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APPENDIX B. ARMY DECONTAMINATION AND DECOMMISSIONING PROCEDURES

WAR DEPARTMENT

Washington 25, D. C., [illegible] July 194[illegible]

SB 5-52-1 Decontamination Procedures is prepared for the information and guidance of all concerned.

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OUTLINE OF PROCEDURES

This outline of procedures for decontamination is to be followed on discontinuance of operations prior to and during dismantling, demolition, alteration, or conversion of plants or equipment or areas where explosives or toxic materials have been manufactured, and in other plants and areas where similar hazards may exist.

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1. GENERAL. *a.* This outline of procedures is to be followed so far as it applies, in preparing specific procedures for decontamination in connection with dismantling, demolition, alteration, or conversion, and indicates steps to be taken to protect those who may subsequently handle equipment and buildings, or enter upon the contaminated areas.

b. The requirements stated and procedures indicated are intended to be of a general nature. At each individual plant there will be compiled for each individual plant location or project a detailed decontamination procedure applicable to specific areas, machines, installations, and buildings, depending upon the materials involved and the hazards to be encountered.

2. DEFINITION OF DECONTAMINATION. "Decontamination" is understood to mean the complete removal or destruction by flashing, of explosive materials; the neutralizing and cleaning out of acid or corrosive materials; and the removal, destruction, or neutralizing of toxic substances.

3. FACILITIES REQUIRED. In general, steam and hot water should be available during decontamination. Personnel protective equipment, such as emergency showers, goggles, uniforms, gloves, rubber boots, rubber aprons, gas masks, respirators, and laundry facilities, should be available for decontamination worker's use. Notation of facilities and equipment required on different installations will be included in the specific procedures prepared by the using services.

4. MARKING. *a.* To prevent contaminated items from being erroneously designated or mistaken as decontaminated, steaming, flashing, and similar operations are to be performed upon pieces segregated by truck loads or by certain buildings or other locations which are to be clearly indicated in the instructions which may be issued for performing the work.

b. The following marking system is to be used. Marking is to be done with yellow paint.

(1) X—A single X to indicate material only partially decon-

APPENDIX A

GENERAL DECONTAMINATION PROCEDURES FOR ORDNANCE PLANTS

(Prepared by Office of the Chief of Ordnance)

(Appendix A-I to A-XI)

8. GENERAL STATEMENT. This general section on decontamination of ordnance plants comprises general information applicable to all explosives plants, buildings, and equipment. Other sections follow which apply distinctly to acid areas of explosives plants and to plants where specific materials are manufactured, that is, TNT, tetryl, nitrocellulose, smokeless powder, pentolite, lead azide, nitroglycerin, and ammonium picrate. Ammunition loading plants, including small arms ammunition, are also covered in the appendixes.

9. EXPLOSIVES HAZARDS. *a. Heat and impact.* During the decontamination of an explosives plant, high temperature and rough handling should be avoided to prevent explosive accidents. Flame cutting devices such as oxyacetylene torches, electric welders, and blow torches should not be used before decontamination because even a slight amount of explosive material remaining in a confined space may explode to cause severe injury to personnel. A written permit should be required for use of such equipment devices in contaminated areas. Striking explosive material with hammers should be avoided. The blow upon a chisel striking explosive dust in a hole in concrete has caused violent local explosive damage. Frictional heat should also be avoided. As for example, before attempting to loosen nuts in disassembling a conveyor, penetrating oil should be applied to the contacting surfaces. Sufficient time should be allowed for the oil to penetrate within the threads before attempting to separate the parts. If holes in walls are drilled for dynamiting, the location should be maintained wet. The locations selected for drilling should be other than where cracks or joints in concrete may conceal explosives dust.

b. Smoking will be prohibited until it is certain that all explosives material and inflammable solvents have been removed or neutralized. Consideration should be given to having all fire prevention regulations, as were in effect during the operation of the explosives plant, complied with during decontamination and dismantling. Explosives should not be exposed to strong alkali or other chemicals in such manner that local heating may cause

decomposition, ignition, or explosion. Soda ash in solution and of proper concentration is considered safe as recommended herein.

c. The responsibility for executing decontamination procedures and inspection should be given to explosives supervisors, preferably those who are familiar with the particular plant, equipment, or areas involved. Such men are familiar with the extent of contamination to be expected at each location.

d. Noncontaminated equipment should not be stored with equipment which has been contaminated or decontaminated.

10. EQUIPMENT CONTAMINATED WITH ACID ONLY. All equipment such as tanks, pipes, valves, and fittings which have contained acid, but no explosives material, should be drained thoroughly, opening pipes at flanges where necessary; valves should be disassembled and packing removed. It should then be washed first with water and immediately thereafter with soda ash solution. Soda ash should be employed in solution only. It is recommended that after neutralizing, a solution of 3 percent soda ash be retained in the pipe or equipment for approximately 24 hours. Since the action of acid on metal may generate explosive gas mixtures, flame and spark should be avoided.

11. EQUIPMENT CONTAMINATED WITH ACID AND EXPLOSIVES. *a.* All large pieces of equipment which have contained explosive material such as nitrators, centrifuges, and metal wash tanks should be washed and then steamed out. Such equipment should then be flashed (subjected to a hot fire to destroy explosive material). Flashing is considered to be the most effective method for destroying explosives material in that such material cannot withstand a high temperature. Solvent, steaming, and swabbing methods are considered effective only when complete inspection can be given all surfaces of equipment to assure that decontamination is complete. If, however, the equipment is to be placed in stand-by condition for possible subsequent use in explosives operation, such as a nitrator in manufacture of high explosive material, flashing in addition to thorough inspection is not required. When any equipment or material which has been used in explosives manufacturing or loading and which may be contaminated is to be removed or shipped, it is first to be inspected and decontaminated and properly marked and tagged before forwarding. Paint marking of decontaminated equipment is preferred to tagging only.

b. Acid tanks which have contained nitrocellulose should be treated with a 15 percent solution of sodium hydroxide after flushing with water. The time of treatment with alkali is recom-

decontaminated, such location should be indicated on the plans, as well as on the grounds by signs and appropriate fencing.

19. PIPES AND FITTINGS. Pipes, fittings, and valves which have contained explosive material, including wash water containing nitrobody and white water, and pipes which hazardous material may back into (such as sparger pipes and service water lines connecting to white water lines), should be decontaminated and flashed in all contaminated parts or up to the first uncontaminated valve. The flashing of some types of valves may destroy their usefulness, in which case, such valves may be decontaminated by disassembling (including removal of bonnet), boiling in soda ash solution, and thorough cleaning with steam or other means until no explosive material remains. Soda ash tanks and pipe lines should be flushed with hot water to remove the crystallized soda ash. If evidence of explosive contamination is found, the equipment should be considered and treated as contaminated and appropriate decontamination procedures should be followed to eliminate the hazard. Service water, steam, air, fume, sewer, and sprinkler system piping may usually be assumed to contain no explosive material, but such systems should be examined for presence of nitrocellulose slurry, white water, and other explosive contamination if pipe systems are interconnected at mains, sparger tubes, and drains. Contaminated packing, lagging, and gaskets should be burned. Valve parts may be then treated with slushing compound to prevent corrosion. Acid pipe which has been subject to corrosion should be pressure-tested before reuse. Pipe used for combustible gas should be blown with compressed air. Putty should be removed promptly from dismantled equipment.

20. PIPE CUTTING. If pipe lines which contain explosive material have been welded at the joints, cutting of the pipe can be approved after explosive material has been flushed out using high pressure water through both ends and all branches. The pipe should then be filled with water and cut, using a roller type cutter, keeping the pipe full of water and playing a water hose over the outside of the pipe. Such a pipe must not be hammered or subjected to heat of a torch.

Note. Special care should be exercised in disconnecting pipe. No forcing should be allowed when pipes fail to respond to ordinary loosening methods. Carbon tetrachloride should be applied to tight connections and another attempt made to loosen the joint, still using only ordinary force. If this procedure should also fail, cutting should be done as outlined above or the entire section should be removed to the burning ground to be flashed, after which force may be used to disconnect the tight joints.

21. PIPE LAGGING. Lagging on pipes which has been subject to overflow of slurry water, white water, or other explosives material, or which may contain explosive material which has leaked from within, should be removed to the burning ground and destroyed. The insulation should be thoroughly wetted before removal, and be maintained wet.

22. BUILDINGS. Structures which are contaminated with explosives material which may be cleaned by the use of steam or hot water, should first have the bulk of the explosive material removed by sweeping and shovelling, using nonsparking tools. When steam or hot water is employed for cleaning walls and floors, efforts should be made to avoid washing the molten or dissolved explosive into cracks of the building and the ground surrounding. Hazardous material crystallized in cracks due to confinement is more objectionable than when exposed on surfaces. Contaminated combustible buildings and combustible portions of such buildings should be burned. Parts of buildings which are porous or which contain cracks should be considered as contaminated, and handled accordingly if in a location where bulk explosives have been handled.

23. DRY HOUSES. The combustible portions of dry houses which have been used for dry tetryl, smokeless powder, pentolite, black powder, mercury fulminate, lead azide, etc., should be burned after salvageable items have been removed, and contaminating explosives have been removed, wetted, or otherwise neutralized.

24. FLASHING PROCEDURE. *a.* If stainless steel equipment is flashed, it should be done by the low temperature method, using oil flame. A flame thrower using kersosene or No. 3 fuel oil and 15-pound steam has been found effective for flashing, in that effective control of the temperature of flashing can be attained. The length of flame is controlled by flow of oil and steam. Oil fire is preferred to wood fire because the latter may cause the temperature of the metal to be sufficiently high to damage the equipment so that it would be suitable for scrap metal only, or heating may at times be insufficient to completely destroy the explosive material. If the flame throwing type of treatment is employed, an adequate barricade should be used to protect workers in case fragments are thrown by explosions in the equipment during flashing or shortly thereafter. Equipment should not be removed from the flashing ground while hot.

b. No metal scrap which has been contaminated with explosives material should be sold without flashing. Even small quantities of

should be applied to the partition rings and packing. Even then the removal of stoneware rings, U-bends, and packing requires the application of more water to remove acids which remain in the openings. Workmen should wear gas masks or air hoods for protection against nitric fumes in this work. Rubber gloves, aprons, etc., should be available and worn when appropriate. Goggles should be worn at all times in handling acid-contaminated items.

31. Where a DNT-MNT mixture is encountered as in the tower absorption system, it is considered an insensitive material if maintained wet and is not likely to cause a fire or explosion.

32. ACID STORAGE TANKS. The acid should be drained and the tank flushed with a fire hose. A solution of 7 percent soda ash should be blown or pumped into the tank. Water may be added to overflowing, keeping the soda ash concentration to not less than 3 percent. Interconnecting acid lines, scale tanks, and tanks may be then decontaminated by pumping this solution throughout the area, making certain that alkalinity remains for effective neutralization. This procedure is intended only for acid decontamination, and the solution should not be allowed to enter pipe or tanks in which nitrobody has been present. The wash should be allowed to remain in each tank for at least 8 hours. The overflow should be allowed to remain on the floors of buildings for several minutes to neutralize acid which may have been spilled. The neutralizing solution should be forced through pipe lines several times, reversing the flow. Tests of the effluent should be made with litmus paper for thorough neutralization.

33. AMMONIA OXIDATION PLANT. *a.* The catalyst should be removed from the converter and a complete platinum recovery made from the converter, heat exchangers, and recovery filter assembly. The assembly should be blown completely free of nitrous gases, acid, etc., and dried. The entire mixer-converter-heat exchanger-platinum recovery assembly should be reassembled and open ends blanked off. Platinum recovery should be extended to include the cooler condenser.

b. Absorption towers should be washed thoroughly with distilled water to displace the nitric acid on the tower plates. After the acid is displaced with water, and the exit line from the tower removed, steam at approximately 5 pounds per square inch gauge pressure, should be applied to the water header to put steam on each coil. The exit header should be left open to drain condensate. With steam on the coils, a small flow of air should be put through

the tower until the plates are dry. The coils should be blown dry with air.

34. SULFURIC ACID CONCENTRATOR. *a.* The concentrator unit, before disconnecting the services, should be given a thorough water and soda ash wash. After draining the unit and disconnecting the steam traps and supply headers, and blanking off open ends of these lines, the distributor and separator tank covers should be removed and the units thoroughly washed with water. Packing should be removed from steam jackets. Valves should be dismantled, cleaned, and greased. Steam lines should be disconnected from vacuum jets and openings plugged.

b. Acid should be drained from the charring unit tubes and tubes cleaned out. The retention tank should be drained, neutralized, and cleaned. Connections should be blanked off, the fume stack disconnected, and its top covered. Any accumulated DNT should be steamed out of the fume system.

c. Sump tanks should be drained, washed, neutralized, and disconnected.

d. Workmen assigned to removing brick from the concentrator tank should be supplied with goggles (acid type), rubber gloves, rubber boots, rubber aprons, hoods, and woolen clothing. Workmen should wear such items when appropriate for protection. Water should be used freely as brick work is removed.

e. The hazard of hydrogen gas being present where acid reacts with steel should be avoided in locations where acid may be present, especially inside tanks and equipment.

f. Chemical putty should be removed promptly from all equipment, pipe, and fittings.

35. NITRIC ACID CONCENTRATOR. *a.* The preheater should be drained and the unit allowed to cool completely before proceeding. The unit should first be thoroughly flushed with hot water. The flanges in the dams on each boiler tube should then be loosened to allow drainage of the pool in each tube. After drainage the flange should be tightened again. The residual traps, flash concentrator feed tanks, and residual tubs should be drained completely. Then water should be put through the preheater to the unit from the concentrating mix feed header which previously has been blown out and washed. This water can be passed through the residual tubs to the sewer, by breaking a flange at the residual pumps. The tee cover on the dehydrating tower can be removed temporarily for washing out the hot fume line and the bleacher from a hose, the water passing through the strong nitric cooler

should be taken apart and gaskets removed. The acid and oil lines, together with all fittings, etc., should be steamed, boiled, and flashed.

b. All valves should be taken apart and parts thoroughly steamed, flashed, greased, and reassembled if contacted by nitrobody.

c. All pumps should be taken apart and the parts thoroughly steamed, flashed, greased, and reassembled.

d. Sight boxes should be removed, steamed, boiled, and flashed.

e. Nitrator valves should be steamed and flashed.

f. Fume lines should be taken down; the gaskets removed; and the sections steamed, boiled, and inspected.

g. Scales should be cleaned and greased, disconnected at the discharge nozzle and raised off the knife edges. Openings in tanks should be sealed off to prevent breathing.

h. The drowning tank, if wood, should be dismantled and burned, and all fittings should be flashed and salvaged.

i. Nitrator coils should be disconnected and each coil blown out separately with air and flashed. Cap immediately to prevent moisture from entering coils, condensing, and freezing to break pipe. Oil may then be applied to prevent corrosion.

j. The floors and walls of the buildings should then be thoroughly steamed and washed.

k. The toluene system should be drained and flushed thoroughly with water.

43. BI-HOUSE DECONTAMINATION. *a.* After the washings with soda ash and sellite are completed, all oil and acid lines should be taken apart and the gaskets removed. The acid and oil lines together with all fittings, etc., should be steamed, boiled, and flashed.

b. All valves should be taken apart and the parts thoroughly steamed, flashed, greased, and reassembled.

c. All pumps should be taken apart and the parts thoroughly steamed, flashed, and then greased and reassembled.

d. All fume lines should be taken down, the gaskets removed, and the sections then steamed and boiled.

e. Sight boxes should be removed, steamed, boiled, and flashed.

f. Scales should be cleaned and greased.

g. Nitrator coils should be disconnected and each coil blown out separately with air and flashed. Oil may then be applied to prevent corrosion.

h. The floors and walls should then be thoroughly steamed and washed.

44. TRI-HOUSE DECONTAMINATION. *a.* After the washings with soda ash and sellite are completed, all oil and acid lines should be taken apart and the gaskets removed. The acid and oil lines together with all fittings, etc., should be steamed, boiled, and flashed.

b. All valves should be taken apart and the parts thoroughly steamed, flashed, and then greased and reassembled.

c. All pumps should be taken apart and the parts thoroughly steamed, flashed, and then greased and reassembled.

d. All fume lines should be taken down, the gaskets removed, and the sections then steamed and boiled.

Note. Tetranitromethane has been found in fume lines and in fume recovery equipment. Washing with sellite solution will remove the tetranitromethane.

e. Sight boxes should be removed, steamed, boiled, and flashed.

f. Scales should be cleaned and greased.

g. Nitrator coils should be disconnected and each coil blown out separately with air and flashed. Oil may then be applied to prevent corrosion.

h. The floors and walls should then be thoroughly steamed and washed.

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45. WASH HOUSE DECONTAMINATION. *a.* Insulation where contaminated should be removed from pipes and process equipment. The contaminated insulation should be sent to the burning ground and burned.

b. Pipes, valves, and fittings which have come in contact with TNT should be dismantled. Iron and steel pipe, valves, and fittings should be steamed and flashed. Stainless steel valves should be taken apart, steamed, and washed with boiling water and toluene.

c. Stainless steel pipe and stacks should be steamed and flashed.

d. Wooden catch boxes should be dismantled and sent to the burning ground and burned.

e. Slurry screens and hoppers should be steamed, washed, and flashed.

f. Rework melt pots should be removed from the houses, washed, steamed, and flashed.

g. Slurry pumps should be disassembled and parts steamed, washed, and flashed.

h. Wash tubs should be cleaned by removing the tri-oil line, the yellow water drain line, and the fume stack. After removing bolts, the top of the tub should be raised about ½ inch by driving wedges between the flanges, and washers placed between flanges at intervals to keep them separated. TNT should be scraped from the inside of the top of the tub, using nonsparking tools. The tub should then be washed with steam and hot water until all traces

t. Ground around the flaker house should be removed if contaminated, and burned at the burning ground.

u. The building should then be thoroughly steamed and cleaned.

48. NAIL HOUSE DECONTAMINATION. *a.* The nail house should be thoroughly steamed and washed with hot water. The building should then be burned.

b. Conveyors should be dismantled. The wooden rollers should be sent to the burning ground and burned. Metal parts should be steamed, flashed, and salvaged.

c. The nailing machine should be thoroughly cleaned, dismantled if necessary.

49. WASTE WATER DISPOSAL PLANTS AND INCINERATOR BUILDINGS. *a.* Waste water should be evaporated as low as possible from all wooden surge tanks (raw storage tanks), equalization tanks (settling tanks) and all storage tanks.

b. All storage thick liquor should be evaporated to the lowest possible level.

c. All lines should be flushed with hot water through preheater feed pumps to all preheaters, deaerators, feed tanks, long and short tube evaporators, lines running to thick liquor tanks, lines running to thick liquor tank pumps, lines running to constant level thick liquor feed tanks and feed lines to weir boxes of all incinerators. Lines should be drained thoroughly and if necessary for cleaning, dismantled.

d. Manhole covers should be removed from evaporators and the tubes inspected. If tubes are in a bad shape, a forty-eight hour boiling period is suggested. Boiling has been found to be much more effective than drilling.

e. The constant level thick liquor feed tanks should be filled with hot water, agitated to clean solids from agitators and float valves, and drained completely into kiln.

f. Flanges at pumps on all preheater feed tanks should be broken, flushed, and all lines drained thoroughly.

g. All preheaters and all vapor line valves should be drained and left in cracked position.

h. All liquor in kiln should be burned to an ash before shutting off the gas flow into the furnace. As much ash and scaling as possible should be scraped loose from the inner walls of the kiln and allowed to work down into the conveyor system. The walls should be flushed thoroughly with hot water. Condensate water should be used to wash ashes into drainage pit.

i. All sump pits, steam traps (leave plugs out), vapor legs, drip lines, unit heaters, etc., should be drained and blown.

j. Valves should be treated as described elsewhere in this bulletin.

k. Sodium hydroxide solution should be removed from storage tanks. Storage tanks should be flushed with hot water and drained thoroughly.

l. Equalization tanks and all storage tanks should be thoroughly flushed and drained to the open ditch.

m. Wooden surge or raw waste storage tank should be thoroughly flushed to reservoir. Surge tank should be opened (bottom valve or manhole) and reflushed.

n. The pond should be drained into ditch with small flow.

o. All wooden lines and lines carrying combination of raw red and yellow water must be handled with extreme care, as residual in these lines will flash with a minimum of friction. All wooden lines should be burned and all metal lines flushed and flashed. The lines requiring caution will be from area settling basins to waste water surge tank and from tank to building. The line from waste water building to pond should be flushed with hot water. The pond should be flashed after draining.

p. Raw sludge taken from lines and surge tank should be removed to burning ground. The tank should be dismantled and burned.

q. The ground, in ditches, in ponds, and surrounding buildings or equipment, which may be contaminated with explosives material should be carefully inspected. If the ground is found to be contaminated, it should be treated and decontaminated as set forth in paragraph 26 of this bulletin.

