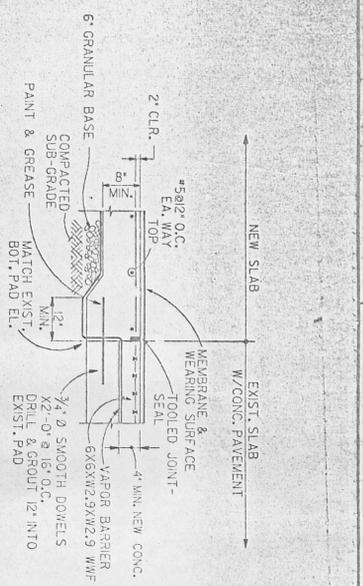
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

4 E. 9th St. No. 2982
CINCINNATI, OHIO 45202

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
DRAWING TITLE
COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASE C, D, & E

DESIGNED BY	MEC	4-89	DATE	4-89	SCALE	AS NOTED
CHECKED BY	EBW	4-89	DATE	4-89	SCALE	AS NOTED
APPROVED BY			DATE		SCALE	

87-D-159 0087502 743-4445-C-00067 C-4 1



TO CORRELATE REFERENCED PANK SHEET NO. S. TO FMPIC DRAWING NUMBERS, SEE FMPIC DRAWING NO. 1749-4445-X-00063

NO.	REVISIONS	DATE	BY	CHKD.
1	GENERAL REVISIONS			
0	CFC			

DATE OF REVISION: 1-25-84
SCALE: 1/2" = 1'-0"
SCALE: 1/4" = 1'-0"

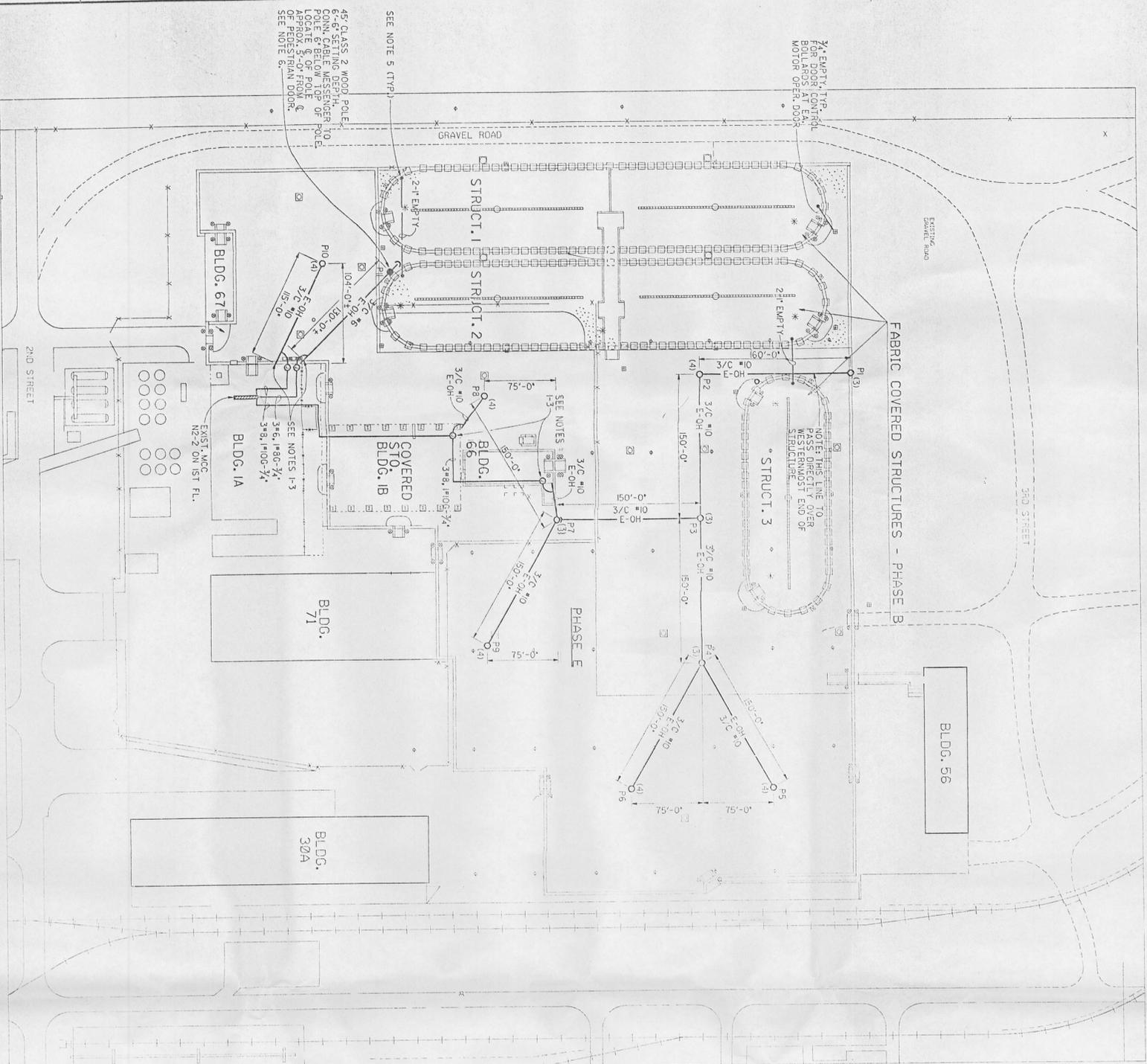
UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
THIS DRAWING PREPARED BY
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CHICAGO, ILL. 60604

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT 1

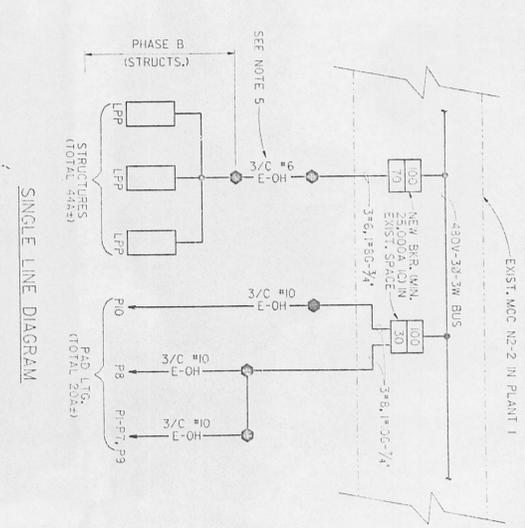
NO.	DATE	BY	CHKD.
1	5-8-91	EBM	LMP
2	5-8-91	EBM	LMP

DATE: 5-8-91
SCALE: AS NOTED
DRAWING NO. 1749-4445-X-00063
SECTION: C-5
1



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

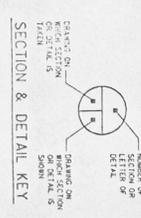
POLE NO.	QUAN.	LUMINAIRE	CONNS.
P1	1		1
P2	1		2
P3	1		1
P4	1		1
P5	1		1
P6	2		1
P7	1		1
P8	1		2
P9	1		2
P10	2		1



SYMBOL	DESCRIPTION
100	W/LED CASE BR. TRIP
70	W/LED CASE BR. TRIP
IC	INTERRUPTING CAPACITY
3/C	3-CONDUCTOR
G	GROUND

- NOTES
- ANCHOR OVERHEAD SPAN MESSENGERS TO BLDG. STEEL, AS FOLLOWS:
 - APPROX. 40'-0" (MIN. 38'-0") OR HIGHER, ABOVE GRADE ON BLDG. 1A.
 - MIN. 12" Ø ABOVE GRADE ON BLDGS. 1B & 66.
 - PROVIDE 3" DIA. STEEL PIPE MOUNTS IF NECESSARY.
 - BOND OVERHEAD SPAN MESSENGERS TO CONDUIT SYSTEM AT SYSTEM MESSENGERS ARE EQUIP. GROUND (CONDUCTORS).
 - 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 EXTENDED INTO JCT. BOX IN BLDG.
 - BALANCE POLE-MTD. LUMINAIRES AS EQUALLY AS POSSIBLE ON ALL 3 PHASES OF SUPPLY IN ACCORDANCE W/CONN. SCHEDULE, THIS SHEET.
 - COORDINATE LUMINAIRE SIZES W/WEATHERHEAD DIMS. FOR OPTIMUM TERMINATIONS. CAP CONDUITS UNITS USED, INCLUDING CONDUITS FOR DOOR CONTROL BOLTAJDS, STUB UP ALL SUCH CONDUITS & ANGLE FOR USE & PROTECT FROM DAMAGE UNTIL ENHANCED FOR USE.
 - THE MESSENGER IN THE AERIAL SERVICE FROM BLDG. 1A TO TERMINAL POLE AT STRUCT. 2 IS AN EQUIPMENT GROUND. NOT A NEUTRAL, AND MAY NOT BE USED AS A NEUTRAL.
 - SEE SHEET E-3 FOR DETAILS, LUMINAIRE AMING DATA & OH LINE STRINGING DATA.