NOTES

1. The "whiskers" formed on outside surfaces of catch tanks, etc., are more sensitive to impack and friction than ordinary TNT. Ignitions of the dry material have occurred upon contact by personnel. Red and yellow wash waters contain highly sensitive material. Dried residues from such wash waters should be carefully handled.

2. Burning buildings upon wet contaminated ground does not destroy the explosive upon the ground. Dry ground condition is necessary for destruction of explosives in the ground.

3. The roofs of catch tanks should be burned, as they may be contaminated due to sublimation and overflow.

4. Water flowing in ditches carries only a small part of the TNT by entrainment, leaving the bulk of the material. Burning the ditches after several weeks of dry hot weather is recommended. Waste explosives and contaminated ground when redried, remains sensitive after all kinds of weather conditions.

5. Light fixtures, conduits, switch boxes, etc., may be contaminated with explosives dust.

6. Wood troughs, tank staves, etc., should be wet when handled.

c. Scrub inside thoroughly with water. Clean the basket with cleansing agent, followed by water wash.

65. MIXING KETTLE. *a.* Remove jets and steam lines from jets to reducer on first floor, and flash.

b. Remove agitator blades, and flash.

c. Remove dump valve, disassemble, clean, and flash.

d. Clean mixing kettle with cleansing agent, followed by thorough water flush.

e. Remove blanks for extra jet openings and clean thoroughly.

66. CONDENSER. Remove the heads from the top and bottom of the condenser, applying penetrating oil when appropriate to prevent ignition of dust beneath bolts and nuts. Clean tubes with cleansing agent, followed by water wash.

67. PROCESS LINES. Remove and flash the following:

a. Line from dissolver to drain.

b. Line from dissolver to still.

c. Line from condenser to dissolver.

d. Line from condenser to measuring tank.

e. Line from top of condenser to vapor trap.

f. Line from measuring tank to still.

g. Lead floor drains from second and third floors.

68. DRY HOUSE. Remove tetryl by sweeping and using nonsparking dust pans. Remove blower ducts and metal frames, washing tetryl from surfaces with water, and using penetrating oil on nuts and bolts when disassembling equipment. Remove metal equipment to burning grounds, and flash. Burn building and trays after salvageable material has been removed. Equipment in blower house is assumed to be uncontaminated. If contaminated, it should be cleaned and flashed.

69. PACKING HOUSE. *a.* Clean walls and floors thoroughly with water.

b. Remove hopper hood, and burn.

c. Clean, grease, and block up scales.

d. Clean the nailing machine, oil with kerosene.

e. Drain and clean outside catch box.

f. Disassemble, clean, and grease water-circulator pump.

g. Remove and flash ejector and circulating lines.

h. Elevator pit and shaft should be thoroughly cleaned with water.

i. Burn building after salvageable material has been removed.

Appendix A–IV

Decontamination of Nitrocellulose Works

70. GENERAL. This section covers the decontamination and dismantling of a plant which has manufactured nitrocellulose, starting with cotton or wood pulp, including the point where water-wet purified nitrocellulose is delivered to the smokeless powder manufacturing area. Great care and attention should be given to nitrocellulose that may become dry, especially in confined condition such as beneath floor boards, in threads of pipe joints, within walls, beneath bolt heads, etc. Nitrocellulose may be handled water-wet with safety, but it must be assured that in the wetting process, water reaches all of the nitrocellulose within cracks and confined places as well as upon the visible surfaces. Buildings and equipment (electrical equipment excepted) should be maintained wet while the decontaminating work is in progress. Dry nitrocellulose is more sensitive to heat, impact, and friction than most of the materials encountered in decontamination of military explosives plants.

71. The buildings and equipment where raw cotton and wood pulp have been stored and handled should be given general cleaning treatments consisting of water washings. Inspections should be made of interiors of hollow walls, the space above ceilings and beneath floors, and if cellulose dust is found, it should be washed out.

72. NITRATING HOUSE. *a.* The building should be washed thoroughly with water. If loose flooring is found, the floor surfacing material should be removed and surfaces cleaned. When wooden sections have been exposed to slurry water, wash thoroughly to remove the nitrocellulose lodged in the crevices. All wood exposed to nitrocellulose slurry should be removed to the burning ground while wet and be burned.

b. Sump pits, floor drains, and traps should be flushed with high pressure water, and sediment removed while wet to the burning ground.

73. BOILING TUB, PULPING, POACHER, BLENDING, AND WRINGER HOUSES. *a.* Wash the buildings thoroughly with water (except electrical equipment), removing nitrocellulose from all of the slurry lines, especially at flanges and valves. The surfaces of beams and piping beneath floors should be inspected and remaining nitrocellulose should be washed off. Floor covering should be inspected and any nitrocellulose beneath should be re-

Appendix A-V

Decontamination of Smokeless Powder Works

74. GENERAL. The hazards of dry nitrocellulose as outlined in appendix A-IV apply to the locations where smokeless powder is manufactured. Even though nitrocellulose is handled in a water-wet or alcohol-wet condition until a colloid is formed in the mixing operation, wet nitrocellulose becomes dry quite readily and such possibility should be guarded against in dismantling the plant. Smokeless powder dust in a dry state should be considered an explosion hazard as is dry nitrocellulose. Whole grains of smokeless powder will burn, but more slowly than dust when small quantities are involved. Whole grains or dust should be considered as a fire hazard if allowed to remain in crevices of wood sections. For example: powder dry houses of wood frame construction which have burned were believed to have been lost because of small amounts of smokeless powder which had remained in the building for a longer time than the regular drying period, had decomposed and ignited. Buildings throughout the plant should be thoroughly washed and maintained wet while dismantling. Before doing any work on equipment which may have become dry, the equipment should, when possible, be thoroughly wetted with water and kept wet.

75. DEHYDRATING PRESSES. Dehydrating presses should be thoroughly flushed with water and the pipe lines emptied, drained and flashed. Auxiliary solvent lines, tanks, and accumulators should be considered as contaminated with nitrocellulose i.e., drained, flashed, disassembled, or dismantled. Pipe lines should be flushed. Washing parts of equipment with caustic soda solution is recommended if the equipment is to be later used only for nitrocellulose dehydration. If used for other purposes or designated as scrap metal, they should be flashed. Leathers and gaskets should be burned at the burning ground. Wet nitrocellulose transfer cars should be washed, transferred to the burning ground, and burned if wooden, flashed if metal.

76. MIXERS. Mixers should be scraped with nonsparking tools while the surfaces of bowl, blades, and shafts are maintained wet with water. Parts should be disassembled and cleaned more thoroughly, removed to the burning ground, and flashed. The packing should be removed from the mixers and be burned.

77. MACARONI, BLOCKING AND GRAINING PRESSES. Macaroni, blocking and graining presses should have screens,

plates, manifolds, etc., removed and parts swabbed with acetone if for standby, or flashed if for nonexplosive destination. The frames of the presses should be thoroughly cleaned, swabbing with acetone when necessary to remove colloid. Powder end of press ram should be scraped while water-wet with a nonsparking tool, then swabbed with acetone. All metal should be flashed before destined for use in nonexplosive work or for scrap.

78. POWDER TRANSFER, SOLVENT RECOVERY, AND AIR-DRY CARS. Powder transfer cars, solvent recovery cars, and air dry cars should be flushed clean with water and flashed. Solvent recovery tanks and auxiliary equipment should be drained thoroughly, flushed with water, and disassembled or dismantled while water-wet. Parts contaminated with smokeless powder, or sublimated and condensed constituents of the powder mix should be removed to the burning ground and flashed.

79. PIPE LINES. The pipe lines should be disconnected from water-dry tanks, inspected and contaminated sections removed to the burning ground, and flashed. Pumps and other auxiliary equipment should be thoroughly cleansed inside and out. Water-dry tanks should be flashed if of metal, burned if wooden.

80. AIR-DRY EQUIPMENT. The air-dry equipment should be thoroughly flushed with water inside and out, protecting the electrical parts of such equipment. When dismantling duct systems, surfaces should be wet, and penetrating oil should be applied to joints before separating parts which have been exposed to smokeless powder dust.

81. BLENDER. The blender elevator car pit and shaft should be washed thoroughly at the same time the building and bins are decontaminated. The pack house and equipment should be cleaned by flushing with water, followed by thorough inspection to assure that decontamination is complete.

Appendix A-VI

Decontamination of Pentolite Works

82. GENERAL. This section covers the decontamination of a plant employed for production of PETN and pentolite. The outline given in the general section of this manual is applicable to pentolite, but because of the nature of PETN, the following additional recommendations should be made. No PETN should be unprocessed. All materials in process of manufacture from the nitrating house to pack house should be completed and packaged as finished pentolite. Great care and attention should be given to

(1) Screens should be removed from melt pots, and cleaned.

(2) Sodium lines and nozzles should be cleaned thoroughly.

b. After autoclaves have been thoroughly cleaned and steamed, the system should be flushed with ammonia from the ammonia scale tanks. This ammonia should be drowned. All ammonia valves and the ammonia feed vent line should be left open and the autoclave thoroughly steamed again. The ammonia scale tank should then be vented further through lines to the storage tank.

c. All nitrous oxide cylinders should be disconnected and vented. Nitrogen and nitrous oxide lines should be flushed with nitrogen from the cylinder room to their termination.

d. After all azide has been destroyed (see par. 98 of this appendix for azide test), sodium nitrate solution should be drained from the storage tank to the killing tank and the storage tank flushed several times with water, allowing the water to drain into the killing tank.

e. After washing and steaming autoclave, hot water should be blown to the drowning tank and pumped through the crude scale tank to the ammonia evaporator where the water should be boiled for ½ hour before draining to the killing tank. Vent lines should be flushed into autoclaves from roof. Wash water plus an appropriate amount of killing solution should be added to the autoclave through the blank flange opening and agitated for ½ hour. The solution should then be blown to the drowning tank and pumped through the crude scale tank to the ammonia evaporator to the drain. The system should then be flushed with water. Killing solution and wash water should again be added to the autoclave and the process repeated until the effluent gives a negative test for azide. Should the azide-free effluent be acidic, soda ash solution should be flushed through the system until neutral.

f. The clear liquor tank should be flushed with hot water from the clean ammonia evaporator. Killing solution should be added, followed by another water flush until effluent gives negative test for azide. The manhole cover should be similarly cleaned.

g. Evaporators, condensers, condensate receivers, wringer, and catch tank. (1) The evaporators should be filled with water which should be boiled for 2 hours under vacuum, thereby flushing the condensers through to the condensate receiver.

(2) The condensate receiver should be drained to the killing tank.

(3) After the filter cloth has been removed from the wringer and burned, hot water should be dropped through the wringer to the catch tank. The water should be pumped to the first and second mother liquor tanks and to the lime treatment tank.

(4) The evaporators should be refilled with water to the level of the upper sight glass. An appropriate amount of killing solution should be added through the sampling device. The solution should be agitated for 1 hour, then water should be added until the evaporator overflows through the condenser to the condensate receiver. This treatment should be continued until the effluent gives a negative test for azide.

(5) The remaining solution in the evaporators should be dropped through the wringer to the catch tank and pumped to the mother liquor tanks.

h. Mother liquid tanks. The hot water pumped from the catch tank, as described above, should be drained and washed to the killing tank sump. The tanks should also be drained of the killing solution and flushed to the sump. The tanks should then be hosed from the top and flushed thoroughly until the effluent gives a negative test for azide.

i. Lime treatment tank, nutsch, and second clear liquor tank. (1) The hot water should be dropped and flushed through the nutsch to the second clear liquor tank and drained to the sump. The same procedure should be followed with the killing solution flush.

(2) The nutsch cloth should be washed and burned.

(3) The lime treatment tank should be filled with water and boiled for 1 hour, using a steam coil. The water should then be dropped to the second clear liquor tank and tested for azide. The procedure should be repeated until azide test gives negative results.

j. Refined scale and storage tanks. (1) The refined scale tank should be flushed through with water and drained to the killing tank.

(2) The catch tank should be filled with water, killing solution added, and the solution pumped through to the refined scale tank until the latter overflows, when the solution should be allowed to stand for 2 hours. The solution should then be dropped to the refined storage tank and tested for removal of azide. The procedure should be repeated until the azide has been destroyed.

(3) The refined storage tank should be filled nearly full of water and killing solution added through the sampling valve. The solution should be circulated for 16 hours, sampled, and tested for azide. If azide is present, more killing solution should be added and the process repeated until all azide has been destroyed. The solution should then be pumped to the feed tank in the lead nitrate preparation building.

k. Killing tank sump. The sump should be flushed several

97. WASTE AZIDE. Waste azide in sumps should be syphoned into a killing tank until the tank is approximately 1/3 full. The agitator should be started and steam at 50 psi should be opened to the blast nozzle in the stack. The liquid should be agitated and a sample withdrawn from the tank and analyzed so that the quantity of killing solution required for the destruction of azide can be calculated. The killing solution should then be added and a sample of the contents should be tested periodically for the presence of azide. When the destruction of azide is complete, the contents of the tank should be syphoned to the settling pond, continuing the agitation until the tank is empty.

98. KILLING SOLUTION. The killing solution and treatment recommended for destroying azide is given in Ordnance Department Safety Bulletin 51. Extreme care should be taken during the destroying of azide as poisonous gases and explosive gases may be liberated during the reaction. Personnel should not be permitted in rooms where azide is being destroyed, and possible sources of ignition of explosive gases should be removed. All liquors in which azide has been destroyed should give a negative test for the presence of azide before permitting release. A simple test consists of adding a small amount of 0.1N ferric chloride solution to a sample of the liquor. If the azide content has been destroyed, the solution will be colorless; and if it has not been destroyed, the solution will turn red or will have a reddish cast. Liquors in which azide has been destroyed must be treated with soda ash solution to precipitate all lead and to neutralize any free acid before such liquors are dumped into streams or brooks. The chemical destruction methods recommended herein involve complicated chemical reactions which may vary in effectiveness, depending upon temperature, concentration of solutions, etc. It is therefore essential that none but fully trained personnel be permitted to judge the effectiveness of azide destruction.

Appendix A-VIII
Decontamination of Nitroglycerin Works

99. GENERAL. This appendix applies to the decontamination of nitroglycerin manufacturing plants. Procedures for the proper cleaning of equipment which has come into contact with solvents or acids, except for the acid equipment specifically mentioned below, are described in appendix A-I of this bulletin.

100. SPENT ACID ELEVATED STORAGE—NITROGLYCERIN RECOVERY. *a.* The tank should be drained and flushed with

water. The tank should then be washed with soda ash solution to neutralize any residual acid, followed with a washing with soap and water, followed by cleaning with nitroglycerin desensitizer. (Soda ash solution, 3 to 7 percent soda ash, should be employed to neutralize any residual acid.)

Note. For desensitizing solution see paragraph 119.

b. The air agitator coil should be washed with water and blown out with air. The coil should then be flashed.

c. All gaskets should be removed from acid line and burned.

d. The acid lines should be washed out with water and any residual acid should be neutralized with soda ash solution and nitroglycerin desensitizer should be run through the lines.

e. The wash tank should be neutralized with soda ash solution and washed with soap and water, followed by nitroglycerin desensitizer.

101. SPENT ACID RECOVERY. *a.* All lead acid lines should be washed with water and neutralized with soda ash solution.

b. Lead residual cooling coils should be disconnected, washed out with water, and neutralized with soda ash solution.

c. The denitrated sulfuric storage tank should be washed out with water and neutralized with soda ash solution.

d. The bleacher pot should be washed out with water and soda ash solution.

102. SPENT ACID STORAGE. *a.* Storage tanks should be drained and neutralized with soda ash solution, followed by cleaning with soap and water and nitroglycerin desensitizer.

b. Gaskets should be removed from acid lines and burned; acid lines should be neutralized with soda ash solution, flushed with water, washed with soap and water, and flushed with nitroglycerin desensitizer.

c. Soda ash solution and nitroglycerin desensitizer should be poured down vent pipes. The vent pipes should be removed and be sent to the burning ground for flashing.

d. Wash tank should be washed with soap and water, neutralized with soda ash solution, and cleaned with nitroglycerin desensitizer.

e. The catch box should be drained and washed first with soda ash solution then with soap and water, and cleaned with nitroglycerin desensitizer.

f. Wooden drop plug sticks should be destroyed by burning.

g. Block cocks should be removed, dismantled, and cleaned, first with soda ash solution and then with soap and water and nitroglycerin desensitizer. Due to porosity, chemical ware should

while wet, and burned. Metal fittings may be salvaged after being exposed to flame.

b. Drop plugs and sticks should be removed to the burning ground and burned.

111. NITROGLYCERIN GUTTERS AND ADAPTERS. *a. Rubber lined gutters.* (1) If plant is to be placed in "standby" condition, the rubber lining should be washed with soap and water, then sponged with nitroglycerin desensitizer. Otherwise the lining should be removed and burned.

Note. For desensitizing solution see paragraph 119.

(2) Lids should be washed with soap and water, followed by nitroglycerin desensitizer, if plant is to be placed in "standby" condition. Otherwise lids should be removed and burned, salvaging metal parts after exposure to flame.

b. Waste water gutters. (1) Tar paper lining should be removed and burned at the burning ground.

(2) Gutters and lids should be treated as described in *a* above.

c. Lead gutters and adapters. Lead gutters and adapters should be washed thoroughly with soap and water, then cleaned with nitroglycerin desensitizer. They should then be removed to the burning ground and flashed.

112. NITROGLYCERIN BUGGIES. *a.* Copper tanks should be removed from the chassis and cleaned with soap and water and nitroglycerin desensitizer.

b. The chassis also should be washed with soap and water, followed by cleaning with nitroglycerin desensitizer.

c. Buggy covers should be soaked overnight in nitroglycerin desensitizer, then flashed.

113. NITROGLYCERIN BLOCK COCKS. Block cocks should be taken apart and all parts cleaned with soap and water and nitroglycerin desensitizer. Care should be taken to see that all drains in the cores of the cocks are cleaned.

114. CHEMICAL WARE CERAMIC VALVES. *a.* Valves of this type should be dismantled, and the parts washed with soap and water and nitroglycerin desensitizer.

b. All drains in the core should be cleaned thoroughly. Cocks may then be reassembled.

Note. Nitroglycerin block cocks, chemical ware, and ceramic valves due to porosity of the material, should be submerged in nitroglycerin disensitizer for several hours.

115. RUBBER HOSE. All rubber hose through which nitroglycerin has passed should be removed from equipment and burned.

116. WHEELING WALKS. *a.* Wheeling walks should be dismantled and burned.

b. When a plant is to be placed in "standby" condition, walks should be inspected and rotten planks replaced and loose boards nailed securely. Any portion of the walk ways that have been involved in a nitroglycerin spill should be dismantled, removed to the burning ground, and burned.

117. VENTS. Vents and vent lines over nitroglycerin equipment should be washed with soap and water, soda ash solution, and nitroglycerin desensitizer should be poured down vent lines. The pipes should be sent to the burning ground and be flashed.

118. BUILDINGS. All buildings in which nitroglycerin has been processed should be washed down thoroughly. Lead and conductive flooring, coves and walls should be cleaned also with nitroglycerin desensitizer.

119. NITROGLYCERIN DESENSITIZER. *a.* Nitroglycerin desensitizer is commercially available and may be used if the material effectively decomposes nitroglycerin. A desensitizing solution which can be made readily at the facility consists of:

½ gallon water.
½ gallon wood alcohol.
2 pounds sodium or potassium sulfite.

b. Where desensitizing solution is used on large quantities of nitroglycerin, a rapid reaction may occur at one point, causing local heating and possibly subsequent detonation of the nitroglycerin. Therefore, it is necessary to remove as much nitroglycerin as possible from equipment first with soap and water before using desensitizer. After desensitizer has been used, the equipment should be flushed with water to remove all decomposition products.