SCALE: 1/8"=1'-0"
0 25' 50' 100'



TO CORRELATE REFERENCED *ANK SHEET NOS. 1 TO FIVE
DRAWING NUMBERS SEE FINEC DRAWING NOS. 748-4445-X-000633

**UNITED STATES DEPARTMENT OF ENERGY
FEBD MATERIALS PRODUCTION CENTER**

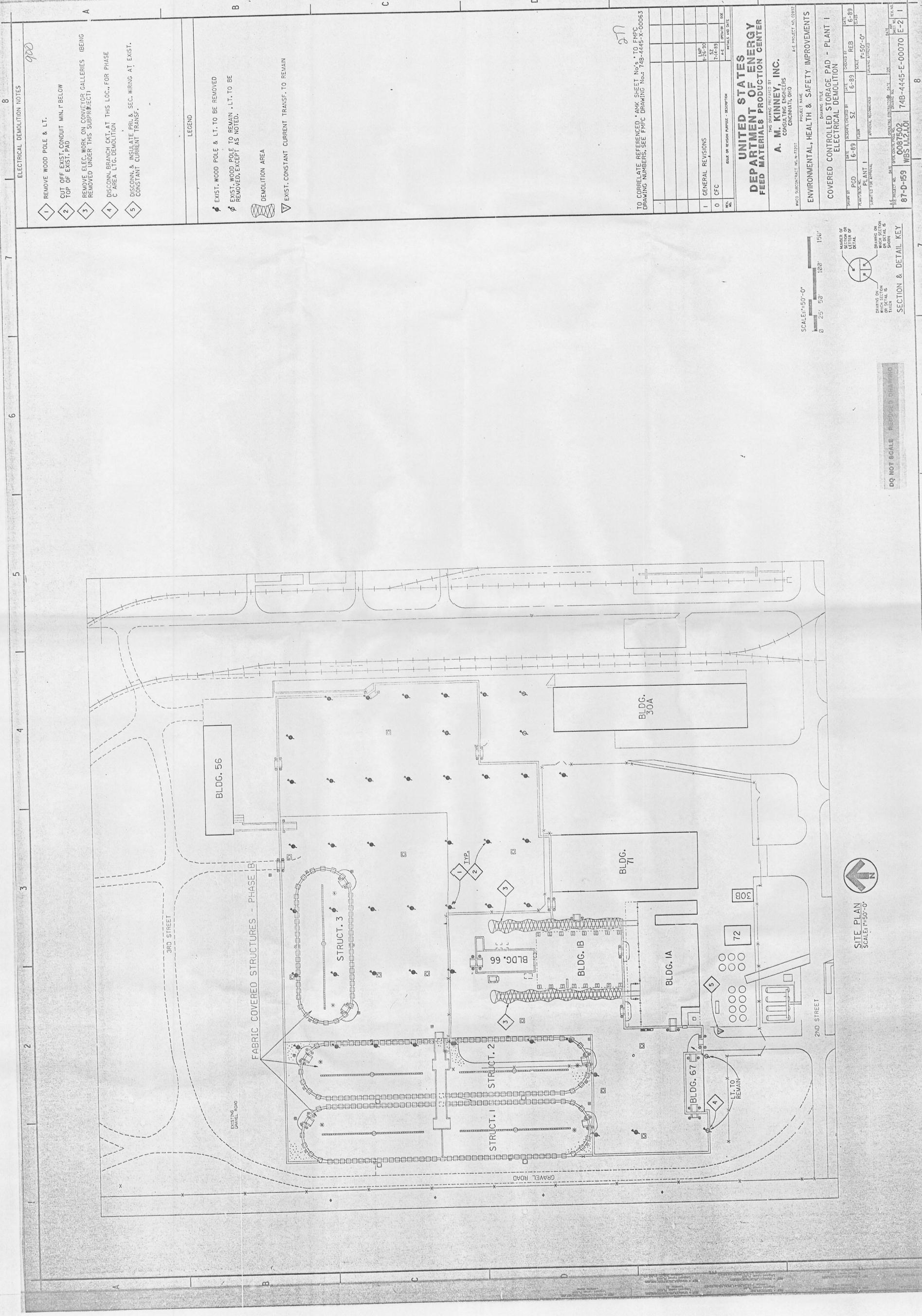
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CHICAGO, ILL.