120. FLASHING. As previously pointed out in appendix A–I of this bulletin, all equipment which cannot be visually examined for removal of contamination should be flashed. Personnel should be adequately protected by barricades or distance from a possible detonation during flashing operations. Special care should be taken in flashing and melting lead spargers and hollow piping where quantities of nitroglycerin which may be contained in cracks, etc., may detonate.

more than 5 pounds gauge pressure. Temporary partitions are to be removed and explosive deposits removed by vacuum, then steam-cleaned. Melt units and mixing kettles and other equipment to be cleaned with steam at not more than 5 pounds gauge pressure; particular attention must be directed to cracks and joints to assure the removal of all explosives. Funnels and pouring tools used in the pouring of high explosives should be flashed. Parts of buildings which are porous or which contain cracks should be considered as contaminated and handled accordingly if in a location where bulk explosives have been handled.

(2) Ducts and piping used for the transfer of explosives and leading from the melt unit to the mixing kettles must be disconnected and all joints and surfaces steam-cleaned of explosives, removed to the burning ground, and flashed. Exhaust ducts are to be taken down and steam-cleaned or, if this is impracticable, removed to an isolated location and the explosive encrustation removed by burning, normally referred to as flashing, using a large quantity of a combustible material to ignite the explosive. Operators burning out explosive residue must be instructed that the igniting train is to be of sufficient length to permit return to a safe location before the explosive is ignited.

d. (1) Sumps at melting and pouring buildings are to be cleaned of all explosives by removing the residue when wet. The interior of the sump, if concrete, is to be steam-cleaned. Where sumps are of wood construction, the deposited explosive on the surface is to be removed with steam; the wood sumps are then to be disconnected from attached piping, using nonferrous tools; and the wood sump dismantled while wet, for burning. Small wood receptacles should be burned without first dismantling. In instances where wood receptacles are held together with steel tie rods and bolts, no attempt should be made to remove the bolts until all visible explosives at the threaded portions have been removed by steam and the joint thoroughly treated with penetrating oil to prevent ignition by friction when explosive may be within the threaded components. Goggles should be worn when removing the nuts from bolts.

(2) Provided sumps are drained or served by inclosed piping either above or below ground, this piping should be removed by disconnecting at the minimum number of joints and the explosive deposits removed by steaming, after which the piping should be flashed.

(3) Where the outlet from sump used for explosives or washout tanks is formed by an open ditch, the gravel or earth for a depth of approximately 1 foot and a width known to include the

explosive contamination, is to be carefully removed and taken to an isolated area previously cleared of combustible materials and deposited in trains approximately 5 feet wide and 8 inches thick and burned by the addition of combustible materials laid on top of the material to be burned.

(4) Samples should be taken of the ground after removal of portions of the ditch to make certain that no explosive material remains. To make certain that decontamination is complete, samples should also be taken of the ground remaining after destruction of contaminated ground by burning.

e. (1) High explosives should be removed from the vacuum collectors and surfaces cleaned, using steam of 5 pounds pressure or less for TNT and Explosive D, acetone for tetryl. The piping serving the collection tank should be flushed with water, under pressure, to remove as much of the explosive as possible. While the interior of the pipe is wetted, penetrating oil with flash point higher than 100° F. should be applied to the joints, bolts, or pipe fittings, and a sufficient time allowed for the oil to enter the threads, before nuts or pipe sections are separated. All such tanks, pipes, and fittings should be flashed.

(2) Dry type primary and secondary vacuum collectors are to be cleaned by removing the fabric socks and, after shaking loose the encrusted explosives, the socks should be disposed of by burning in the manner prescribed for high explosives; for example, placing the socks on a combustible train of excelsior and igniting the train to burn into the wind. In this connection, the length of train extending beyond the explosive contaminated socks should be sufficient to permit operators to retire to a safe distance, approximately 200 feet, before the flame reaches the explosive contaminated socks.

(3) Vacuum separator tanks are to have bottom collector bells removed and thoroughly cleaned of all encrusted explosives, using steam for TNT or explosive D and acetone for tetryl. The interior of the tank and the connecting pipe outlets from the tank are to be likewise cleaned of all explosive contamination.

(4) Wet type vacuum collecting systems are to be drained of water and the interior of the tank and piping cleaned in the manner prescribed for dry type collectors and piping. Sludge tanks and pumps forming a part of the wet collecting systems are to be cleaned of explosive deposits; joints in the equipment that were in contact with explosives, where secured by screws, bolts, or other type of fastenings, are to be carefully separated after lubricating the screw threads with penetrating oil. After

(5) Dry houses for azide and fulminate are usually equipped with drying racks or cabinets. The surfaces and interior of these units must be washed thoroughly with the appropriate desensitizing solutions for the explosive involved. Door hinges and air-duct connections to the cabinets and into the room must be disconnected, after desensitizing solutions have been used, and again cleaned in the solution. Wooden trays and racks should be destroyed by burning at the burning ground. Interior of air-duct piping is to be carefully cleaned, after washing with water, by clean rags wet with desensitizing solution drawn through the pipe; the rags must be attached to rope lanyards when lengths of pipes are being cleaned. Wood or metal ram rods should not be used for this purpose. The metallic equipment should be flashed.

(6) Leather strap dry racks are to be washed with water and desensitizing solution, after which the leather straps are to be carefully removed and burned.

(7) Sumps used to collect waste lead azide, mercury fulminate, or primer mixtures suspended in water are to be flushed with clean water, and the interior and exterior surfaces thoroughly washed with mops saturated with the appropriate desensitizing solutions, after which the sumps are to be again flushed with clean water.

(8) Where the sump water has been permitted to run in ditches, the soil at these locations is a potential hazard and should be removed for disposal by burning. Removal of the soil must be accomplished only after thoroughly wetting with water. No picks or mattocks should be used in loosening the soil, but steel shovels may be used if caution is exercised.

(9) Samples should be taken of the ground after removal of portions of the ditch, to make certain that no explosive material remains. Samples should also be taken of the ground remaining after destruction of contaminated ground by burning, to make certain that decontamination is complete.

(10) Bags or collectors found tied to the mouth of discharge pipes to the sump must be saturated with water before the tying cord or other device for holding the collector in position is released. Such bags must immediately be placed in water for transfer to an isolated spot for burning. The bags must be arranged for burning while still wet and must not be handled in the dry state. When dry, the combustible train may then be ignited without disturbing the explosive contaminated bags.

(11) Short runs of underground piping leading to or from the mercury fulminate, lead azide, or primer mixture sumps, must be decontaminated by flushing with water and swabbing with rags

saturated with appropriate desensitizing solution. Long runs of underground pipe, those that exceed 10 feet in length, are to be flushed with desensitizing solution and then dug up while wet and removed for disposal.

(12) After cleaning the interior of primer and preparation houses, the sections between ceilings and roof and between exterior and interior walls, if the building is walled, should be inspected. Where explosives are discovered, the surfaces should be wet down, desensitized, and removed.

(13) Operating buildings containing consolidating presses are to be thoroughly washed with water and mopped down. All ledges above windows, doors, and at the wall plates must be thoroughly cleaned with wet mops.

(14) Equipment is to be freed of explosives by wiping with rags moistened with desensitizing solution, after which this equipment, including press control levers and other devices, is to be oiled or greased to prevent rust. Scales, consolidating presses, detonator loading and primer loading machines should be disassembled and surfaces thoroughly cleaned.

(15) Table top covering, when found cracked or otherwise damaged to permit infiltration of powder, is to be removed and burned in the usual manner, and the table carefully decontaminated with desensitizing solution. All other table top coverings are to be washed with water. Tables should be burned when decontamination cannot be made complete.

(16) Wherever desensitizing solutions are used on equipment and installations, the parts should be rinsed with clear water before oil or grease is applied or the parts reassembled.

c. (1) Tracer, igniter, and incendiary processing buildings are peculiar in that the promiscuous use of water may develop a fire hazard; therefore, all excess explosives should first be removed by sweeping or by mopping with cloths dampened with safety solvent. Where tracer, igniter, and incendiary dusts are found within hollow walls and above ceilings, fuller's earth may be added in proportion of four parts of earth to one part of explosives dust to prevent ignition during dismantling the building.

(2) Press buildings where pellets of tracer, igniter, and incendiary mixtures are manufactured, including the screening buildings, rest houses, and magazines, should be carefully inspected to determine that the hazardous mixtures are removed from corners, above ceilings, and interior side walls.

d. Tetryl pelleting, and booster and fuze assembly buildings are to be washed down with water. The equipment is to be disassembled and thoroughly cleaned with acetone-dampened rags

class II locations, but which have been exposed to explosives dust, should have the bell, fan, steel band, and other parts in which dust may be concealed, removed and all dust cleaned from the surfaces. The use of air spray containing safety solvent with flash point not less than 100° F., accompanied by brushing with a fiber bristle brush, is effective for this decontamination. All other electrical equipment which has been exposed should be dismantled and cleaned, in a similar manner. Electrical conduits may also contain dust deposits. The conduits should be flushed with air. Electric power should be shut off and circuits, including lighting circuits, disconnected before the cleaning of electrical equipment is started.

e. Before decontamination of machinery is started, power switches controlling the equipment should be locked in the OFF position. All machinery which has been exposed to explosive dust should be completely dismantled and all parts thereof should be separated and cleaned with safety solvent with flash point not less than 100° F., using an air gun or spray if available. Conveniently shaped fiber and clean paint brushes should be used to remove all explosives as they become loosened. When necessary, accumulations may be removed by brushing with a bristle brush with the application of safety solvent with flash point not less than 100° F. Although safety solvent, with flash point less than 100° F., is safe at normal temperatures below its ignition point, flame producing devices should not be used near this material.

(1) Special attention should be given to possible explosives dust accumulation inside hollow pedestals of machinery. Machines should be moved cautiously from their original position to avoid ignition of dust which may have sifted beneath the base of the machine.

(2) Transmission belts which are in good condition but which have been exposed to explosives dusts should be carefully cleaned with soap and water prior to storage. Belts found to be cracked or split should be destroyed by burning.

(3) Conveyor systems which have been subjected to explosives sifting out of boxes during transfer should be carefully dismantled and the parts cleaned of all dust accumulations with safety solvent with flash point not less than 100° F.

(4) Smokeless powder loading funnels or stacks should be brushed thoroughly from the top down and should be hosed with water as a final cleaning.

f. Metal tote boxes used for ammunition handling should be thoroughly cleaned with solvent. Wooden tote boxes which are contaminated should be destroyed by burning. Pointed sticks may be used to remove powder lodged around the edges of boxes. Maizo

pans, catch pans, and screens should be soaked in solvent to loosen powder accumulations. After soaking the pans, a stiff fiber brush, or, when necessary, a wooden paddle may be used to remove the accumulation. Pans in poor state of repair or which contain explosives difficult to remove and waste cans should be sent to the burning ground for disposal. Rubber buckets should be thoroughly cleaned with soap and water.

134. MISCELLANEOUS. *a.* The lids on all floor drains should be lifted and the drains thoroughly flushed with a full stream of water. The lids and mouths of floor drains should be wiped clean. Wooden shovels should be used to remove as much explosives as possible from sumps, catch boxes, and drains. The sumps, etc., and connecting pipes or troughs, should then be thoroughly flushed with water under pressure. If still contaminated, pipes should be wet when removed. Explosives so removed from sumps, catch boxes, and drains should be burned at a burning ground. It is recommended that quantities not exceeding 25 pounds be burned at a time. The explosive material should be maintained wet and burned upon a mat of wood or excelsior. A distance of 250 feet should be maintained between the burning location and any building, railroad, or highway. Combustible vegetation such as dry grass and leaves should be cleared within a radius of 250 feet. Ample time should be allowed between batches so that the ground will not be hot, to ignite the explosive material prematurely. Appropriate fire fighting facilities should be available. Care should be exercised to prevent explosive material becoming dry because in that condition a dangerous degree of sensitivity is reached. Before burning, explosives may be saturated with kerosene and ignited by means of an excelsior train running away from the explosives in the same direction as the wind.

b. Live primers which may be found during clean-up operations should be placed under water pending disposal at the burning ground. It should be stressed to those engaged in decontamination that primers are hazardous even when under water and must be handled carefully.

c. Bullet point paint identification units should be dismantled for cleaning. Lacquer residue on the parts of units should be removed by applying thinner and scraping with a nonsparking tool. Paint scrapings should be placed in a covered container and sent to the burning ground for disposal. Thinner used for cleaning should be kept in approved safety cans.

d. Mops, brooms, floor brushes, sponges, rags, etc., which have been used in explosives locations should be destroyed by burning.

138. PART III: ETHYLENE GAS HOLDER. The gas holder will be purged with nitrogen in accordance with recommendations of "The Purging of Gas Piping and Gas Apparatus" by the American Gas Association. All exposed metal work should be painted with corrosive resistant paint. All valves will be cleaned and greased. After a thorough purging, the holder will be filled with air.

139 PART IV: ETHYLENE COMPRESSOR AND DRYER INSTALLATION. *a.* The entire installation will be thoroughly purged with nitrogen.

b. All steam and water lines will be drained.

140. PART V: H MANUFACTURING PLANT. *a.* Disconnect electric power by means of the plant master switch.

b. All H in tanks or reactors will be transferred to a filling plant, ton containers, or destroyed in the disposal reactor. All equipment will be drained completely.

c. All sulfur monochloride will be drained back to the field tanks. The field tank vent will go through a dryer. The tank will be isolated from the sulfur monochloride lines, and the pipe lines drained and cleaned.

d. All ethylene and tail gas lines will be purged with nitrogen.

e. All H lines wil be drained.

f. All reactors, including disposal reactors, will be decontaminated with boiling caustic, in accordance with standard practice.

g. All safety and receiver tanks will be decontaminated with boiling caustic. All possible sources of contamination shall be decontaminated with bleach slurry. All waste metal, valves, pipe sections, or other metal fittings will be boiled in caustic. All scrap wood that could possibly be contaminated will be burned. All scrap metals will be burned to decontaminate.

h. All H.S. lines will be decontaminated by pumping through them a solution of hot caustic. Then all flanged joints will be opened and decontaminated in the same way. Operators must wear masks, impermeable clothing, and rubber gloves. A sufficient supply of M5 Ointment and a first aid squad must be on hand for the operations.

i. All H pumps will be dismantled and decontaminated, in the same manner as the equipment described in *g* above. All sulfur monochloride pumps will be drained and thoroughly flushed with water. All pumps should be lubricated when reassembled.

j. All caustic lines will be cleaned and thoroughly flushed with water. The caustic tank will be treated in the same way.

k. All brine will be drained back to the brine tank.

l. The refrigeration system will be pumped down until all refrigerant is in the receiver. Be sure there is a safety valve on the tank and that the valve is set for the proper working pressure. Then wash system thoroughly.

m. All water and steam lines will be drained.

Appendix B–II

Decontamination Procedures for H Shell or Bomb Loading Plant

Note. For operations in paragraph 141*c* to *h*, inclusive, operators will be equipped with masks, suitable gloves, and impermeable clothing.

141. OPERATIONS. *a.* Drain all piping and run down tanks to the liquid-level tanks to ton containers.

b. Circulate 20 percent caustic through entire system back to the liquid-level tanks.

c. Dismantle and decontaminate the vacuum equipment pump, then oil and reassemble.

d. Dismantle the filling head and soak in 20 percent caustic. Lubricate and reassemble.

e. Remove the manholes from the liquid-level tanks or storage tanks, and with the tanks 2/3 full of 20 percent caustic, insert a steam line and boil the solution for 6 hours in order to decontaminate not only the tanks but any sludge that may be in the tanks. The decontaminated sludge will be removed and burned in a suitable incinerator.

f. Thoroughly wash all parts of the filling machine with decontaminating solution before dismantling begins.

g. Dismantle all piping and all the machinery. All usable parts will be washed in 20 percent caustic. All junk parts will be burned. All wood that has accumulated around the plant will be destroyed by burning.

h. All pits from which tanks, pumps, or other equipment have been removed will be thoroughly decontaminated with 20 percent caustic.

Appendix B–III

Decontamination Procedures for Arsenic Trichloride Manufacturing Plant (part I to part III)

142. PART I: ARSENIC TRICHLORIDE MANUFACTURING PLANT. *a.* After all sulfur monochloride has been disposed of from sulfur monochloride plant and arsenic trichloride plant that can be removed by pumping, and the reactors in the arsenic trichloride plant have been drained empty, close the drain valves

w. The two water pumps will be thoroughly cleaned and drained.

x. The sulfur dioxide disposal system will be thoroughly cleaned with water.

y. The wood lime tanks will be filled with water. After all nozzles have been blanked off, a small amount of oil will be placed on top of water to prevent mosquito breeding. All pipe and pumps will be thoroughly drained free of water.

z. The water tank will have all outlets blanked off and left full of water, with a little oil film on top.

aa. All steam lines will be drained and steam blanked off at the steam supply line.

ab. The water will be turned off at the underground water valve in the main feeding to the building. All water lines are to be drained and the drain valve left open.

ac. The two lime circulating pumps and two waste disposal pumps will be cleaned, greased, and reassembled.

ad. The waste disposal line to the disposal pit will be thoroughly flushed and then blown out with air.

ae. All factory supplies, hand tools, greases, oils, paint, fittings, valves, etc., that have been used will be thoroughly cleaned and disposed of by returning to property or in any other approved manner.

af. The inside of the reactors and AT receivers will be coated with heavy oil.

143. PART II: SULFUR MONOCHLORIDE PLANT. *a.* All sulfur monochloride remaining in the reactors and storage after bulk disposal will be pumped through the arsenic tricholride plant reactor and into the lime slurry tanks of the sulfur dioxide disposal system, care being taken not to feed the sulfur monochloride too fast to the lime slurry, allowing sufficient time for neutralization. Lime must be kept in sufficient concentration in the slurry to give a basic test to phenolphthalein indicator, at all times.

b. The reactors will have about 6 inches of residue and sulfur monochloride remaining in them which cannot be pumped out. This sulfur monochloride and residue will be neutralized in the following manner: Remove the feed plate cover for charging sulfur on one reactor at a time. Pump 500 gallons of 50 percent caustic from caustic tank truck into one empty reactor in arsenic trichloride building. With the other reactors empty, open the valves below all the reactors, having previously closed the residue drain valve to pump. This will allow the 50 percent caustic to equalize in all reactors. The valves will then be closed below the reactors and water added to the 50 percent caustic, with the agitators running,

to dilute to 10 percent caustic, Sp. Gr. 1.112 at 60° F. This dilute (10 percent caustic) will then be pumped into the sulfur monochloride reactor at the SM plant in order to neutralize and decontaminate the sludge. After the reaction in the sulfur monochloride reactors has subsided somewhat, the solution will be circulated with the sump pump. The solution will be tested from time to time with phenolphthalein indicator to be sure that it is basic at all times. If needed, more 10 percent caustic may be added in the same manner as before. After some temporary connections are made at arsenic trichloride plant, as described in AT decontaminating, Part II (Appendix B III), pump the decontaminated waste from sulfur monochloride reactors to sulfur monochloride residue storage tank and then directly to lime disposal tanks, thence to the waste disposal pit. The same procedure will be used successively for each of the sulfur monochloride reactors.

c. After the reactors have been thoroughly decontaminated and washed, carefully loosen and remove the blank flange on the drain line. The tank will then be washed thoroughly with a hose, using a large quantity of water.

d. All chlorine and vent lines will be thoroughly washed with water and dried with air.

e. All sulfur monochloride lines will be thoroughly washed out with water, steamed, and washed again.

f. The sulfur monochloride sump pumps will be pulled, decontaminated, greased, and reassembled. Thoroughly decontaminate and clean sump tanks with water.

g. All tanks will be completely empty, and all valves will be opened and allowed to drain.

h. The drain cock on the bottom of the exhauster will remain open.

i. The calcium chloride vent dryer will be emptied and washed thoroughly, leaving it empty and dry.

j. All plug cocks will be cleaned and lubricated. All other valves carrying sulfur monochloride will be drained, cleaned, and greased.

k. The vent scrubber will be drained and any sulfur deposits removed.

l. The water supply to the building will be turned off at the underground main feeder valve. All water lines will be drained. Any line that will not drain or may have low points will be blown out thoroughly with air.

m. All hand tools, paint, grease, valves, fittings, and any other factory supplies will be disposed of by returning to the

and both acid and caustic towers. Let off acetylene pressure from the building through the vent line on the exit hydraulic.

d. Purge entire building equipment as given under paragraph *b*, part I.

e. Pump out all acid in any of the acid tanks to the waste silos at the generator building to be neutralized by the lime sludge. Remember to have a vent open somewhere in the system so a vacuum will not be created.

f. Drain any remaining small amount of acid down the sewer and flush sewer with water. Also drain caustic tanks to the sewer.

g. Close drain valves between all tanks and towers. Connect water hose to each of the acid circulating tanks, fill three-quarters full, and drain down the sewer.

h. Take manhole covers off acid circulating tanks and wash all tar sludge down drain to sewer. Replace manhole covers.

i. Fill each acid tank one-half full of water and circulate through the tower for ½-hour periods, alternating both tanks and pumps. Repeat above at least three times with each acid tank. On last circulation with each tank, use steam on the acid cooler sufficient to heat the wash water to a temperature of 200° F.

j. Lift off the top of the acid tower; take out the distribution plate. Wash the packing with water and remove it for disposal. If the packing is covered with tar it can be cleaned only by hand.

k. Drain the brine inlet and return piping back to the manufacturing building, drain out valves on the aftercooler. Flush thoroughly with water and drain completely.

l. Drain 1½-inch caustic supply line both back to the manufacturing building and to each caustic tank. Wash out with water and drain the line. Wash out both caustic tanks, pumps, and the tower by circulating water for ½-hour periods as given above under instruction in *i* above for the acid tower and tanks.

m. Now fill all towers, tanks, pumps, and piping with water to push out any remaining traces of acetylene. Drain all equipment to the sewer.

147. PART III: ACETYLENE GENERATION BUILDINGS. *a.* Before starting decontamination and clean-up, all cans of calcium carbide should be taken from the building storage room and returned to the property warehouse.

b. Purge acetylene header and all other lines using nitrogen as specified under paragraph *b*, part I.

c. Check all generator hoppers to see that all carbide is gone. Fill all generators with water completely by taking off the guard handle from the overflow valve when in closed position, opening

feed lock rod handle and carbide charging door, then opening water-filling valve until water overflows from the charging door opening.

d. Close each charging door with the generator full of water and open the intermediate and generator service valves. Open drain valve on header drip pot, then open water valve on each generator one at a time and close after a good stream of water comes out of the drip pot. Water should be allowed to flow from the generators to surge tanks while they are vented to the atmosphere.

e. Disconnect instrument piping valves at orifice plates, open all drain connections to drip pots, and flash back arrestors and allow water to flush through.

f. After thorough flushing, drain all water from generators, generator hydraulics and service piping, GC-4 rotameter controls, 4-inch header, surge tank, hydraulic seal pot, and feed back line. Remove drain plugs on generator residue line and on generator hydraulic.

g. Take all plug valves apart, clean thoroughly, regrease, and reassemble.

h. Remove generator hopper dome from each generator by means of rope and the building hoist. Using *soft wood stick*, clean off all caked lime from inside of dome and water shell. Spray paint inside of dome and water shell. Remove filter from generator.

i. If the building has a contaminated waste silo system, decontaminate by pumping each silo full of lime sludge and agitate for at least 6 hours. Drain sludge to pits and wash down thoroughly with water.

j. Lime sludge and contaminated waste pits should be treated the same as the silos, as given above.

k. After all clean-up is completed, the underground water main valve should be shut, and all water lines drained. The steam line should be shut off and drained thoroughly.

148. PART IV: SULFURIC ACID SYSTEM. *a.* The sulfuric acid system consists of two 8,000-gallon bulk storage tanks, two gear pumps, and interplant piping to all acetylene purification buildings. In addition, from each purification building an overhead waste acid disposal pipe runs to the contaminated waste silos at the generator buildings.

b. The pipe should be drained as completely as possible of the bulk of its acid. A water hose should be connected to one end of the pipe and, with the other end open, the pipe should be flushed

line and drains, into the air washer. (Air washer pumps must be shut down and drains opened for this operation.)

(3) This operation will then be followed by a final water wash.

(4) Tail gas line, scrubber, and recirculating tanks will be drained, and dried out with air.

l. Recirculating pumps, which will have been decontaminated will be taken apart, cleaned, repaired, greased, and reassembled.

m. Arsenic trichloride weigh scales will be thoroughly cleaned by washing all exposed parts, grease coated.

n. Mercuric chloride scales will be cleaned by washing with water.

o. All instruments and gauges will be cleaned. All instrument lines will be decontaminated in the same manner as other toxic lines.

p. All loose material will be removed from plant, and floors scrubbed with 20-percent caustic solution, then hosed down with water.

Appendix B-VI

Decontamination Procedure for Crude and Finished L Transfer Lines

151. PROCEDURES. *a.* All finished L will be drained from the transfer lines, into suitable storage containers.

b. The lines will be thoroughly decontaminated with caustic solution, rinsed with water, and blown clear with air.

c. All valves will be removed, dismantled, and decontaminated as in *b* above, repacked, greased, and reassembled. All flanged joints will be opened and decontaminated and old gaskets destroyed. Operators will be properly protected with impermeable clothing, masks, and proper gloves. A first aid squad with an adequate supply of BAL ointment will be on hand to take care of any emergencies.

Appendix B-VII

Decontamination Procedures for Crude L Treaters and Filter

152. PROCEDURES. *a.* The treaters and filter will be decontaminated by washing with caustic and water.

b. The treaters and filter will be taken apart, cleaned thoroughly, and the equipment and inside surfaces allowed to dry.

c. All valves will be taken apart, decontaminated as in *a* above, repacked, greased, and reassembled.

d. All exterior surfaces will be protected with paint.

e. Operators will be properly protected with impermeable clothing, masks, and proper gloves. A first aid squad with a plentiful supply of BAL ointment should be on hand to take care of any emergencies.

Appendix B-VIII

Decontamination Procedure for Iron Tanks and Transfer Tanks

153. PROCEDURES. *a.* The tanks will be decontaminated, and cleaned, by washing with caustic and water until all sludge is removed and tank surfaces are clean.

b. The sump pump will be dismantled, decontaminated, repacked, greased, and reassembled.

c. All valves will be taken apart, decontaminated, repacked, greased, and reassembled.

d. The interior of the tanks will be protected with a light coating of SAE 60 or 70 viscosity.

e. The liquid level gauges will be decontaminated by caustic and water rinsing.

f. All exterior surfaces will be protected with paint.

Appendix B-IX

Decontamination Procedure for Still Condenser Refrigeration System

154. PROCEDURES. *a.* All excess ammonia will be pumped into cylinders or discarded.

b. All water will be drained from the condensers and compressor jackets and these blown dry with air.

c. The compressors will be given an overhauling and properly protected inside with grease.

d. All instruments and control valves will be cleaned. Overhauling is optional.

e. All exposed surfaces will be properly protected with paint.

Appendix B-X

Decontamination Procedure for Air Washers and Ventilation Ducts

155. PROCEDURES. *a.* All caustic will be drained to the sewer.

b. The air washers and all ventilation ducts will be thoroughly washed and dried.

as acetylene is liberated by the action of caustic on L. After the tanks have been cleaned of sludge, one tank is filled half full of 20 percent caustic. This is drained to the blowcase tanks, blown to the measuring tanks, and then run back to the storage tank. Similarly, caustic is pumped from this tank to measuring tanks, and then drained back to the same tank. After the L and sludge have been washed out of the lines and tanks, copious amounts of water should be used to wash out the caustic. All process piping carrying L is decontaminated by pumping water, then caustic through it, followed by water, and then air dried.

d. The pumps in the tanks, the caustic circulating pump, the two Nash Hytor vacuum pumps, and the Blackmer gear pump will be dismantled, decontaminated, protected with grease, and reassembled.

e. The vacuum lines, vent lines, and the L lines from the finished L transfer tanks will be decontaminated with caustic, washed clean with water, blown out, and air dried. Finished L lines will be blanked at the transfer tanks.

f. The Penberthy sight gauges will be drained, decontaminated with caustic, washed with water, and air dried.

g. The calcium chloride dryer will be drained, decontaminated with caustic, washed with water, and allowed to drain until dry.

h. The Chicksan joint assemblies are to be taken apart and soaked for 24 hours in kerosene. They are to be decontaminated with 10 percent caustic. After the decontamination, the joints are to be steamed, dried, and greased.

i. The caustic circulating tanks are to be emptied of caustic and washed thoroughly with water. The caustic scrubber is to be filled with fresh water and drained, until the wash water is free of caustic and clear in color. The bottom drain on the scrubber should be left open to permit complete draining the tower. The caustic feed line into the caustic tanks should be allowed to drain into the tanks, the line washed with water, and then blanked at the main caustic storage tank.

j. The Saran unloading connections should be removed and destroyed by burning. The filling and vent manifold lines will be decontaminated, washed with water, and air dried.

k. The cypress water tank of the interrupted water supply system will be left full of water. The water lines supplying this tank should be drained. If the wooden tank is allowed to dry out, the wood will shrink and extensive recoopering may be necessary before it can be disposed of.

l. Steam, air, and water lines will be shut off at the main, and these lines drained. Steam line to building should be blanked.

m. All plug cocks will be taken apart, decontaminated with caustic, washed clean with water, and greased. All other valves carrying L will be decontaminated, repacked, and greased.

n. All metal surfaces will be given a protective coating of paint to prevent corrosion.

Appendix B-XV

Procedures for Decontaminating A Charcoal and Whetlerizing Plant

160. PROCEDURES. *a.* The interiors of the buildings will be cleaned by the most convenient method, thereby washing all accumulated carbon dusts to the floors, which will be washed and neutralized and grounds "policed." All accumulated rubbish and scrap metal will be disposed of.

b. Adequate fire protection service will be maintained until equipment and buildings are dismantled or otherwise disposed of.

c. The silo will be completely emptied.

d. The following sawdust or crushed coal handling and processing equipment will be thoroughly cleaned, and resulting accumulations of materials carefully disposed of:

(1) All sawdust or coal conveyors.
(2) Magnetic separators.
(3) Primary sawdust mills.
(4) Secondary sawdust mills.
(5) Sawdust and crushed coal blowers, ducts, and storage bins.
(6) Sawdust conveyor feed pipes.
(7) Coal crushing and briquetting apparatus.

e. All mixers will be thoroughly cleaned, disconnecting steam supply, draining steam jacket, and blowing them out with air.

f. Zinc chloride melt tanks will be emptied, washed with weak hydrochloric acid, then water flushed.

g. Karbate tanks, solution lines, and pumps: this system will then be thoroughly water flushed and air blown—all flanged connections loosened and left to drain.

h. Ovens and auxiliary equipment: the ovens will be thoroughly cleaned inside, then run with heat for 24 to 48 hours to dry duct system thoroughly.

i. Hoppers and chutes will be thoroughly cleaned.

j. Leach drums: these drums, solution lines, and tanks will be flushed with water and emptied. Flanged connections will be opened to drain.

k. Classifiers: all decks will be thoroughly flushed.

l. Whetlerizing equipment: in general, this equipment will be

(3) R-1 pipe lines will be blown with air before disconnecting at the storage tanks, pumps, and weigh tanks. Workmen doing the disconnecting should wear rubber gloves, and an oxygen helmet should be on hand in case R-1 fumes are present. The R-1 lines should then be washed with water, steamed, and blown dry.

(4) Sulfuric acid pipe lines will be blown before being disconnected at the storage tanks, pumps and weigh tanks, thoroughly washed out with water, steamed, and blown dry. The wash water will be run to the acid sewer, and neutralized with lime in the sump.

(5) Lime slurry and caustic pipe lines will be disconnected at the pumps and storage tanks, washed out with water, and drained.

(6) Haveg filtrate and slurry lines shall be disconnected at the pumps and tanks thoroughly washed with water, steamed if necessary, and drained.

(7) All vent lines will be disconnected, steamed, and blown with air.

u. All valves and plug cocks will be cleaned with water, greased, and put back in place.

v. Refrigeration equipment: brine will be drained back to the brine receiver tank. Check for alkalinity. The refrigeration system will be pumped down until all refrigerant is in the receivers. If the receiver will be subjected to high pressure, a safety valve will be provided. Brine circulating pumps will be cleaned, repacked greased, reassembled and painted.

w. Empty outside storage tanks will be cleaned. R-5 tanks will be purged with air through the absorbers. S-1, R-1, and R-10 tanks will be thoroughly washed with water, steamed until clean, and dried. All other tanks containing chemicals will be emptied and cleaned after transferring the contents to containers for proper disposal. This includes pumps and lines pertaining to them or connected thereto.

x. Lime unloading and slaking equipment should be decontaminated as follows:

(1) The lime unloading equipment will be cleaned. The automatic scale and accessory equipment will be thoroughly cleaned and reassembled.

(2) Lime slaking equipment, slurry holding tanks, and slurry circulating pumps will be cleaned with water.

Note. Lime slurry equipment should not be cleaned until all other equipment has been cleaned out. Lime slurry is needed in the absorbers and sumps to neutralize R-5 and acidic waste accumulating from cleaning of equipment.

y. Water and caustic absorption towers will be thoroughly washed with water, drained, and dried by air.

z. Lime absorbers will be cleaned by washing with water and drained.

aa. Sumps, and sewers; lime slurry will remain in the sump until all acidic waste from the tanks and other equipment has been neutralized. Then sumps and sewers will be cleaned. Also motor agitators on sumps and sump pumps will be thoroughly cleaned.

ab. A great variety of equipment in the CC_2 plant contains piping, pumps, and other items made from duriron, aluminum, stainless steel, everdur, silver, glass lined pipe, and karbate pipe. When material is being prepared for disposal, all of these materials should be painted a different color or otherwise marked to designate them from the more ordinary metals and materials.

Appendix B-XVII

Decontamination Procedure for Phosgene Plant

162. PROCEDURE. *a.* Transfer all chlorine to tank cars or cylinders for disposal. Be certain all liquid phosgene has been removed from storage and loading tanks.

b. Pass air through the entire system until the air shows no traces of carbon monoxide or chlorine at the vents of the scrubbing tower.

c. Have men, wearing the proper masks, remove the catalyst from the tubes and place it in barrels, 30 to 50 pounds in each barrel and then drown it slowly with water from a hose. This will destroy the phosgene that will be held in the catalyst. Have operators wear their masks during the hosing operation and stay on upwind side of barrels.

d. Vent the chlorine vaporizers, purge them with air, wash out the ferric chloride sludge with hot water, and then dry inside of tanks.

e. Vent the phosgene storage tanks, purge them with air, wash out the sludge with hot water, and then dry inside of tanks.

f. Drain and neutralize the remaining sulfuric acid in acid scrubbing tower (if this equipment was used) with caustic, then thoroughly wash with water.

g. Thoroughly wash the caustic from the caustic scrubbing tower with water.

h. All valves in contact with chemical agents should be dismantled, and contaminated packings and lubricants replaced.

i. All pumps should be completely decontaminated and cleaned, lubricated, and then reassembled and stored for disposal.

j. Ammonia should be removed from the refrigeration unit and placed in approved containers.

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Shut down and decontamination procedures for Plum Brook Ordnance Works, Sandusky, Ohio

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7. Floor coverings in buildings that have contained explosive material should all be carefully removed when building is inspected for contamination. When buildings are found to be contaminated to such an extent that it cannot easily be removed, the building will be prominently placarded as being contaminated.

8. An accurate log shall be maintained of each building on the reservation giving a complete and accurate account of all decontamination and shut-down operations performed in and around the building and its equipment.

SHUT DOWN PROCEDURE

TNT AREAS

LINE OFFICES:

1. Drain and blow out all water and steam lines, steam traps, unit heaters, radiators, etc.
2. Drain thoroughly all plumbing fixtures and put in freeze-proof condition.
3. Return all miscellaneous equipment, supplies, etc. to Stores.
4. Turn over all recording units to Gauge and Instrument Department for stand by service.
5. Clean out all lockers.
6. Clean buildings and grounds.

CHANGE HOUSES:

1. Drain and blow out all water and steam lines, including hot water tanks, unit heaters, drinking fountains, etc.
2. Drain thoroughly all plumbing fixtures and put in freeze-proof condition.
3. Return all miscellaneous equipment, janitor supplies, etc. to Stores.
4. Clean out all lockers.
5. Clean building and grounds.

CONTROL LABORATORIES:

1. Disconnect and drain all water and steam lines, steam traps, unit heaters, radiators, etc.
2. Drain thoroughly all plumbing fixtures and put in freeze-proof condition.
3. Return all supplies, lab equipment, etc. to Stores.
4. Properly dispose of all samples.
5. Clear buildings and grounds.

AREA MAINTENANCE SHOPS:

1. Drain and blow all steam and water lines and leave in freeze-proof condition.
2. Remove all miscellaneous tools, equipment and fittings to general warehouse for credit.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
TNT AREAS

LINE FLUSH

Before each individual house procedure, a general flushing is to be given mono, bi and tri houses, as explained below.

Fill tri house nitrators with cold water and agitate for fifteen minutes; drop to drowning tub; fill bi-nitrator with water, send to pump tank and send to mono house scale tank into nitrator, again agitating for fifteen minutes, and then drop to drowning tub. Fill mono nitrator with water and heat to approximately 170° F. Agitate several minutes. By use of the top separator send flush to mono oil scale tank and to bi-fortifier house. Remove orifice in mono oil line and agitate several minutes, then drop to drowning tub. Flush mono waste line to recovery. Fill bi-fortifier nitrator with water and heat to approximately 170° F. Agitate several minutes and by use of top separator siphon to blow case. Blow to tri house bi-oil scale tank and drop to both nitrators, removing orifice in bi-oil line. Agitate several minutes and drop to drowning tub.

Repeat the above procedure, using a 7-10% soda ash solution.

MONO HOUSE

13. All pipe and fittings which cannot be visually inspected are to be flashed.

14. Turn over all motors to the Electrical Department.

15. Scale working parts, gauge and finished surfaces are to be properly cleaned and greased by the Scale, Gauge and Instrument Department.

16. Grease properly all drive equipment. Spray with oil all removed flanges and bolts.

17. Disconnect, grease and put in stand by condition Troy Steam engine.

18. Drain, properly clean and blow out all water, steam and air lines, including water manifold jackets, drinking fountain, unit heaters, etc.

19. Break flange on master intake water valve and pump water out to below frost level.

20. Return hydrometers, thermometers, rubber hose, etc., to Stores for credit.

21. Lift, remove and flash all lead flooring.

22. Remove material from wooden drowning tub to burning ground, dismantle and burn tub.

23. Give grounds and building a general cleaning.

BI-FORTIFIER HOUSE

7. Dismantle, steam, grease, reassemble and tag all valves on acid or contaminated lines and leave in operating house. Include stainless steel valves and check valves in discarded blow shed. Mono- and bi-oil valves are to be flashed. Show on tag all work which has been done.

8. Have all pumps dismantled, cleaned, greased, reassembled and tagged by the Pump Department. Have mono-mix pump flashed.

9. Store AOP pump motor and mix pump tank motor inside building and turn over all motors to the Electrical Department for stand by service.

10. Clean and flash all enclosed sight glasses.

11. Scale working parts, gauges and finished surfaces are to be properly cleaned and greased by the Scale, Gauge and Instrument Department. Include gauges located in old blow shanty.

12. Grease properly all drive equipment and spray with oil all removed flanges and bolts. Barco joints and stainless steel pipe and fittings should also be serviced.

13. Return hydrometers, thermometers, rubber hose, flash lights, lanterns, etc. to Stores for credit.

14. Remove contaminated putty, packing and insulation to burning ground.

15. Drain, properly clean and blow out all water and steam lines, including nitrator water manifold jackets, drinking fountain, showers, unit heaters, etc.

16. Break flange on master intake water valve and pump water out to below frost level.

17. Clean nitrator and pump tank buildings, giving pits special attention.

18. Paint where needed to prevent rust and corrosion.

19. Remove material from wooden drowning tub to burning ground, dismantle and burn tub.

7. Dismantle, steam, grease, reassemble and tag all valves on acid or contaminated lines and leave in operating house. Show on tag all work which has been done. Have bi-oil and tri-oil valves flashed.

8. Dismantle, clean and have flashed oleum and semi-mix acid pumps. Turn over all pumps to the Pump Department.

9. Have flashed all pipes and fittings which cannot be visually inspected.

10. Store oleum and mix-acid pump motors inside building and turn over all motors to the Electrical Department.

11. Scale working parts, gauges and finished surfaces are to be properly cleaned and greased by the Scale, Gauge and Instrument Department.

12. Grease properly all drive equipment and spray with oil all removed flanges, bolts, etc.

13. Disconnect Troy steam engines, grease and put in stand by condition.

14. Remove all putty, packing and insulation which has been contaminated with nitro-body and send to burning ground.

15. Drain, properly clean and blow out all water and steam lines, including drinking fountain, unit heaters, hot water flushing tank, nitric water manifold jackets, steam traps, oleum storage heating coils, bi-oil scale tank heating coils, etc.