PROJECT NAME: ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
DRAWING TITLE: COVERED CONTROLLED STORAGE PAD - PLANT 1
ELECTRICAL POWER AND LIGHTING

DATE: 1/27/81
SCALE: 1/8"=1'-0"

DESIGNED BY: D.B./S.Z.
CHECKED BY: R.E.B.
DATE: 1/27/81

PROJECT NO.: 0087502
DRAWING NO.: 748-4445-E-00069
SHEET NO.: E-1



- ELECTRICAL DEMOLITION NOTES
- 1 REMOVE WOOD POLE & LT.
 - 2 CUT OFF EXIST. CONDUIT MIN. 1" 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 PRIM. & SEC. WIRING AT EXIST. CONSTANT CURRENT TRANSF.

- LEGEND
- EXIST. WOOD POLE & LT. TO BE REMOVED
 - EXIST. WOOD POLE TO REMAIN. LT. TO BE REMOVED, EXCEPT AS NOTED.
 - DEMOLITION AREA
 - EXIST. CONSTANT CURRENT TRANSF. TO REMAIN

TO CORRELATE REFERENCED * AMK SHEET No's. TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No.: 74B-4445-X-00063

NO.	DATE	BY	DESCRIPTION
1	6-89	SZ	GENERAL REVISIONS
0	6-89	SZ	CFC

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
 ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
 COVERED CONTROLLED STORAGE PAD - PLANT I
 ELECTRICAL DEMOLITION

PROJECT NO. 87-D-159
 DRAWING TITLE: COVERED CONTROLLED STORAGE PAD - PLANT I ELECTRICAL DEMOLITION
 DATE: 6-89
 SCALE: 1"=50'-0"

DESIGNED BY: []
 CHECKED BY: []
 DRAWN BY: []
 APPROVED FOR APPROVAL: []

DATE: 6-89
 SCALE: 1"=50'-0"

DATE: 6-89
 SCALE: 1"=50'-0"