16. Break flange on master intake water valve and pump water out to below frost level.

17. Lift and remove lead flooring and have flashed.

18. Clean and have flashed all open and closed sight boxes.

19. Paint where needed to prevent rust and corrosion.

20. Remove material from wooden drowning tub to burning ground, dismantle and burn tub.

21. Return flash lights and lanterns to Stores for credit.

22. Give building and grounds a general cleaning.

23. Oleum & Mixed Acid Storage: Flush tanks thoroughly with water and drain, then fill with a 10% soda ash solution and agitate for some time. Drain and flush thoroughly, leaving bottom flanges in a cracked position. If thorough draining is not effected, quite often sulfates will build up around open flange drain line, creating a reservoir. In the cleaning of tanks, thorough flushing cannot be over emphasized.

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WASH HOUSE

11. Remove flaker, melt and drier tank covers, steam and have flashed.

12. Thoroughly clean and grease flaker drum, flaker bearings and vibrox unit.

13. Properly clean and grease all drive equipment and spray all removed flanges and bolts with oil.

14. Thoroughly steam and boil all exhaust stacks, vents for wash and filter tanks, etc., and have flashed.

15. Lift and remove all lead flooring and have flashed.

16. Thoroughly clean elevator pit. Clean and properly lubricate working parts of elevator and leave locked out in lowest position.

17. Clean enclosed separation sight box and have flashed.

18. Flush and drain main sellite and sellite measuring tank. Also flush and drain sellite unloading line, line from storage to intermediate tank, overflow line from intermediate back to storage and line from measuring tank to wash tank.

19. Store all motors inside building and turn over to Pump Department.

20. Scale, Gauge and Instrument Department will properly clean and grease scale working parts, gauges, tagometers and finished surfaces.

21. Drain, properly clean and blow out all steam and water lines, jackets, heater coils, unit heaters, drinking fountain, heater coils on inside intermediate tank, etc., including water lines to elevator shaft and heater coils on outside sellite storage tank.

22. Remove and burn inside catch boxes.

23. Remove material from outside catch boxes,dismantle and burn. Also burn buggies..

24. Steam thoroughly and dismantle entire dust collecting system, loading system, TNT loading system, hopper, flaker, etc., and have flashed.

25. Return hydrometers, thermometers, rubber hose, rubber boots and clothing, flashlights, lanterns, tools, stamping equipment, etc., to Stores for credit.

26. Tag buildings showing TNT between walls.

27. Break flange on master intake water valve and pump water out to below frost level.

28. Paint where needed to prevent rust and corrosion.

29. Give building and grounds a general cleaning.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
RECOVERY

1. Drain acid from absorption and denitration systems to the lowest possible level before starting procedure.

2. Remove manhole covers and break bottom flanges on waste acid and residual storage tanks and drain. Flush each tank with cold water for several hours by the use of air agitation and drain to sewer.

DENITRATION SYSTEM:

3. Disconnect the following lines in order to permit flushing: tower residual lines to lead cooling tubs; return waste acid line to storage; bleacher bi-pass line. Drain all three to sewer. Flush oil separator, rotameter, preheaters and tower by feeding cold water into priming cup of waste acid pump several hours. Fill waste acid storage tank with water, add enough soda ash to make approximately a 7 - 10% solution and run through system. Use air agitation and extend flushing time over several hours. Also neutralize and flush residual tank. Bring preheaters and tower up to operating temperature, using approximately 2 g.p.m. water flow, and boil for several hours.

4. Inspect waste acid and residual storage tanks and if not clean scrape and reflush.

5. Disconnect rotameters, oil separator and preheater bottom flanges, steam and blow out with air.

6. Steam and blow all interconnecting lines from waste acid tank to tower.

7. Remove putty, packing and insulation from denitrating tower, preheaters, bleacher pot and S-bends and send to burning ground.

8. Steam interconnecting duriron and ceramic fume lines and S-bend condensors to remove as much acid as possible.

ABSORPTION SYSTEM:

9. Disconnect pyrex line to nitric storage tank on acid side and run approximately a 3 to 4 g.p.m. water flow through ceramic tower absorption system for several hours, flushing towers, pulsometers, acid cooling pots, N. A. storage pot, pyrex lines, etc.

10. Remove all tower ceramic crossovers and pressure flush each tower separately. Steam all tower sections and crossovers inside and out.

11. Proceed with fume side in a similar manner.

12. Drain both systems thoroughly and blow out pulsometer pots, equalizer pots, pyrex lines, etc.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
DNT NITRATING HOUSE

1. Reduce storage to the lowest possible level.

2. Give the following lines, tanks, nitrators, etc., a quick water flush, followed by a neutralizing flush; then thoroughly drain. Flush in the order mentioned:

   (a) Fill nitrator, drop to fortifier, and then to outside dry well.

   (b) Fill nitrator, drop to cycle acid tank through both cycling line and sight box separation line. Pump part of flush back to nitrator by the use of the cycle acid pump, crack flange between pump and cycle acid tank and drain to sewer. Thoroughly drain tank and blow out pig.

   (c) Fill nitrator, send part of flush to drowning tub, part to wash tank and the remainder to recovery.

   (d) Fill fortifier, pump to mixed acid tank and drop through line to outside storage. Break line between pump and tank and drain.

   (e) Send a portion of flush from mixed acid scale tank through feed line to nitrator.

   (f) Thoroughly flush, neutralize and drain mixed acid storage tank. Use air agitation to facilitate flushing.

   (g) Fill nitric acid storage and pump to scale tank, drop to fortifier and then to dry well.

3. Steam and blow out toluene scale tank, toluene transfer line from intermediate storage and feed line to nitrator.

4. Flush soda ash measuring tank and drop to wash tank.

5. Thoroughly flush wash tank with hot water supplied by hot water storage tank, dropping a portion through plug valve line to catch box and balance through sight box to blow case. Blow through line to sweat and grain, which is to be disconnected outside of crude storage tank. Flush separation line from wash tank to catch box.

6. Remove top manhole covers on mixed acid scale, cycle acid, mixed acid storage, nitric acid storage and crude DNT blow case. Inspect and if not clean, re-neutralize. Flush with air agitation and thoroughly drain by leaving bottom flanges in cracked position. Blow out.

7. Break all acid lines and pipes contaminated with organic material. Thoroughly steam, flush and blow out. When necessary, dismantle for cleaning.

DNT NITRATING HOUSE

18. Break flange on master intake water line valve and pump out to below frost level.

19. Lift, remove and flash lead flooring.

20. Return hydrometers, thermometers, tools, lanterns, etc., to Stores for credit.

21. Remove contaminated putty, packing and insulation, and send to burning ground.

22. Remove material from wooden drowning tub and catch boxes to burning ground, dismantle and burn tub and boxes.

23. Paint where needed to prevent rust and corrosion.

24. Clean building and grounds.

SWEAT AND GRAIN HOUSE

15. Return hydrometers, thermometers, tools, lanterns, etc. to Stores for credit.

16. Paint where needed to prevent rust and corrosion.

17. Clean building and grounds.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
SELLITE PLANT NO. 315

1. Drain all lines and tanks as free of acid and solution as possible.

2. Remove all raw material from building (sodium sulfite, soda ash, sulphur, etc.)

3. Clean out sulphur and soda ash pits and bins, elevators, storage and weigh hoppers and conveyors.

4. Scrape and clean insides of sulphur burners and thoroughly flush with hot water.

5. Inspect combustion chambers and clean if needed.

6. Open SO_2 gas cooling systems at flanges and thoroughly flush cooling coils with hot water. Drain and blow out.

7. Thoroughly flush and neutralize sulphuric acid scrubbing towers by breaking the inverted U-bend flanges between absorption tower and acid scrubbing tower. Inspect and drain thoroughly.

8. Properly flush, clean and drain cooler heads.

9. Thoroughly flush absorption towers with hot water.

10. Thoroughly flush with hot water distributors, return tubs, acid circular cooler lines and coils, sellite circular cooler lines and coils, lead pipe coils, all lead lines, etc. Completely drain.

11. Flush gas lines between towers with hot water.

12. Thoroughly flush all mixing tanks, storage tanks, process lines and transfer lines with hot water, removing all sludge. Completely drain.

13. Dismantle and steam fume exhaust lines from absorption towers and acid scrubbing tower stack, including exhauster unit.

14. Drain, properly clean and blow all steam and water lines, cooling coils, drinking fountains, unit heaters, showers, etc. Drain hot water tank. Leave all plumbing in freeze-proof condition.

15. Have all pumps serviced and tagged by the Pump Department.

16. Turn over all motors to the Electrical Department.

17. Have all lead valves on process lines dismantled, cleaned, greased, reassembled, tagged and stored or left close to place of installation.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
WASTE WATER DISPOSAL PLANTS NOS. 208, 508 & 901
AND
INCINERATOR BUILDINGS NOS. 209, 509 and 902

1. Evaporate waste water as low as possible from all wooden surge tanks (raw storage tanks), equalization tanks (settling tanks) and all storage tanks.

2. Incinerate all storage thick liquor to the lowest possible level.

3. Flush all lines with hot condensate through preheater feed pumps to all preheaters, deareators, feed tanks, long and short tube evaporators, lines running to thick liquor tanks, lines running to thick liquor tank pumps, lines running to constant level thick liquor feed tanks and feed lines to weir boxes of all incinerators. Drain thoroughly and if necessary for cleaning, dismantle.

4. Remove manhole covers from evaporators and inspect tubes. If tubes are in bad shape, a forty-eight hour boiling period is suggested. Boiling has been found to be much more effective than drilling.

5. Fill constant level thick liquor feed tanks with hot condensate, agitate to clean solids from agitators and float valves and drain completely into kiln.

6. Break flanges at pumps on all preheater feed tanks (two in each plant), flush and drain all lines thoroughly.

7. Drain all preheaters and all vapor line valves and leave in cracked position. This is mandatory.

8. Burn all liquor in kiln to an ash before shutting off the gas flow into the furnace. Scrape as much ash and scaling as possible loose from the inner walls of the kiln and allow to work down into the conveyor system. Then thoroughly flush kilns with hot condensate. Use condensate water to wash ashes into drainage pit. same?

9. Drain and blow all sump pits, steam traps (leave plugs out), vapor legs, drip lines, unit heaters, etc.

10. Turn over all flow meters, thermostatic valves, solenoid valves, PH machines, etc., to the Gauge and Instrument Department. All batteries must be removed from instruments on panel boards.

11. Turn over all electrical equipment to the Electrical Department.

12. With the exception of removing vent plugs and draining, have all pumps serviced and tagged by the Pump Department.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
AMMONIA STORAGE PLANTS NOS. 301, 701, 801 AND 801-A

1. Turn off water at main intake valve inside refrigeration houses and when water is off in Area break flange and drain to below frost level. Blow out ammonia compressor lines in refrigeration houses, including inlet and outlet cooling water lines to both upper and lower compressor water jackets of all ammonia compressors. Also drain and blow inlet and outlet water lines to reflux colum lines at the low pressure plant No. 801 and 801-A. Turn off main line steam header valves. Drain and blow out thoroughly main steam header inlet and outlet lines to bayonet heaters in high pressure tanks, all radiator units, unit heaters, steam tracer lines on oil filters, and inlet and outlet lines to ammonia vaporizer or condensate tank ahead of compressors.

2. After all ammonia and ammonia gas has been reduced to the lowest level by pumping out to tank cars, vent high pressure tanks to the air and remove manhole covers from tanks for ventilation. Leave all line valves open.

3. After all high pressure tanks have been vented and lines are free of ammonia, turn over gauges, mercoid switches, solenoid valves, etc. to the Instrument and Gauge Department.

4. Hortonsphere and Compressor Plant No. 801 and 801-A: After hortonsphere has been emptied to the lowest possible level, remove manhole cover from top of sphere and 3" ring joint flange from bottom and flush thoroughly with fire hose for sometime. Drain ammonia compressors as previously outlined. Drain ammonia pump, all lines to and from vaporizer, reflux ammonia columns in both condensers, other connecting lines, and blow out. Drain all oil traps on ammonia compressors and blow out.

5. Dismantle, clean, grease and reassemble ammonia pump and compressors, putting them in stand by condition. Spray with oil all removed flanges and bolts.

6. Turn over all motors to the Electrical Department.

7. Have valves cleaned, greased and tagged by the Valve Department.

8. Paint badly corroded lines, etc.

9. Clean buildings and grounds.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
AMMONIA OXIDATION PLANTS
NOS. 302, 702 and 802

No. 302 - Five (5) Recovery Compressor Units
No. 702 - Four (4) Recovery Compressor Units
No. 802 - Four (4) Recovery Compressor Units

1. Flush out and drain:
   (a) Water jackets on compressor cylinders.
   (b) Water jackets on power cylinders.
   (c) Intercoolers, and
   (d) Aftercoolers - to prevent freezing.

2. Drain and blow out condensate water traps on intercoolers and aftercoolers, to prevent freezing and corrosion.

3. Remove piston-rod packing and oil wiper rings from compressor and power end piston-rods to insure no corrosion to rings or piston rods. Pack rings in grease.

4. Remove lay-shaft gear housing and use sludge oil on lay-shaft gears and crank shafts.

5. Use sludge oil on crank shafts, crosshead shoes and guides, and piston rods to power and compressor ends, and crosshead tie rods, to prevent corrosion.

6. Disassemble main bearings, crank and crosshead bearings, and use sludge oil on these parts.

7. Use sludge oil on lay-shafts, lay-shaft bearings, oil drive gears and chains, lay-shaft eccentrics and eccentric straps.

8. Use sludge oil on power cylinder intake and exhaust valve rocker arms, rollers, valve guides and valve stems.

9. Remove power intake and exhaust valve stem packing and sludge with oil.

10. Use sludge oil through intakes on power and compressor cylinders to sludge valves, pistons and cylinder walls.

11. Seal outside intakes on compressors to guard against moisture and elements.

AMMONIA OXIDATION PLANTS

All steam tracer lines.
Steam header and tracer lines on all ammonia and condensate lines on each unit.
Inlet and outlet lines to radiators, unit heaters, etc. This is also to be done in buildings Nos. 310, 710 and 810 (mix acid offices and pump houses).

6. Drain all gasifiers and blow by removing rupture discs. Also drain and blow ammonia lines to all units.

7. Turn over all gauges, rotameters, micromax units, truck scales #805, etc., to the Gauge, Scale and Instrument Department for removal and storage.

8. Store motors inside and turn over to the Electrical Department for service.

9. Have pumps serviced and tagged by the Pump Department.

10. Have all acid valves torn down, cleaned, greased, tagged and either stored or left close to place of installation.

11. Return all hydrometers, thermometers, tools and other supplies to proper source for credit.

12. Remove platinum gauzes to reliable storage.

13. Paint where necessary to prevent rust and corrosion.

14. Clean buildings and grounds.

NITRIC ACID CONCENTRATOR BUILDINGS

6. Turn off steam at main header valve, drain and blow all steam and steam condensate lines, traps, steam jacket tubes in preheaters and boilers, ejector steam line to fume absorption tower, unit heaters, etc.

7. Turn over all gauges rotameters, micromax units, etc. to the Gauge and Instrument Department for removal and storage.

8. Store all motors inside and turn over to the Electrical Department.

9. Have pumps serviced and tagged by the Pump Department.

10. Have all acid valves serviced and tagged by the Valve Department.

11. Return all hydrometers, thermometers and other supplies to the proper source for credit.

12. Remove all contaminated insulation and packing and send to burning ground.

13. Paint where needed to prevent rust and corrosion.

14. Clean building and grounds.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
CON-MIX, TNT AND DNT MIXED ACID DIVISIONS

1. Thoroughly flush, first with water, then with soda ash solution, upright high chrome weak nitric storage tanks, scale tanks and NAC weak and strong nitric storage tanks in each semi-mixed acid division. Also flush and blow out the stainless steel lines interconnecting these units. If necessary for thorough flushing, dismantle long lines. Open dump valves and remove manhole covers on all tanks and after flushing is completed, replace.

2. Have all valves on process lines serviced, tagged and placed loosely in position or close to place of installation.

3. Turn scale tank scales over to Scale Maintenance for stand by service.

4. Thoroughly flush with water, scrape and remove sulfate deposits and follow by flushing with soda ash solution all con-mix, TNT mix and DNT mix horizontal circulating tanks, all TNT mix, DNT mix horizontal storage tanks, and all con-mix and sulfuric circular storage tanks. Replace manhole covers after flushing is completed. Disconnect, thoroughly neutralize, flush and blow out all transfer lines carrying acid to, between and from these units. Disconnect the following lines (if necessary, dismantle), neutralize, flush and blow out:

   SS lines connecting NAC weak nitric high chrome storage tank with AOP weak nitric upright storage tank.

   Lead lines from NAC residual cooling vats to SAC and return pipe lines from SAC to strong sulfuric storages for con-mix.

5. TANK FARMS: Fill and thoroughly flush for several hours by use of fire hose each circular storage tank. Neutralize and re-flush. Level each tank into the other to flush and neutralize interconnecting lines. Drain tanks and blow out lines, including feed lines to docks and pump shed. Tanks are to be inspected and if necessary, scraped and re-flushed.

6. Turn off water at all cooling towers, drain and blow out lines. Drain, flush, neutralize and blow out all acid lines to and from these towers, as well as all lines to and from loading and unloading docks.

7. Store motors inside and turn over to Electrical Department.

8. Have pumps serviced and tagged by the Pump Department.

9. Blow out steam lines in oleum unloading pump house.

10. Paint where needed to prevent rust and corrosion.

11. Clean building and grounds.

STAND BY AND STORAGE PROCEDURE FOR BOOSTER PUMPING STATIONS
NOS. 203 AND 503

1. Permanently close intake valves, disconnect lines to venturi meters and small control lines to surge relief mechanisms, sinks, drain, etc., and drain and blow thoroughly.

2. Thoroughly drain all discharge and suction lines.

3. Remove all vent plugs and drain all water pumps, including vacuum priming pumps, and steam, electric and gasoline driven units. Have Pump Department pull packing, fill packing glands with grease and push an excess of grease through fittings around bearings.

4. Thoroughly clean strainers on process pump lines and lubricate fittings.

5. Drain auxiliary gasoline engine water cooling systems.

6. Drain, properly clean and blow out all water and steam lines, unit heaters, hot water tank, etc.

7. Have all valves serviced by the Valve Department.

8. Remove tops of check valves and drain. Have flappers, seating edges, flanges and bolts greased and the unit reassembled.

9. Turn over all electric motors, storage batteries, D. C. switch equipment, etc., to the Electrical Department for stand by service.

10. Turn over all gauges and meters to the Gauge and Instrument Department.

11. The 24" steel pipe line and the 30" reinforced concrete pipe line connecting the Lakeside Pumping Stations Nos. 1 and 2 are to be drained back through their respective stations.

12. Drain all tanks and leave plumbing in freeze-proof condition.

13. Return all miscellaneous supplies and equipment to Stores for credit.

14. Paint where needed to prevent rust and corrosion.

15. Clean all buildings and grounds.

STAND BY AND STORAGE PROCEDURE
FOR
SEWAGE DISPOSAL PLANT NO. 14

1. The following lift stations are to be bi-passed and put in stand by and storage condition:

   Station No. 522 - Ransom Rd. (Acid #2).
   Sellite Station - Ransom Rd. (Acid #3).
   Pentolite Station (Behind Field Office #2022)
   Station in Area "A" (South of Bldg. #144). Not being used.
   Columbus Avenue Station (close to staff house #28).

2. Do the following work where it applies to the above:

   Thoroughly wash and scrub out wet wells.
   Turn over electrical equipment (heaters, motors, etc.) to the Electrical Department.
   Turn over pumps to the Pump Department.
   Turn over valves to the Valve Department.
   Paint to prevent rust and corrosion where needed.
   Clean all buildings.

3. If lift stations cast iron pipe lines to sewage disposal are to be salvaged, pressure flushing will be required. If this is done, they should be flushed in the order listed in Item No. 1. In other words, the longest line should be flushed first, as all 8" branches tie into a 15" main line.

4. Follow the procedure given below at the sewage disposal plant.

   (a) Pump House: Pump all sewage into primary digester. Clean wet well by scrubbing and the use of a pressure hose. Remove pumps from basement to first floor. Have flushed, cleaned, greased and tagged by the Pump Department.