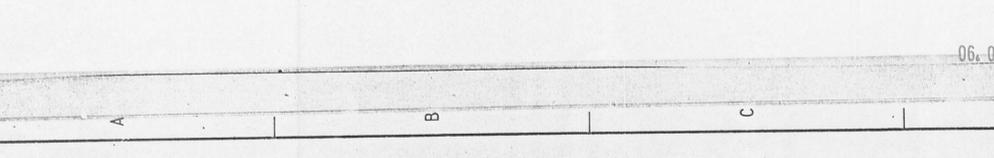
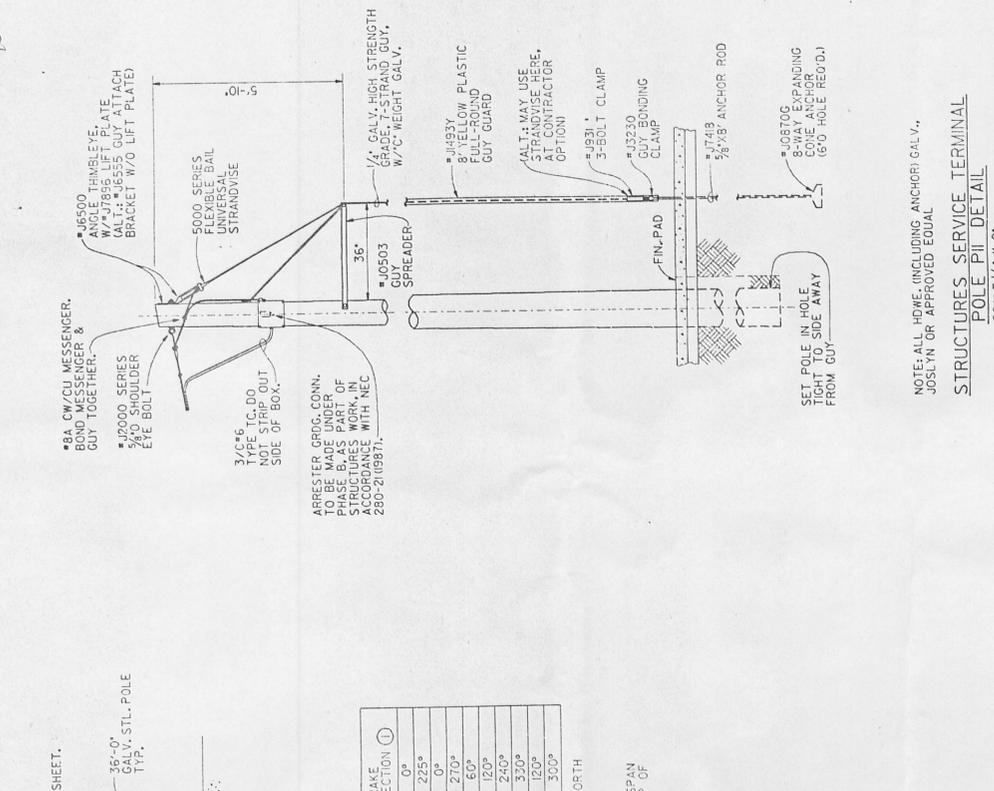