   (b) Primary Settling Tank: Pump all sludge out into digester. Thoroughly flush settling tank and chlorine mixing chamber with water. Scrub and use pressure hose. To facilitate thorough flushing, remove riser tube from chlorine mixing chamber.

   (c) Digester: Draw down all final sludge into bed and pump to nearby field for drying. Thoroughly flush digester and fill with water to displace gas. Digester now may be entered for thorough cleaning. This is done by scraping and the use of a pressure hose.

   (d) Thoroughly flush all interconnecting lines between pump house, primary settling tank, chlorine mixing tank and digester.

SHUTDOWN AND STORAGE PROCEDURE
FOR
STORES AND PROPERTY DEPARTMENTS

It shall be the responsibility of this department to have representatives go into every building on the reservation for the purpose of returning to Stores all equipment and supplies normally issued through this department which have not been permanently affixed either to the building or to process machinery, and to take an inventory of all materials stored in various buildings such as fiberboard boxes, pipe, etc. All material possible shall be returned and checked into General Stores. Materials to be returned to Stores will be all protective clothing, rubber boots, rubber coats, gas masks, sanitary supplies, etc. Materials not to be returned will be valves which are affixed to piping, etc.

SHUTDOWN AND STORAGE PROCEDURE
FOR
ELECTRICAL DEPARTMENT

4. Insulation test will be made on each starter and if test indicates considerable amount of moisture in the oil, it shall be drained and refilled.

5. All air brake starters will be cleaned and inspected.

6. After completion of storage work, all starters will be tagged with official tag carrying all necessary information.

TRANSFORMERS:

1. The primary fuses on all transformers will be opened.

2. The secondary circuit of all transformers will be disconnected at the transformer.

3. All transformers will be left in place, filled with oil.

4. An insulation test will be made of every transformer, primary and secondary winding, and the results of this test will be placed on official tag and attached to each transformer.

PRIMARY DISTRIBUTION LINES:

1. The oil breakers on all distribution lines not required for storage work or other use and will be opened and so tagged.

2. Primary lines will be grounded at the sub-station end.

3. Since it will be necessary to maintain electric service in the administration area, and in some parts of the manufacturing areas, some primary distribution circuits will be kept in service but all branches from these circuits not required will be disconnected.

SHUTDOWN AND STORAGE PROCEDURE
FOR
COMBINED SHOPS

All machine tools shall be carefully cleaned and painted where necessary, and the surface protected by light grease. All chucks, heads and tools shall be attached to machine and all extra accessories shall be labeled and placed with respective machines. All equipment shall be placed under cover and materials checked back into Stores. Portable welding outfits shall be thoroughly cleaned, serviced, and painted. All gas and air tanks shall be placed in storage sheds provided for that purpose. All other machine shop equipment such as hoists, trucks, etc., shall be cleaned and serviced. Carpenter tools, saws, and other equipment shall be thoroughly cleaned and painted where necessary. All saw and planer blades shall be removed and returned to Stores. Entire building shall be cleaned.

All paint and supplies shall be removed from paint shop and placed in paint storage shed. Paint storage shed shall be placed in orderly arrangement.

All materials including tools and parts in the tool shop shall be checked back into Stores.

All pipe shall be removed from pipe shop to proper racks and racks placed in order. All pipe fittings shall be returned to Stores.

All repaired valves and unused valve parts from valve repair shop shall be returned to Stores.

SHUTDOWN AND STORAGE PROCEDURE
FOR
GAUGE AND INSTRUMENT DEPARTMENT

It shall be the responsibility of the Gauge and Instrument Department to properly clean, service and paint, where necessary, all gauges and instruments on the reservation. All outside gauges and instruments shall be properly protected. All electrically operated gauges and instruments shall be disconnected from circuit. All gauges and instruments, detached, shall be properly tagged, giving the type of gauge and original location.

The above directions apply to all scales as well.

SHUTDOWN PROCEDURE
FOR
PENTOLITE AREA

LINE OFFICE:

1. Drain and blow out all water and steam lines, steam traps, unit heaters, radiators, etc.

2. Drain thoroughly all plumbing fixtures and put in freeze-proof condition.

3. Return all miscellaneous equipment, supplies, etc., to Stores.

4. Clean building and grounds.

CHANGE HOUSE AND COMFORT STATIONS:

1. Drain and blow out all water and steam lines including hot water tanks, unit heaters, drinking fountains, etc.

2. Drain thoroughly all plumbing fixtures and put in freeze-proof condition.

3. Return all miscellaneous equipment, janitor supplies, etc., to Stores.

4. Clean building and grounds.

CONTROL LABORATORY:

1. Disconnect and drain all water and steam lines, steam traps, unit heaters, radiators, etc.

2. Drain thoroughly all plumbing fixtures and put in freeze-proof condition.

3. Return all supplies, laboratory equipment, etc., to Stores.

4. Properly dispose of all samples (acetone, acid, PETN and Pentolite).

5. Clean out all lockers.

6. Tag parts of building likely to be contaminated with explosive material.

7. Clean building and grounds.

AREA MAINTENANCE SHOP:

1. Drain and blow out all steam and water lines and leave in freeze-proof condition.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
PENTOLITE AREA ACID STORAGE

1. Remove all acid possible from lines and storages.

2. Disconnect, flush and dismantle truck lines at strong and weak acid storages. Tear down Barco joints, clean, grease and remove pack gaskets.

3. Thoroughly flush strong nitric storage with water, using air agitation, and drain. Fill with water and pump approximately half of solution into each nitrator. Drop to each drowning tank, each vacuum crock filter, pump to spent acid storage and drain. Repeat the above procedure using soda ash solution. Drain and blow out all tanks and lines. Inspect spent acid storage and filter and if further cleaning is necessary, scrub with a warm acetone solution. Leave tank covers in cracked position. Dismantle spent acid transfer line from crock filter in nitrating house to storage and thoroughly clean with acetone. Dismantle all contaminated lines while completely filled with water.

4. Drain all pumps and have them serviced by the Pump Department.

5. Turn over all motors to the Electrical Department.

6. Have all valves serviced and tagged, particularly stainless steel. Exercise extreme care in dismantling contaminated valves.

7. Drain and blow out all water lines.

8. Return supplies to Stores.

9. Remove all contaminated insulation and water-proof lagging to burning ground.

10. Paint where needed to prevent rust and corrosion.

11. Turn off water at frost box.

12. Give building a general cleaning.

13. All valves and equipment that have contained explosives material that cannot be thoroughly visually inspected shall be flashed.

PENTOLITE AREA NITRATING HOUSE

9. Drain, properly clean and blow out all water and steam lines and units: heating system coils, water jackets, etc.

10. Turn off intake water valve at frost box.

11. Return hydrometers, thermometers, flashlights, tools, etc., to Stores for credit.

12. Lift, remove and have flashed all lead flooring.

13. Properly clean and grease all drive equipment and spray with oil or grease all removed flanges and bolts.

14. Thoroughly clean elevator pit, clean and properly lubricate working parts of elevator and leave locked out in lowest position.

15. Scale, Gauge and Instrument Department will properly clean and grease scale working parts, gauges and finished surfaces.

16. Paint where needed to prevent rust and corrosion.

17. Give building and equipment a general cleaning.

18. Remove material from wooden waste water and vacuum filter tubs to burning ground. Dismantle and burn tubs.

19. All valves and equipment that have contained explosive material that cannot be thoroughly visually inspected shall be flashed.

PENTOLITE NEUTRALIZING HOUSE

12. Vent CO_2 supply lines from inert gas storage receiver tank to dissolver and precipitation tanks and from receiver tank to inert gas storage supply tank.

13. Remove material from wooden waste and vacuum filter tubs to burning ground. Dismantle and burn tubs.

14. Turn off water at frost box outside building.

15. Paint where needed to prevent rust and corrosion.

16. Give building and equipment a general cleaning.

17. All valves and equipment that have contained explosives material that cannot be thoroughly visually inspected shall be flashed.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
DRYERS

1. Remove all dryer trays, tote boxes, cannisters, loading and unloading equipment, brushes, brooms, dust pans, mops, buckets, waste cans, etc., to a designated location.

2. Turn over all mercoid switches, level gauges, air gauges, heat recorders, etc., to the Gauge and Instrument Department.

3. Drain, properly clean and blow out all steam lines, traps and heating system coils.

4. Turn over all motors to the Electrical Department.

5. Have valves serviced and tagged by the Valve Department.

6. Turn water off at frost box and put lavatory and all plumbing in freeze-proof condition.

7. Return rubber hose, tools and other miscellaneous equipment to Stores for credit.

8. Have air compressor equipment put in stand by condition.

9. Remove air filter racks and burn filter.

10. Clean building and grounds.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
PENTOLITE PACK HOUSE

1. Remove all samples and loose Pentolite.

2. Steam clean nailing machine.

3. Clean conveyor.

4. Turn over pack house heating equipment to the proper source for stand by service.

5. Return miscellaneous supplies, tools, equipment, etc., to Stores for credit.

6. Tag building as being contaminated,with explosive material.

7. Clean building and grounds.

GENERAL: Make inspection of grounds around all process buildings and where contaminated fill is found, ground is to be removed to at least a depth of six inches and sent to burning ground.

STAND BY AND STORAGE PROCEDURE
FOR
REFRIGERATION HOUSE

1. Vent all ammonia and ammonia gas to the atmosphere through exhaust line leading outside building.

2. Drain, properly clean and blow out all water lines:

   Inlet and outlet water cooling lines to both upper and lower water jackets of ammonia compressor.
   Cold water tank and coils.
   Cold water suction and discharge lines.
   Supply lines to Pentolite Neutralizing and Nitrating Houses.
   Drinking fountain, etc.

   Spray cold water tank coils with a light oil.

3. Drain and blow out all steam lines, steam traps, and heaters.

4. Turn over all pumps to the Pump Department.

5. Turn over all motors to the Electrical Department.

6. Have all valves serviced and tagged by the Valve Department.

7. Turn over temperature control units, water gauges, etc., to the Gauge and Instrument Department.

8. Paint where needed to prevent rust and corrosion.

9. Give building a general cleaning.

STAND BY, STORAGE AND DECONTAMINATION PROCEDURE
FOR
PENTOLITE ACETONE RECOVERY AND STORAGE

1. Reduce all acetone storages to the lowest possible level.

2. Flush with water main spent acetone return line and all branch lines from process building pumps to spent acetone storage. Disconnect line at storage, install a reducer and introduce water through lines from process buildings. Dismantle sections while filled with water. Steam and clean with acetone. Dismantle in same manner all other lines carrying spent acetone.

3. Remove top and bottom flanges on spent acetone storages and flush vigorously with pressure hose for several hours and drain. Enter tanks, scrape and remove remaining deposits, thoroughly flush with hose. Leave top and bottom flanges in cracked position for ventilation. Flush thoroughly and dismantle if necessary spent acetone vent baffle lines from condensors. Insist that person or persons entering tanks wear gas masks.

4. Fill recovered acetone storage tanks with water, leave filled for several hours. Then remove top manhole cover and bottom flange connection. Flush thoroughly and drain. Leave openings in cracked position.

5. Flush with water, drain and blow out the following acetone transfer lines:

   Line from recovered storage to recovery building.
   Welded header line from recovered storage to process acetone pumps.
   Header drain line for process acetone pumps to ground collecting basin.
   Discharge recovered acetone lines to process buildings.
   Line from fresh acetone charge pumps to recovered storage.
   Lines from main storages to charge pump.
   Line from unloading pump to main storages.

   Other transfer acetone lines of considerable length shall be taken care of in the same manner.

6. Pump out acetone below standpipe level in main storages and completely fill tanks with water. Flush and drain after several hours standing. Leave top and bottom manhole covers in cracked position for ventilation.

7. Tear down Barco joints at unloading dock, remove pack gaskets, clean and grease.

8. Recovery Acetone Tower: Insert an auxiliary steam line into tower through spent feed opening and with the use of tower steam, boil and thoroughly flush with water for several hours and drain through float tank valve. Introduce water flow at top of tower. Individually flush with water the various plate levels by removing manhole covers. Also clean and drain

PENTOLITE HOUSE

12. Remove all contaminated insulation and water-proof lagging to burning ground.

13. Return all supplies to Stores.

14. Vent CO_2 supply lines from inert gas storage receiver tank to dissolver and precipitation tanks and from receiver tank to inert gas storage supply tank.

15. Remove material from wooden waste and stainless steel filter tub to burning ground. Dismantle and burn tub.

16. Turn off water at frost box outside building.

17. Paint where needed to prevent rust and corrosion.

18. Give building and equipment a general cleaning.

19. All valves and equipment that have contained explosives material that cannot be thoroughly visually inspected shall be flashed.

SULFURIC ACID CONCENTRATOR BUILDINGS

13. Disconnect, remove vent plugs and drain all pumps. Flush, drain and neutralize and blow out all connecting lines. Have Pump Department put in stand by condition.

14. Store electric motors inside and turn over to the Electrical Department for service. High tension voltage rooms will also be taken care of by the Electrical Department.

15. Turn over gauges, meters, solenoid valves, rotameters, etc. to the Gauge and Instrument Department for removal and storage. Have all batteries removed from instrument board panels at once.

16. Close main gas valves, together with each header valve and hand operated valve behind each solenoid at furnace inlet.

17. Drain, properly clean and blow out all water and steam lines.

18. Put all plumbing in freeze-proof condition.

19. Return hydrometers, thermometers, rubber hose, rubber boots, etc. to Stores.

20. Thoroughly flush for sometime, neutalize, re-flush and drain outside platform NAC and TNT residual storage tanks and all interconnecting lines, including main header line to docks.

21. Break flange on master intake water valve and pump water out to below frost level.

22. Paint where necessary to prevent rust and corrosion.

23. Clean building and grounds.

APPENDIX C. NPDES PERMIT FOR PLUM BROOK STATION

Ohio Environmental Protection Agency
Application for Modification of Ohio NPDES Permit

For Agency Use	
	2I0[illegible] Application Number
	04[illegible] Date Received
	90 04 25 Year Month Day

RECEIVED
APR 25 1990
OHIO EPA
N. W. D. O.

1. Number of permit for which modification is being requested 2I000002*CD

2. Name of organization responsible for facility NASA - Plum Brook Station

3. Address, location, and telephone number of facility producing discharge:

   A. Name NASA - Plum Brook Station

   B. Mailing Address:

      1. Street Address 6100 Columbus Avenue

      2. City Sandusky

      3. State Ohio 4. Zip Code 44870

   C. Location:

      1. Street 6100 Columbus Avenue

      2. City Sandusky 3. County Erie

   D. Telephone No. 419 (Area Code) 625-1123

4. Describe in detail the provision(s) of the permit the applicant wishes to modify.

   Request modification to the NPDES Permit to add Sampling Station #2I000002008 - Discharge from B-Control Treatment Plant.

5. Describe in detail the reason a modification is desired. (See Rule 3745-33-06 of the Ohio Administrative Code [formerly OEPA Regulation EP-31-06] for grounds for modification.)

   Modification is desired due to the reactivation of the existing building, B-Control, thereby requiring the reactivation of the existing wastewater treatment plant.

PAID
Amount $15.00 Date 4/25/90
Check # 16997 Date 4/20/90

6. Name of receiving water or waters Discharge leaches out prior to reaching any receiving

PBS002-03

OhioEPA
State of Ohio Environmental Protection Agency

. Box 1049, 1800 WaterMark Dr.
.olumbus, Ohio 43266-0149
(614) 644-3020
FAX (614) 644-2329

George V. Voinovich
Governor

March 7, 1990

Re: OEPA Permit No. 2I000002*DD
Facility Name: NASA, Plum Brook Station

NASA
Plum Brook Station
6100 Columbus Road
Sandusky, Ohio 45870

Transmitted herewith is one copy of the Public Notice and Proposed Modification to the above-referenced permit.

The public has been invited to submit comments regarding this proposed modification. If sufficient public interest is indicated, a public meeting will be held.

All written comments received during the 30-day period following the date of public notice and the public meeting record, if a public meeting is held, will be considered. This proposed modification will take effect on the date indicated unless an adjudication hearing is requested by you or by an aggrieved or adversely affected party.

If you wish to challenge this proposed action, you may request an adjudication hearing within thirty (30) days of the mailing of this proposed action, as provided by Section 3745.07 Ohio Revised Code. Since all other conditions of the permit remain in effect, a hearing may not be requested on any issues other than the proposed modification. If an adjudication hearing is requested, the existing NPDES permit will remain in effect until the hearing is resolved. At an adjudication hearing, you may appear in person or be represented by an attorney, or such other representative as is permitted to practice before this agency, or you may present your position, arguments, or contentions in writing. At an adjudication hearing, you may also present evidence and examine witnesses appearing for and against you. Requests for hearing shall specify the issues of fact and law to be contested. Any such request for hearing must be sent to the Hearing Clerk, Ohio EPA, at the same address shown above.

The Director may withdraw this proposed modification at any time before it takes effect. He may also issue a revised proposed modification.

If you have any questions, please contact the Ohio EPA District Office in your area.

Robert E. Phelps

Robert E. Phelps, P.E. Manager
Permit Administration Section
Division of Water Pollution Control

REP/mbn
Certified Mail

Printed on recycled paper

OHIO ENVIRONMENTAL PROTECTION AGENCY
MODIFICATION OF NATIONAL POLLUTANT DISCHARGE
ELIMINATION SYSTEM (NPDES) PERMIT

ISSUE DATE: March 7, 1991 EXISTING PERMIT NO: 2IOOOOO2*CD

EFFECTIVE DATE: April 16, 1991 APPLICATION NO: OHOOO1392

ENTITY NAME: NASA, Plum Brook Station

FACILITY LOCATION: 6100 Columbus Avenue, Sandusky, Ohio, Erie County

In accordance with Rule 3745-33-06 of the Ohio Administrative Code (formerly Ohio EPA Regulation EP-31-06), the above referenced NPDES permit is hereby modified as follows:

Page	Revision
M5, M6, M7 and M8	Changed note (1) referring to reporting when the plant is not staffed.
8a	Added new outfall 2IOOOOO2008 with table of final effluent limitations and monitoring requirements.
8b	Added new outfall 2IOOOOO2009 with table of final effluent limitations and monitoring requirements.
M9	Added sampling stations 2IOOOOO2008 and 2IOOOOO2009 and location descriptions to Part II, Item A.

Attached are the modified pages to the NPDES permit.

All terms and conditions of the existing permit not recommended for modification by this document will remain in effect. Any modified term or condition contained in this modification shall supersede, on the date this modification is effective, the existing respective term or condition of the permit.

When the modification is effective, the OEPA permit number will be changed to 2IOOOOO2*DD. The application number will remain OHOOO1392.

Gerry Ioannides
Director

4768P
Form EPA 4439

PART I, A. - FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from the following outfall: 2IO00002007. SEE PART II, OTHER REQUIREMENTS, for location of effluent sampling.

EFFLUENT CHARACTERISTIC			DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
			Concentration Other Units (Specify)		Loading kg/day			
REPORTING CODE	UNITS	PARAMETER	30 DAY	7 DAY	30 DAY	DAILY	Measurement Frequency	Sample Type
00083	UNITS	Color, Severity	-	-	-	-	Daily(1)	Observation
00300	MG/L	Dissolved Oxygen	5.0(min)	-	-	-	1/Month	Grab
00530	MG/L	Residue, Total Nonfilterable	12	18	-	-	1/Month	Grab
00610	MG/L	Nitrogen, Ammonia (NH_3)	-	-	-	-	1/Month	Grab
01330	UNITS	Odor, Severity	-	-	-	-	Daily(1)	Observation
01350	UNITS	Turbidity, Severity	-	-	-	-	Daily(1)	Observation
31616	#/100ML	Fecal Coliform (Summer Only)	1000	2000	-	-	1/Month	Grab
50050	MGD	Flow Rate(2)	-	-	-	-	Daily(1)	24 Hr. Total
50060	MG/L	Chlorine, Total Residual (Summer Only)	-	0.5(max)	-	-	Daily(1)	Grab
80082	MG/L	Biochemical Oxygen Demand, Carb.	10	15	-	-	1/Month	Grab

(1) Except days when plant is not normally staffed. Report "AN" on the monthly report form for those days.
(2) Estimated flow is acceptable if there is no flow meter.

2. The pH (Reporting Code 00400) shall not be less than 6.5 S.U. nor greater than 9.0 S.U. and shall be monitored 1/month by grab sample.

3. Samples taken in compliance with monitoring requirements specified above shall be taken at Sampling Stations described in Part II, OTHER REQUIREMENTS.