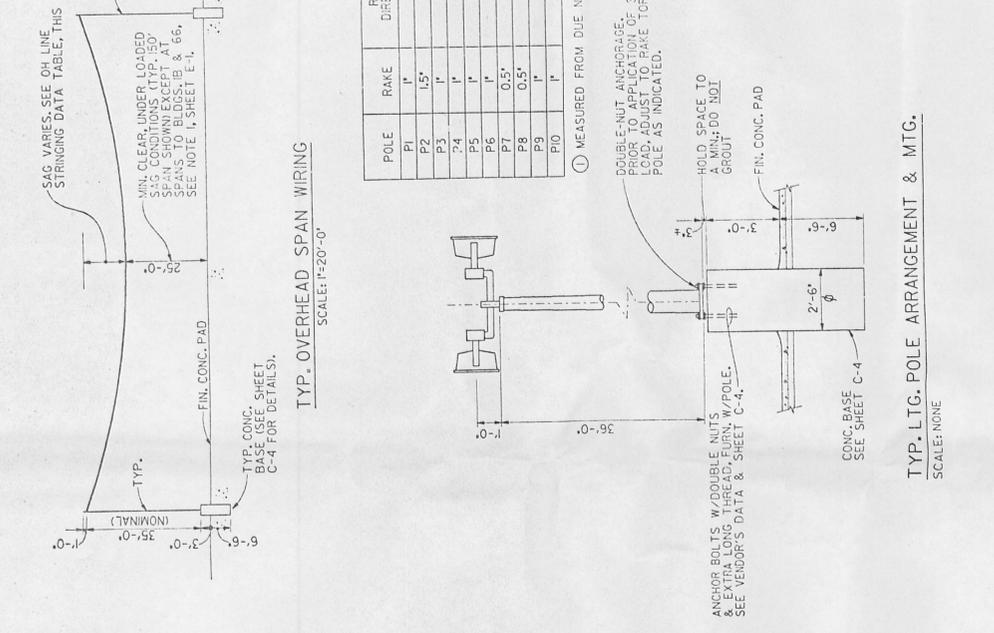
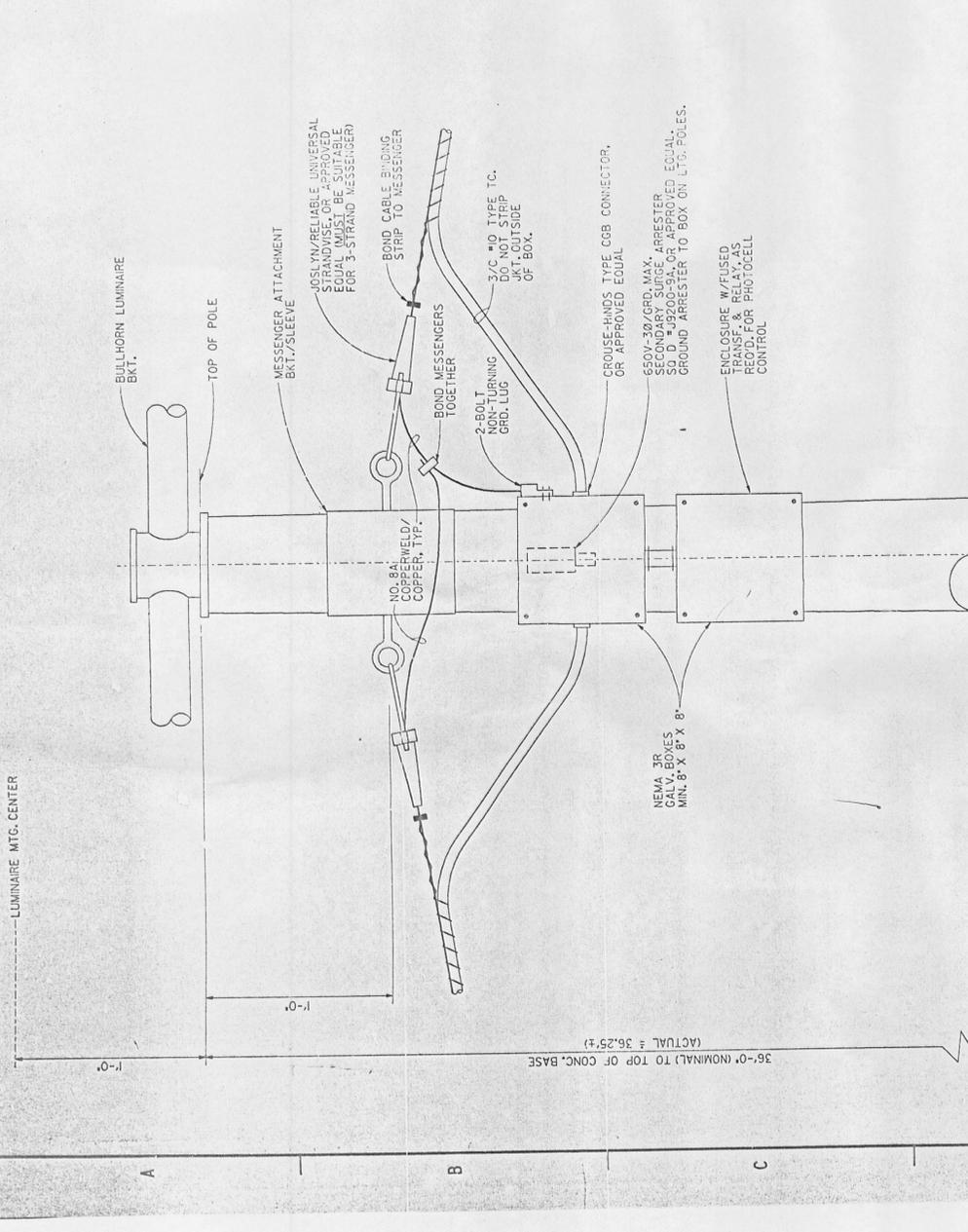
DATE: 6-89
 SCALE: 1"=50'-0"