PBS002-05

Ohio Environmental Protection Agency
Application for Modification of Ohio NPDES Permit

For Agency Use	Application Number
	Date Received
	Year · Month Day

1. Number of permit for which modification is being requested 2I000002*CD

2. Name of organization responsible for facility NASA Plum Brook Station

3. Address, location, and telephone number of facility producing discharge:

   A. Name NASA Lewis Research Center, Plum Brook Station

   B. Mailing Address:

      1. Street Address 6100 Columbus Ave.

      2. City Sandusky

      3. State OH 4. Zip Code 44870

   C. Location:

      1. Street 6100 Columbus Ave.

      2. City Sandusky 3. County Erie

   D. Telephone No. 419 (Area Code) 621-3205

4. Describe in detail the provision(s) of the permit the applicant wishes to modify.

   Additional discharge of 100,000 gallons of accumulated raw water from excavated underground storage tank pit, to Ransom Brook (Outfall 2I00000202). The removed UST's contained gasoline and diesel fuel.

5. Describe in detail the reason a modification is desired. (See Rule 3745-33-06 of the Ohio Administrative Code [formerly OEPA Regulation EP-31-06] for grounds for modification.)

   This modification is requested for the following reasons:

   1.) To facilitate additional excavation of slightly contaminated soil, and backfill of the pit, as required by Ohio Fire Marshal (Bustr)

   2.) The alternative of pumping the water into tank trucks and hauling to the Sandusky WWTP appears not to be logistically possible, given a 9000 limit required by the Plant.

   3.) The levels of contaminants present in the water are very low and would not threaten human health or the environment if discharged (see enclosed analytical results).

6. Name of receiving water or waters Ransom Creek Brook

IENT: NASA PBS

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT

REPORT PREPARED BY

CONTRACT NO: ESI-7019-004

DATA RELEASED BY

REPORTING DATE: 31-Oct-89

****

CLIENT ID	PBS-7132
HEAI ID	6526-6528
PARAMETER:	
LEAD (ug/L)	<5.0
TPH (mg/L)	<1.0
FLASHPOINT (degrees F)	NO FLASH <200

5963

R.E. WARNER & ASSOCIATES

GEMINI TOWERS II • 2001 CROCKER ROAD
WESTLAKE, OHIO 44145 • TELEPHONE 216/835-9400

LORAIN NATIONAL BANK
LORAIN, OHIO
56-111/412

CHECK NO. 5963

* fifteen and 00/100 *

DATE 11/16/89

AMOUNT $ 15.00

PAY TO THE ORDER OF Treasurer of State of Ohio

AUTHORIZED SIGNATURE

Joseph D. O'Brien

⑈005963⑈ ⑆041201114⑆ 01105175⑈

OEPA Permit No. 2IOOOOO2*CD

Application No. OHOOO1392

Effective Date: December 22, 1988

Expiration Date: December 19, 1993

OHIO ENVIRONMENTAL PROTECTION AGENCY

AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et. seq. hereinafter referred to as "the Act"), and the Ohio Water Pollution Control Act (Ohio Revised Code Section 6111),

NASA
Plum Brook Station

is authorized by the Ohio Environmental Protection Agency, hereafter referred to as "Ohio EPA", to discharge from the wastewater treatment works located at 6100 Columbus Avenue, Sandusky, Ohio, Erie County

and discharging to Plum Brook, Ransom Brook and Kuebler Ditch

in accordance with the conditions specified in Parts I, II and III of this permit.

This permit is conditioned upon payment of applicable fees as required by Section 3745.11 of the Ohio Revised Code.

This permit and the authorization to discharge shall expire at midnight on the expiration date shown above. In order to receive authorization to discharge beyond the above date of expiration, the permittee shall submit such information and forms as are required by the Ohio EPA no later than 180 days prior to the above date of expiration.

Stephen A. Scoles
Acting Assistant Director

4768P

Form EPA 4428

PART I, A. - FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from the following outfall: 2I000002002. SEE PART II, OTHER REQUIREMENTS, for location of effluent sampling.

EFFLUENT CHARACTERISTIC			DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS*	
			Concentration Other Units (Specify)		Loading kg/day			
REPORTING CODE/UNITS		PARAMETER	30 DAY	DAILY	30 DAY	DAILY	Measurement Frequency	Sample Type
00335	MG/L	Chemical Oxygen Demand	40	60	-	-	1/Week	24 Hr. Comp.
00530	MG/L	Residue, Total Nonfilterable	30	45	-	-	1/Week	24 Hr. Comp.
00550	MG/L	Oil and Grease, Total	-	10	-	-	1/Month	Grab
00620	MG/L	Nitrate Nitrogen, Total	10	20	-	-	1/Week	24 Hr. Comp.
00665	MG/L	Phosphorus, Total (P)	-		-	-	1/Month	24 Hr. Comp.
01034	UG/L	Chromium, Total (Cr)	83	200	-	-	1/Week	24 Hr. Comp.
01042	UG/L	Copper, Total (Cu)	14	46	-	-	1/Week	24 Hr. Comp.
01045	UG/L	Iron, Total (Fe)	-	-	-	-	1/Week	24 Hr. Comp.
01051	UG/L	Lead, Total (Pb)	30	45	-	-	1/Week	24 Hr. Comp.
01092	UG/L	Zinc, Total (Zn)	189	600	-		1/Week	24 Hr. Comp.
01220	UG/L	Chromium, (Hex) Dissolved	10	19	-	-	1/Week	24 Hr. Comp.
50050	MGD	Flow Rate	-	-	-	-	1/Month	24 Hr. Total

* Monitoring and reporting is only required when the Hypersonic Tunnel Facility (HTF) is in operation. Report "AH" on the monthly report form when there is no discharge from the HTF.

2. The pH (Reporting Code 00400) shall not be less than 6.5 S.U. nor greater than 9.0 S.U. and shall be monitored 1/week by grab sample.

3. Samples taken in compliance with monitoring requirements specified above shall be taken at Sampling Stations described in Part II, OTHER REQUIREMENTS.

PART II, OTHER REQUIREMENTS

A. Description of the location of the required sampling stations are as follows:

Sampling Station	Description of Location
2IOOOOO2001	Instream sampler on Kuebeler Ditch.
2IOOOOO2002	Instream sampler on Ransom Brook.
2IOOOOO2003	Instream sampler on Plum Brook.
2IOOOOO2004	Outfall from Taylor Road sewage treatment plant.
2IOOOOO2005	Outfall from Space Power Facility package plant.
2IOOOOO2006	Outfall from J site package plant.
2IOOOOO2007	Outfall from B-2 site package plant.

B. If Severity Units are required for Turbidity, Odor, or Color, use the following table to determine the value between 0 and 4 that is reported:

REPORTED VALUE *	SEVERITY DESCRIPTION	TURBIDITY	ODOR	COLOR
0	None	Clear	None	Colorless
1	Mild			
2	Moderate	Light Solids	Musty	Grey
3	Serious			
4	Extreme	Heavy Solids	Septic	Black

* Interpolate between the descriptive phrases.

C. Permit limitations may be revised in order to meet water quality standards after a stream use determination and waste load allocation are completed and approved. This permit may be modified, or, alternatively, revoked and reissued, to comply with any applicable water quality effluent limitations.

PBS002-10

OhioEPA
State of Ohio Environmental Protection Agency
Northwest District Office
1035 Devlac Grove Drive
Bowling Green, Ohio 43402-4598
(419) 352-8461

Richard F. Celeste
Governor

Re: Erie County
NASA Plum Brook Station
NPDES Permit 2IO00002

March 16, 1989

Robert P. Kozar, Chief
Plum Brook Management Office
NASA
6100 Columbus Avenue
Sandusky, Ohio 44870

Dear Mr. Kozar:

On January 25, 1989 a compliance inspection of your wastewater treatment facilities was conducted. In the meeting, we also discussed the renewal NPDES permit limits and the compliance status of the entity.

A review of the past year of self-monitoring reports indicated that suspended solids violations were recurring at outfall 001 and there were several violations of the fecal coliforms and chlorine residual limitations during the summer months at outfalls 004, 005 and 007. As explained in your correspondence, and again at the January 25 meeting, NASA feels that the suspended solids violations may be beyond their control. However, the other violations can probably be corrected with operational adjustments and improvements.

A renewal NPDES permit was issued in December 1988. In that permit, the total iron limits were deleted and monitoring is now required at the three ambient stream monitoring stations (001, 002 and 003). Likewise, the previous suspended solids limits at these three outfalls were relaxed to represent a typical stormwater monitoring situation. It was also noted by NASA that the average zinc limit was more restrictive than in the previous permit. This limit and others were reviewed against the current Ohio Water Quality Standards, and adjusted accordingly. Several toxic metal limits, such as zinc are based on a scale relating to the hardness of the receiving stream water.

A tour of the facility included inspections of the three sewage treatment plants which serve operations at the Plum Brook Station. In general, the plants are well maintained and operated. The trickling filter plant located on Taylor Road also serves approximately 43 private homes outside the station.

REPORTING AND TESTING REQUIREMENTS
FOR COOLING WATER SYSTEM ADDITIVES

Division of Water Pollution Control
Permits Section
State of Ohio Environmental Protection Agency
P.O. Box 1049, 1800 WaterMark Drive
Columbus, Ohio 43266-0149

Dischargers of once-through cooling water or blowdown from either open or recirculating cooling water systems are required by the terms of their NPDES permit to obtain approval to use cooling water additives. They are required to demonstrate that the intended additive to be used will not be harmful to aquatic life. This requirement is imposed in lieu of a continuing monitoring program for the additives.

To meet the requirements of the cooling water additives statement in the NPDES permit, the permittee shall submit the following.

1. The name of the additive.

2. The concentration (mg/l) of

3. The expected concentration o :harge or blowdown immediately prior t

4. The flowrate (mgd) of the di

5. Name of the state surface wa

6. Toxicity information regardi

   For determining safe concent additives the following information sh

   The 96-hr. or 48-hr. (as not ed by static bioassay procedures o y Tests with Fish, Macro-invertebrates and Amphibians (U.S. EPA Report Number EPA 660/3-75-009) for the following species:

   48 hrs - Daphnia Magna
   96 hrs - Fathead Minnow
   96 hrs - Blue Gill Sunfish
   96 hrs - Rainbow Trout

OEPA- Columbus
Swaraj Chakrabarti
614-644-2001

If all of the required information is not submitted, permission to use the additive(s) will be denied. If the Ohio EPA review of the required information indicates neither an acute or chronic toxicity problem will be caused by the use of the additive(s) permission shall be granted. Any questions should be directed to Ohio EPA, Division of Water Pollution Control, Industrial NPDES Permits Group at (614) 644-2001.

JM/SC/mds
0089F/6
01/17/89

PART I, A. - FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from the following outfall: 2I000002001. SEE PART II, OTHER REQUIREMENTS, for location of effluent sampling.

EFFLUENT CHARACTERISTIC			DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS*	
			Concentration Other Units (Specify)		Loading kg/day			
REPORTING CODE/UNITS		PARAMETER	30 DAY	DAILY	30 DAY	DAILY	Measurement Frequency	Sample Type
00335	MG/L	Chemical Oxygen Demand	40	60	-	-	1/Week	24 Hr Comp
00530	MG/L	Residue, Total Nonfilterable	30	45	-	-	1/Week	24 Hr Comp
00550	MG/L	Oil and Grease, Total	-	10	-	-	1/Month	Grab
00665	MG/L	Phosphorus, Total (P)	-	-	-	-	1/Month	24 Hr Comp
01034	UG/L	Chromium, Total (Cr)	83	200	-	-	1/Week	24 Hr Comp
01042	UG/L	Copper, Total (Cu)	14	46	-	-	1/Week	24 Hr Comp
01045	UG/L	Iron, Total (Fe)	-	-	-	-	1/Week	24 Hr Comp
01051	UG/L	Lead, Total (Pb)	30	45	-	-	1/Week	24 Hr Comp
01092	UG/L	Zinc, Total (Zn)	189	600	-	-	1/Week	24 Hr Comp
01220	UG/L	Chromium, (Hex) Dissolved	10	19	-	-	1/Week	24 Hr Comp
50050	MGD	Flow Rate	-	-	-	-	1/Month	24 Hr Total
71850	MG/L	Nitrate Nitrogen, Total	10	20	-	-	1/Week	24 Hr Comp

* Monitoring and reporting is only required when the Space Power Facility (SPF) is in operation. Report "AH" on the monthly report form when there is no discharge from the SPF.

2. The pH (Reporting Code 00400) shall not be less than 6.5 S.U. nor greater than 9.0 S.U. and shall be monitored 1/week by grab sample.

3. Samples taken in compliance with monitoring requirements specified above shall be taken at Sampling Stations described in Part II, OTHER REQUIREMENTS.

PART I, A. - FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from the following outfall: 2I000002003. SEE PART II, OTHER REQUIREMENTS, for location of effluent sampling.

EFFLUENT CHARACTERISTIC			DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS*	
			Concentration		Loading			
REPORTING CODE/UNITS		PARAMETER	Other Units (Specify) 30 DAY	DAILY	kg/day 30 DAY	DAILY	Measurement Frequency	Sample Type
00335	MG/L	Chemical Oxygen Demand	40	60	-	-	1/Week	24 Hr Comp
00530	MG/L	Residue, Total Nonfilterable	30	45	-	-	1/Week	24 Hr Comp
00550	MG/L	Oil and Grease, Total	-	10	-	-	1/Month	Grab
00665	MG/L	Phosphorus, Total (P)	-	-	-	-	1/Month	24 Hr Comp
01034	UG/L	Chromium, Total (Cr)	83	200	-	-	1/Week	24 Hr Comp
01042	UG/L	Copper, Total (Cu)	14	46	-	-	1/Week	24 Hr Comp
01045	UG/L	Iron, Total (Fe)	-	-	-	-	1/Week	24 Hr Comp
01051	UG/L	Lead, Total (Pb)	30	45	-	-	1/Week	24 Hr Comp
01092	UG/L	Zinc, Total (Zn)	189	600	-	-	1/Week	24 Hr Comp
01220	UG/L	Chromium, (Hex) Dissolved	10	19	-	-	1/Week	24 Hr Comp
50050	MGD	Flow Rate	-	-	-	-	1/Month	24 Hr Total
71850	MG/L	Nitrate Nitrogen, Total	10	20	-	-	1/Week	24 Hr Comp

* Monitoring and reporting is only required when the B-2 Environmental Chamber and Nuclear Test Reactor is in operation. Report "AH" on the monthly report form when there is no discharge from these facilities.

2. The pH (Reporting Code 00400) shall not be less than 6.5 S.U. nor greater than 9.0 S.U. and shall be monitored 1/week by grab sample.

3. Samples taken in compliance with monitoring requirements specified above shall be taken at Sampling Stations described in Part II, OTHER REQUIREMENTS.

PART I, A. - FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from the following outfall: 2IOOOOO2005. SEE PART II, OTHER REQUIREMENTS, for location of effluent sampling.

EFFLUENT CHARACTERISTIC			DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
			Concentration		Loading			
REPORTING			Other Units (Specify)		kg/day		Measurement	Sample
CODE/UNITS		PARAMETER	30 DAY	7 DAY	30 DAY	DAILY	Frequency	Type
00083	UNITS	Color Severity	-	-	-	-	Daily(1)	Observation
00300	MG/L	Dissolved Oxygen	5.0(min)	-	-	-	1/Month	Grab
00530	MG/L	Residue, Total Nonfilterable	12	18	-	-	1/Month	Grab
00610	MG/L	Nitrogen, Ammonia (NH_3)	-	-	-	-	1/Month	Grab
01330	UNITS	Odor Severity	-	-	-	-	Daily(1)	Observation
01350	UNITS	Turbidity Severity	-	-	-	-	Daily(1)	Observation
31616	#/100ML	Fecal Coliform, (Summer Only)	1000	2000	-	-	1/Month	Grab
50050	MGD	Flow Rate	-	-	-	-	Daily(1)	24 Hr Total
50060	MG/L	Chlorine, Total Residual (Summer Only)	-	0.5(max)	-	-	Daily(1)	Grab
80082	MG/L	Biochemical Oxygen Demand Carb.	10	15	-	-	1/Month	Grab

(1) Except days when plant is not normally staffed. Report "AH" on the monthly report form for those days.

2. The pH (Reporting Code 00400) shall not be less than 6.5 S.U. nor greater than 9.0 S.U. and shall be monitored 1/month by grab sample.

3. Samples taken in compliance with monitoring requirements specified above shall be taken at Sampling Stations described in Part II, OTHER REQUIREMENTS.

PART I, A. - FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date of this permit and lasting until the expiration date, the permittee is authorized to discharge in accordance with the following limitations and monitoring requirements from the following outfall: 2I000002007. SEE PART II, OTHER REQUIREMENTS, for location of effluent sampling.

EFFLUENT CHARACTERISTIC			DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
			Concentration Other Units (Specify)		Loading kg/day			
REPORTING CODE	UNITS	PARAMETER	30 DAY	7 DAY	30 DAY	DAILY	Measurement Frequency	Sample Type
00083	UNITS	Color Severity	-	-	-	-	Daily(1)	Observation
00300	MG/L	Dissolved Oxygen	5.0(min)	-	-	-	1/Month	Grab
00530	MG/L	Residue, Total Nonfilterable	12	18	-	-	1/Month	Grab
00610	MG/L	Nitrogen, Ammonia (NH_3)	-	-	-	-	1/Month	Grab
01330	UNITS	Odor Severity	-	-	-	-	Daily(1)	Observation
01350	UNITS	Turbidity Severity	-	-	-	-	Daily(1)	Observation
31616	#/100ML	Fecal Coliform (Summer Only)	1000	2000	-	-	1/Month	Grab
50050	MGD	Flow Rate(2)	-	-	-	-	Daily(1)	24 Hr Total
50060	MG/L	Chlorine, Total Residual (Summer Only)	-	0.5(max)	-	-	Daily(1)	Grab
80082	MG/L	Biochemical Oxygen Demand, Carb.	10	15	-	-	1/Month	Grab

(1) Except days when plant is not normally staffed. Report "AH" on the monthly report form for those days.
(2) Estimated flow is acceptable if there is no flow meter.

2. The pH (Reporting Code 00400) shall not be less than 6.5 S.U. nor greater than 9.0 S.U. and shall be monitored 1/month by grab sample.

3. Samples taken in compliance with monitoring requirements specified above shall be taken at Sampling Stations described in Part II, OTHER REQUIREMENTS.

PART III - GENERAL CONDITIONS

I. DEFINITIONS

"daily load limitations" is the total discharge by weight during any calendar day. If only one sample is taken during a day, the weight of pollutant discharge calculated from it is the daily load.

"daily concentration limitation" means the arithmetic average (weighted by flow) of all the determinations of concentration made during the day. If only one sample is taken during the day its concentration is the daily concentration. Coliform bacteria limitations compliance shall be determined using the geometric mean.

"7-day load limitation" is the total discharge by weight during any 7-day period divided by the number of days in that 7-day period that the facility was in operation. If only one sample is taken in a 7-day period the weight of pollutant discharge calculated from it is the 7-day load. If more than one sample is taken during the 7-day period the 7-day load is calculated by determining the daily load for each day sampled, totaling the daily loads for the 7-day period and dividing by the number of days sampled.

"7-day concentration limitation" means the arithmetic average (weighted by flow) of all the determinations of daily concentration limitation made during the 7-day period. If only one sample is taken during the 7-day period, its concentration is the 7-day concentration limitation for that 7-day period. Coliform bacteria limitations compliance shall be determined using the geometric mean.

"30-day load limitation" is the total discharge by weight during any 30-day period divided by the number of days in the 30-day period that the facility was in operation. If only one sample is taken in a 30-day period the weight of pollutant discharge calculated from it is the 30-day load. If more than one sample is taken during one 30-day period the 30-day load is calculated by determining the daily load for each day sampled, totaling the daily loads for the 30-day period and dividing by the number of days sampled.

"30-day concentration limitation" means the arithmetic average (weighted by flow) of all the determinations of daily concentration made during the 30-day period. If only one sample is taken during the 30-day period, its concentration is the 30-day concentration for that 30-day period. Coliform bacteria limitations compliance shall be determined using the geometric mean.

"85 percent removal limitations" means the arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 15 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period.

Absolute Limitations. Compliance with limitations having descriptions of "shall not be less than", "nor greater than", "shall not exceed", "minimum", or "maximum", shall be determined from any single value for effluent samples and/or measurements collected.