DATE: 6-89
 SCALE: 1"=50'-0"

SCALE: 1"=50'-0"
 0 25' 50' 100' 150'

SECTION & DETAIL KEY

DO NOT SCALE. REFER TO DRAWING FOR DIMENSIONS.

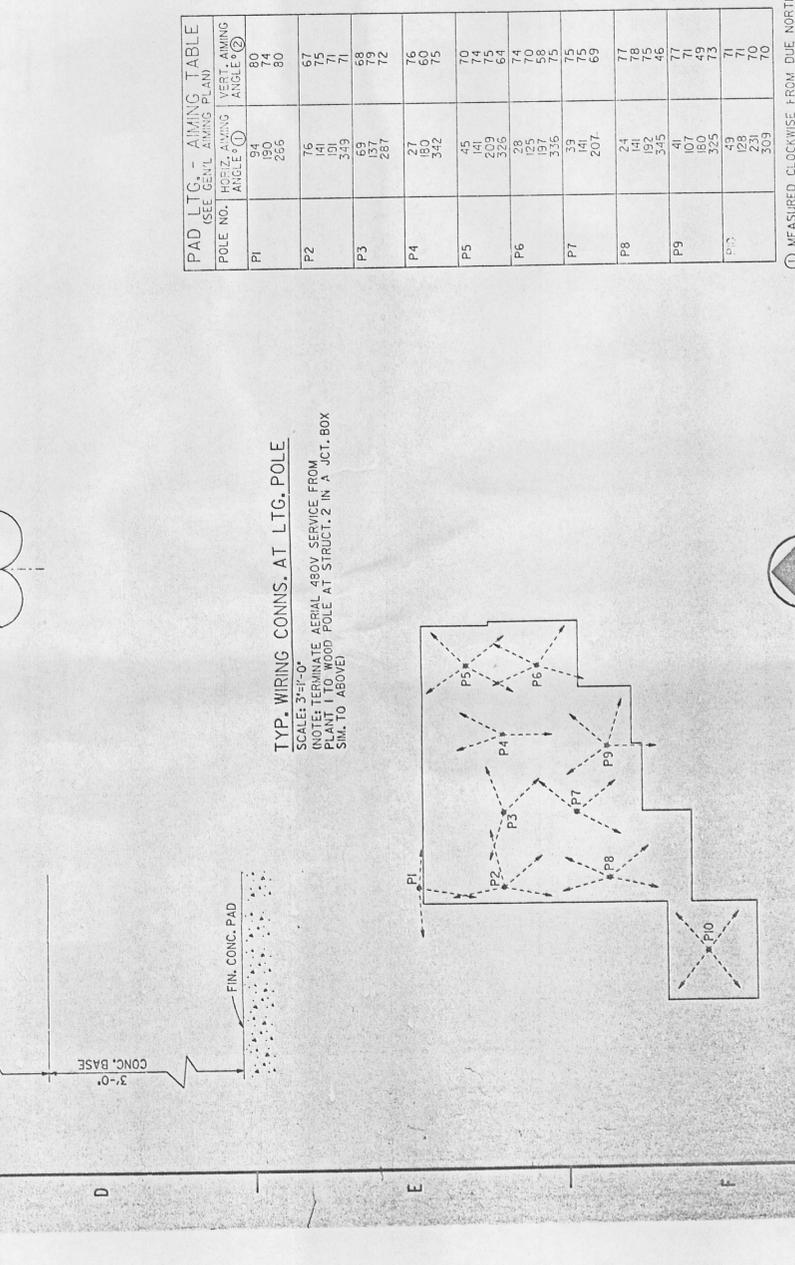
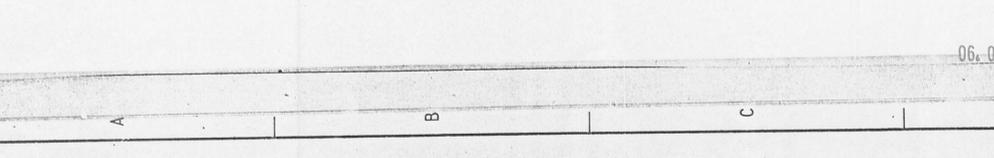


OH STRINGING DATA NOTES

1. "T" = SAG FT.
2. OH SPANS MAY BE STRING TO EITHER SAG OR TENSION FIGURES, BUT MUST BE PRE-STRESSED BRIEFLY TO INDICATED VALUES.
3. DATA IS SUITABLE FOR STRINGING UNDER WIND CONDITIONS OF 15 MPH OR LESS, DO NOT STRING WHEN WIND EXCEEDS 15 MPH.

PAD LTG. - AIMING TABLE
(SEE GEN'L AIMING PLAN)

POLE NO.	HORIZONTAL ANGLE (°)	VERTICAL ANGLE (°)
P1	80	74
P2	76	67
P3	101	71
P4	349	71
P5	69	68
P6	137	79
P7	287	72
P8	27	76
P9	180	60
P10	342	75
P11	45	70
P12	141	74
P13	209	75
P14	326	64
P15	28	74
P16	135	70
P17	336	48
P18	336	75
P19	75	75
P20	207	69
P21	24	77
P22	141	78
P23	192	75
P24	345	46
P25	41	77
P26	180	49
P27	325	73
P28	49	71
P29	128	71
P30	238	70
P31	303	59



UNITED STATES DEPARTMENT OF ENERGY FEED MATERIALS PRODUCTION CENTER

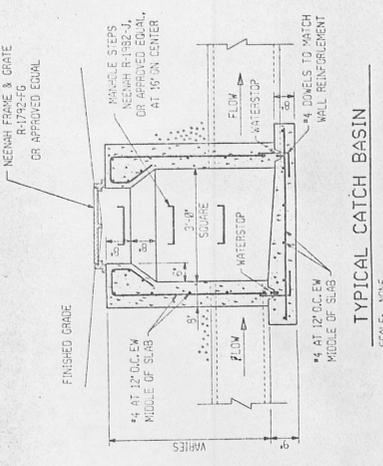
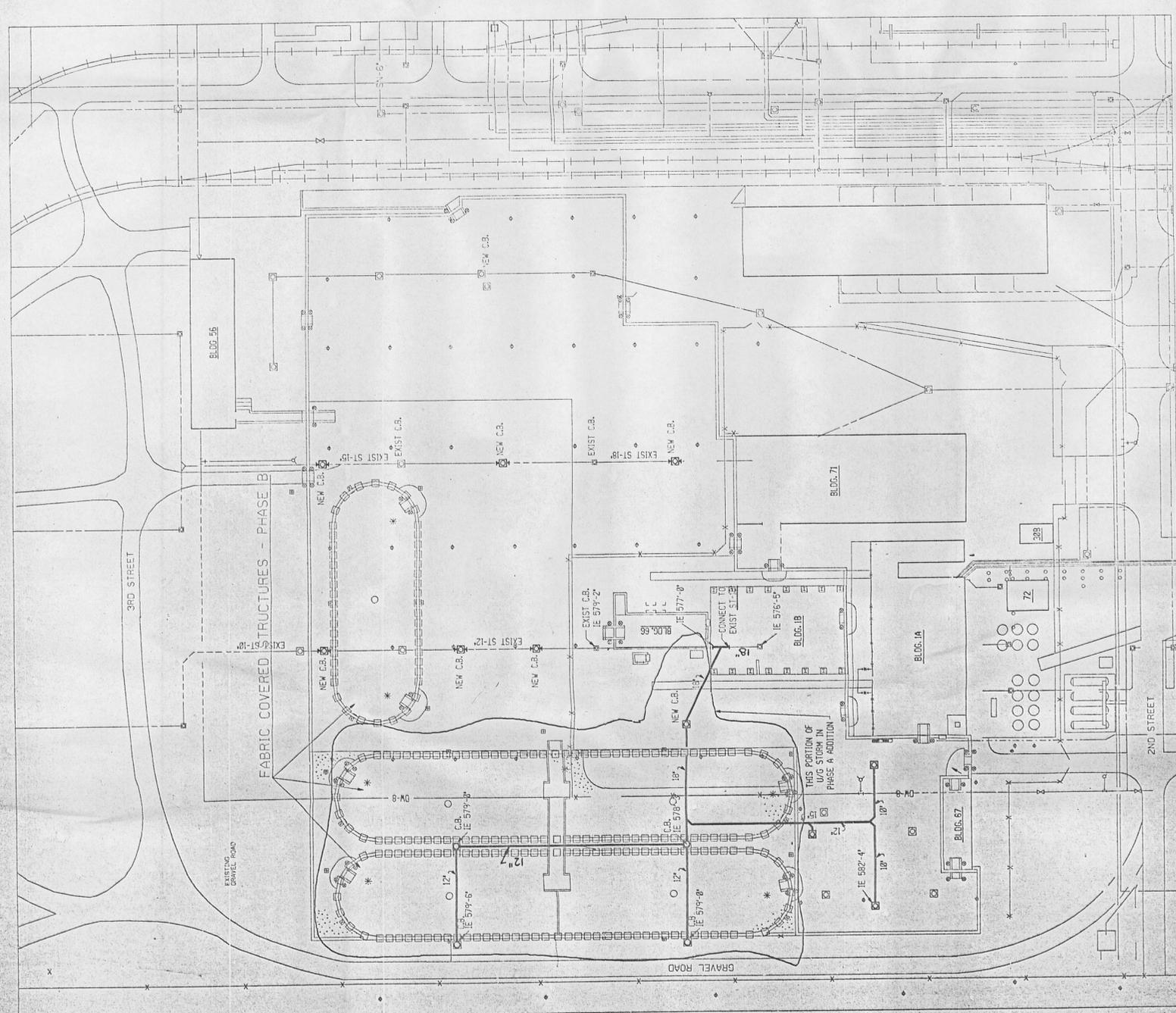
PROJECT TITLE: ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
DRAWING TITLE: COVERED CONTROLLED STORAGE PAD - PLANT I ELECTRICAL DETAILS

DESIGNED BY: A. M. KINNEY INC.
PROJECT NO.: 748-4445-E-00071

DATE: 87-D-159
SCALE: 1/2"=1'-0"

TO CORRELATE REFERENCED *AMK SHEET NO. 5, TO FMFC DRAWING NUMBERS, SEE FMFC DRAWING No. 748-4445-X-00063

978



1) FIELD VERIFY ALL INVERT ELEVATIONS

NOTES

900

279
TO CORRELATE REFERENCED *AMK SHEET, No. 5, TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No.: 74B-4445-X-000263

NO.	DATE	BY	DESCRIPTION
1			GENERAL REVISIONS
0			CFC

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FEED MATERIALS PRODUCTION CENTER**
THIS DRAWING PREPARED BY
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO
PROJECT NAME
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
A.E. PROJECT NO. 000263

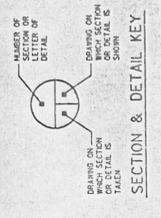
DATE	BY	DESCRIPTION	SCALE	NOTED
05-89	DMG	DMG	05-89	6-89
05-89	DMG	DMG	05-89	6-89

COVERED CONTROLLED STORAGE PAD - PLANT I
SITE DRAINAGE

SCALE 1" = 50'
0 25 50 100 150 200 250
FEET

SITE PLAN
SCALE: 1" = 50'-0"

DO NOT SCALE REDUCED DRAWING



8 7 6 5 4 3 2 1
A B C D E F