"Net concentration" shall mean the difference between the concentration of a given substance in a sample taken of the discharge and the concentration of the same substances in a sample taken at the intake which supplies water to the given process. For the purpose of this definition samples that are taken to determine the net concentration shall always be 24-hour composite samples made up of at least six increments taken at regular intervals throughout the plant day.

"Net load" shall mean the difference between the load of a given substance as calculated from a sample taken of the discharge and the load of the same substance in a sample taken at the intake which supplies water to given process. For purposes of this definition samples that are taken to determine the net loading shall always be 24-hour composite samples made up of at least six increments taken at regular intervals throughout the plant day.

"MGD" means million gallons per day

"mg/l" means milligrams per liter

"ug/l" means micrograms per liter

"Reporting Code" is a five digit number used by the Ohio EPA in processing reported data. The reporting code does not imply the type of analysis used nor the sampling techniques employed.

Quarterly sampling frequency means the sampling shall be done in the months of March, June, August and December.

Yearly sampling frequency means the sampling shall be done in the month of September.

Semi-annual sampling frequency means the sampling shall be done during the months of June and December.

Winter shall be considered to be the period from November 1 thru April 30.

5. SAMPLING AND ANALYTICAL METHODS

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored flow. Test procedures for the analysis of pollutants shall conform to regulation 40 CFR 136, "Test Procedures For The Analysis of Pollutants" unless other test procedures have been specified in this permit. The permittee shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals to insure accuracy of measurements.

6. RECORDING OF RESULTS

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

A. The exact place and date of sampling;(time of sampling not required on EPA 4500)

B. The person(s) who performed the sampling or measurements;

C. The date the analyses were performed on those samples;

D. The person(s) who performed the analyses;

E. The analytical techniques or methods used; and

F. The results of all analyses and measurements

7. RECORDS RETENTION

The permittee shall retain all of the following records for the wastewater treatment works for a minimum of three years, including:

A. All sampling and analytical records (including internal sampling data not reported);

B. All original recordings for any continuous monitoring instrumentation;

C. All instrumentation, calibration and maintenance records; and

D. All plant operation and maintenance records.

E. All reports required by this permit.

F. Records of all data used to complete the application for this permit for a period of at least three years from the date of the sample, measurement, report or application.

These periods will be extended during the course of any unresolved litigation, or when so requested by the Regional Administrator or the Ohio EPA. The three year period for retention of records shall start from the date of sample, measurement, report or application.

8. AVAILABILITY OF REPORTS

Except for data determined by the Ohio EPA to be entitled confidential status, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the appropriate District Offices of the Ohio EPA. Both the Clean Water Act and Section 6111.05 Ohio Revised Code state that effluent data and receiving water quality data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in the Ohio Revised Code Section 6111.99.

9. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

10. RIGHT OF ENTRY

The permittee shall allow the Director, or an authorized representative upon presentation of credentials and other documents as may be required by law to;

A. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit.

B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit.

C. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit.

D. Compliance Schedule Events:

If the permittee is unable to meet any date for achieving an event, as specified in the Schedule of Compliance, the permittee shall submit a written report to the appropriate District Office of the Ohio EPA within 14 days of becoming aware of such situation. The report shall include the following:

1. The compliance event which has been or will be violated;

2. The cause of the violation;

3. The remedial action being taken;

4. The probable date by which compliance will occur; and

5. The probability of complying with subsequent and final events as scheduled.

E. The permittee shall report all instances of noncompliance not reported under paragraphs A, C, or D of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph C of this section.

F. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

13. RESERVED

14. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

15. AUTHORIZED DISCHARGES

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than, or at a level in excess of, that authorized by this permit shall constitute a violation of the terms and conditions of this permit. Such violations may result in the imposition of civil and/or criminal penalties as provided for in Section 309 of the Act, and Ohio Revised Code Sections 6111.09 and 6111.99

16. DISCHARGE CHANGES

The following changes must be reported to the appropriate Ohio EPA District Office as soon as practicable.

A. For all treatment works, any significant change in character of the discharge which the permittee knows or has reason to believe has occurred or will occur which would constitute cause for modification or revocation and reissuance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. Notification of permit changes or anticipated noncompliance does not stay any permit condition.

B. For publicly owned treatment works:

1. Any proposed plant modification, addition and/or expansion that will change the capacity or efficiency of the plant;
2. The addition of any new significant industrial discharge; and
3. Changes in the quantity or quality of the wastes from existing tributary industrial discharges which will result in significant new or increased discharges of pollutants.

C. For non-publicly owned treatment works, any proposed facility expansions, production increases, or process modifications, which will result in new, different, or increased discharges of pollutants.

Following this notice, modifications to the permit may be made to reflect any necessary changes in permit conditions, including any necessary effluent limitations for any pollutants not identified and limited herein. A determination will also be made as to whether a National Environmental Policy Act (NEPA) review will be required. Sections 6111.44 and 6111.45, Ohio Revised Code, require that plans for treatment works or improvements to such works be approved by the Director of the Ohio EPA prior to initiation of construction.

D. In addition to the reporting requirements under 40 CFR 122.41(l) and per 40 CFR 122.42(a), all existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Director as soon as they know or have reason to believe:

23. CIVIL AND CRIMINAL LIABILITY

Except as excepted in the permit conditions on UNAUTHORIZED DISCHARGES or UPSETS, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

24. STATE LAWS AND REGULATIONS

Nothing in this permit shall be construed to preclude the institution of any legal action nor relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Act.

25. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, state, or local laws or regulations.

26. UPSET

The provisions of 40 CFR Section 122.41(n), relating to "Upset," are specifically incorporated herein by reference in their entirety. For definition of "upset", see Part I.

27. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

28. SIGNATORY REQUIREMENTS

All applications submitted to the Director shall be signed and certified in accordance with the requirements of 40 CFR 122.22(b) and (c).

All reports submitted to the Director shall be signed and certified in accordance with the requirements of 40 CFR Section 122.22(b) and (c).

29. OTHER INFORMATION

A. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

B. ORC 6111.99 provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $25,000 per violation.

C. ORC 6111.99, states that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $25,000 per violation.

D. ORC 6111.99 provides that any person who violates Sections 6111.04, 6111.042, 6111.05, or division (A) of Section 6111.07 of the Revised Code shall be fined not more than twenty-five thousand dollars or imprisioned not more than one year, or both.

30. NEED TO HALT OR REDUCE ACTIVITY

40 CFR 122.41(c), states that it shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with conditions of this permit.

31. APPLICABLE FEDERAL RULES

All references to 40 CFR in this permit mean the version of 40 CFR which is effective as of the effective date of this permit.

PB5002 -27

National Aeronautics and
Space Administration

Lewis Research Center
Plum Brook Station
6100 Columbus Avenue
Sandusky, Ohio 44870

NASA

Reply to Attn of: 2870

April 11, 1991

Mr. Tyler Ruggles
Division of Water Pollution Control
Ohio Environmental Protection Agency
Northwest District Office
1035 Devlac Grove Drive
Bowling Green, Ohio 43402

Subject: NPDES Permit Noncompliance Notification For March 1991.

OEPA Permit No.: 2I000002*CD

Plum Brook Station is providing monthly written notification to the Northwest District Office of the Ohio Environmental Protection Agency of non-emergency noncompliance with the Plum Brook Station NPDES permit.

If you have any questions, please contact me at 419/621-3233 or Michele Smith at 419/621-3237.

Amy L. Bower

Amy L. Bower
Industrial Hygienist

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cc: 7020/P. McCallum
2870/File✓
SVER/K. Hite
SVER/M. Smith
SVER/D. Young

April 11, 1991

Subject: NPDES Permit Noncompliance Notification For March 1991.
OEPA Permit No.: 2I000002*CD

1. The limitation which has been exceeded:

   Total Residue, monthly average limit and daily limit for Outfall 001-Instream Sampler on Kuebler Ditch.

2. The extent of the exceedence:

   The NPDES monthly average limit is 30 mg/l; the monthly average for March was 31.9 mg/l.

   The NPDES daily maximum limit is 45 mg/l; the daily level on March 13 was 96.8 mg/l.

3. The cause of the exceedence:

   Exceedences are due to muskrat activity in this open ditch.

4. The period of the exceedence including exact dates and times:

   The monthly average limit exceedence was for the month of March 1991.

   The daily maximum limit was exceeded on March 13, 1991.

5. If uncorrected, the anticipated time the exceedence is expected to continue:

   Exceedences are naturally occurring and not due to Plum Brook Station activities.

6. Steps being taken to reduce, eliminate and/or prevent recurrence of the exceedence:

   Exceedences are due to muskrat activity, a natural occurrence, in this open ditch. It should be noted that our sampling location is at a weir and not a point source and that Kuebler Ditch has a muddy base. Environmental staff personnel are evaluating the feasibility of modifying the NPDES Permit to the sampling of point source discharges into Kuebler Ditch.

April 11, 1991

Subject: NPDES Permit Noncompliance Notification For March 1991.
OEPA Permit No.: 2I000002*CD

1. The limitation which has been exceeded:

   Copper, monthly average limit and daily limit for Outfall 003-Instream Sampler On Plum Brook.

2. The extent of the exceedence:

   The monthly average limit is 14 ug/L; the monthly average for March was 45 ug/L.

   The daily limit is 46 ug/L; the daily level on March 7 was 60 ug/l and on March 20 was 50 ug/l.

3. The cause of the exceedence:

   Copper levels at Outfall 003 are consistent with copper levels found upstream in Plum Brook and therefore are not due to Plum Brook Station activities. The March monthly average for Plum Brook upstream was 50 ug/l.

4. The period of the exceedence including exact dates and times:

   The monthly average limit exceedence was for the month of March 1991.

   The daily limit was exceeded on March 7 and March 20, 1991.

5. If uncorrected, the anticipated time the exceedence is expected to continue:

   Copper levels at Outfall 003 are consistent with copper levels found upstream in Plum Brook and therefore are not due to Plum Brook Station activities. The March monthly average for Plum Brook upstream was 50 ug/l.

6. Steps being taken to reduce, eliminate and/or prevent recurrence of the exceedence:

   A complete evaluation of laboratory procedures and a parameter trend analysis of various Plum Brook locations is currently being performed. Necessary adjustments will be initiated based on results.

Outfall	Date	Parameter	Reported	Units	Permit Limitation
004	8/14	Fecal Coliforms	2400	#/100ml	2000
004	August Average	Fecal Coliforms	2400	#/100ml	1000
005	August Average	Dissolved Oxygen	0.9	mg/l	5.0 min.
005	8/6	Total Residual Chlorine	1.9	mg/l	0.5
005	8/7	Total Residual Chlorine	0.7	mg/l	0.5
005	8/13	Total Residual Chlorine	0.8	mg/l	0.5
001	9/7	Suspended Solids	75.2	mg/l	45
001	Sept. Average	Suspended Solids	31	mg/l	30
001	9/7	Copper	60	ug/l	46
001	Sept. Average	Copper	40	ug/l	14
002	9/14	COD	64	mg/l	60
002	Sept. Average	COD	45	mg/l	40
002	9/7	Suspended Solids	213	mg/l	45
002	Sept. Average	Suspended Solids	55	mg/l	30
002	9/7	Copper	50	ug/l	46
002	Sept. Average	Copper	38	ug/l	14

Outfall	Date	Parameter	Reported	Units	Permit Limitation
003	Average	Copper	52	ug/l	14
003	10/17	Copper	50	ug/l	46
004	Average	Fecal Coliforms	2400	#/100ml	1000
004	10/15	Fecal Coliforms	2400	#/100ml	2000
005	5 days	Residual Chlorine	0.57 to 1.9	mg/l	0.5

We received your letters dated September 13, October 11, and November 8, 1990, acknowledging the above violations and the actions being taken to prevent further occurrences.

Please be advised that failure to comply with the effluent limitations and/or monitoring requirements specified in your NPDES permit may be cause for enforcement action pursuant to Ohio Revised Code, Chapter 6111. If these violations continue to occur and if satisfactory progress is not made, it may be necessary to initiate enforcement action to achieve compliance.

If there are any questions, please contact this office.

Sincerely,

Ralph J. Baker

Ralph J. Baker
Division of Water Pollution Control

/mtt

cc: Heidi Sorin, Enforcement Section, DWPC, CO
file

Outfall	Date	Parameter	Reported	Units	Permit Limitation
004	May, avg.	Fecal coliform	2,400	100ml	1,000
004	5/1	Total Residual Chlorine	0.52	mg/l	0.5
004	5/23	Total Residual Chlorine	0.52	mg/l	0.5
005	5/11	Dissolved oxygen	2.80	mg/l	5.0 (min)
005	5/14	Total Residual Chlorine	1.90	mg/l	0.5
005	5/16	Total Residual Chlorine	0.62	mg/l	0.5
005	5/31	Total Residual Chlorine	0.81	mg/l	0.5
001	6/29	Oil and Grease	15.20	mg/l	10
001	June, avg.	Copper, total	32.5	ug/l	14
002	June, avg.	Copper, total	30	ug/l	14
003	June, avg.	Copper, total	30	ug/l	14
004	6/7	Dissolved oxygen	5.2	mg/l	6.0 (min)
004	6/5	Fecal coliform	2,400	100ml	2,000

PB5002-31

National Aeronautics and
Space Administration

Lewis Research Center
Plum Brook Station
6100 Columbus Avenue
Sandusky, Ohio 44870

NASA

Reply to Attn of 2870

June 11, 1990

Mr. Tyler Ruggles
Division of Water Pollution Control
Ohio Environmental Protection Agency
Northwest District Office
1035 Devlac Grove Drive
Bowling Green, OH 43402-4598

Subject: Notice of Violation, Erie County, NASA-Lewis Research Center, Ohio EPA NPDES Permit No. 2I000002 NPDES Permit No. OH0001392, Dated May 30, 1990

Dear Mr. Ruggles:

In response to your subject letter we provide the following information describing our current efforts to determine the source and solution to our NPDES permit noncompliance issues.

As reported to Mr. Ralph Baker of the OEPA, NPDES Enforcement Division, in our monthly Noncompliance Notifications, we have identified high concentrations of copper in our upstream monitoring station at Kuebler Ditch as it enters Plum Brook Station. As an example, sampling at the upstream monitoring station revealed that copper concentrations were 100 ug/l, 100 ug/l, and 50 ug/l on the dates January 17, February 7, and March average, respectively, while the Outfall 001 concentrations downstream were 70 ug/l, 70 ug/l, and 35 ug/l (average).

Additionally, based on the analysis of zinc from upstream monitoring (also on Outfall 001), the same trend exists. On January 17, 1990, upstream zinc analysis was 874 ug/l while down stream at Outfall 001 it was 732 ug/l. The January average for zinc in outfall 001 was 495 ug/l upstream and 267 ug/l down stream.

Using these dates as an example, Plum Brook Station has not contributed to the copper or zinc concentrations in Kuebler Ditch. The concentrations have in fact been less as the stream leaves the site in each case. NASA continues to research the potential sources of these noncompliances and will establish additional monitoring points upstream of Outfalls 002 and 003. We will continue to report our progress in these matters and work with OEPA to determine the best method for solution.

Please be advised that failure to comply with effluent limitations and/or monitoring requirements specified in your NPDES permit may be cause for enforcement action pursuant to Ohio Revised Code, Chapter 6111. If these violations continue to occur and if satisfactory progress is not made, it may be necessary to initiate enforcement action to achieve compliance.

If there are any questions, please contact this office.

Sincerely,

Tyler Ruggles

Tyler Ruggles
Division of Water Pollution Control

/eb

cc: Heidi Sorin, Enforcement Section, DWPC, CO
A & C Representative
File

3. These three outfalls involve three different watersheds separated by approximately one mile distance with no common contributors.

4. The concentrations of Copper have remained relatively constant during the past four years of records that were searched.

5. The discharge limits have been reduced several times over the life of the permit. The most recent change in 1989 reduced the daily maximum discharge limit from 300 µg/L to 46µg/L. The monthly average was reduced from 200 µg/L to 14 µg/L. These restrictive limits essentially force a condition of non-compliance approximately 50 percent of the time since ambient concentrations seem to be consistently in the 20 to 80 µg/L range.

Conclusion: Our operations are apparently not contributing to this condition. Copper concentrations have not changed over the past four years. Non-compliance results from setting of discharge limits at or below natural levels.

B. Fecal Coliform Bacteria in Outfall 004

This discharge level was exceeded three times. Three conditions can cause this:

- Insufficient treatment in the primary and secondary stages
- Insufficient chlorine in the third stage contact tank
- Inadequate contact time in the contact tank

We have been reviewing our plant's third stage treatment operations for a number of months to obtain the proper adjustment of chlorine feed to flow conditions. Our system contact tank is 2,500 gallons and sized to provide a minimum 30-minute contact time at the rated plant flow of 110,000 gpd (76 gpm). We believe that during periods of high flow, the dampened, more continuous flow characteristics tend to become more pulsed due to the float controlled operating features of the plant pumps. During such conditions, contact time may be reduced in the final chlorine contact tank. We are planning to have this, as well as all plant operations, reviewed by a qualified sanitary engineer in the spring of this year.

OhioEPA
State of Ohio Environmental Protection Agency

Northwest District Office
1035 Devlac Grove Dr.
Bowling Green, Ohio 43402
(419) 352-8461

Richard F. Celeste
Governor

Re: Notice of Violation
Erie County
Nasa Plum Brook Station
Ohio EPA NPDES Permit No. 2I000002
NPDES Permit No. OH0001392

December 19, 1989

Mr. Robert P. Kozar
Chief, Plum Brook Office
NASA
6100 Columbus Avenue
Sandusky, Ohio 44870

Dear Mr. Kozar:

We are in receipt of your self-monitoring report covering the months of July and August, 1989 for the referenced facility. Our review indicates violations of the conditions of your NPDES permit. The specific instances of noncompliance are as follows:

Outfall	Date	Parameter	Reported	Units	Permit Limitation	
002	7/6	Copper	80	ug/l	46	unknown
002	July Average	Copper	80	ug/l one data point	14	unknown
003	7/6	Copper	70	ug/l	46	unknown
003	July Average	Copper	42.5	ug/l except 7/6 met daily limit	14	unknown
004	7/18	Fecal Coliforms	2400	#/100ml	2000	heavy water + less Cl conta.
004	7/12	Total Residual Chlorine	0.65	mg/l	0.50	
004	7/21	Total Residual Chlorine	0.85	mg/l	0.50	
004	7/26	Total Residual Chlorine	0.88	mg/l	0.50	

Outfall	Date	Parameter	Reported	Units	Permit Limitation	
005	7/14	Dissolved Oxygen	0.20	mg/l	5.0 min.	low wa- flow
005	7/20	Dissolved Oxygen	4.05	mg/l	5.0 min.	
005	7/20	Total Residual Chlorine	1.40	mg/l	0.5	heavy wa flow excessive trigger of chlorn
005	7/21	Total Residual Chlorine	2.00	mg/l	0.5	
005	7/26	Total Residual Chlorine	2.00	mg/l	0.5	
007	7/14	Dissolved Oxygen	2.85	mg/l	5.0 min.	low wa- flow
007	7/20	Dissolved Oxygen	4.85	mg/l	5.0 min.	
007	7/20	Total Residual Chlorine	1.80	mg/l	0.5	heavy wa flow dissolve too rel the prev
007	7/21	Total Residual Chlorine	1.30	mg/l	0.5	
007	7/25	Total Residual Chlorine	2.00	mg/l	0.5	
007	7/26	Total Residual Chlorine	2.00	mg/l	0.5	
001	August Average	Copper	32.5	ug/l	14 not daily but	
002	August Average	Copper	30	ug/l	14 not daily but	
003	8/17	Residue, Total NFLT	50.6	mg/l	45	

Outfall	Date	Parameter	Reported	Units	Permit Limitation	
005	8/21	Total Residual Chlorine	1.10	mg/l	0.5	erratic flow
005	8/22	Total Residual Chlorine	1.50	mg/l	0.5	
005	8/23	Total Residual Chlorine	0.95	mg/l	0.5	
007	8/10	Dissolved Oxygen	4.5	mg/l	5.0 min.	low fl
007	8/1	Total Residual Chlorine	1.50	mg/l	0.5	erratic flow
007	8/3	Total Residual Chlorine	0.55	mg/l	0.5	
007	8/4	Total Residual Chlorine	0.55	mg/l	0.5	
007	8/7	Total Residual Chlorine	0.56	mg/l	0.5	
007	8/9	Total Residual Chlorine	1.40	mg/l	0.5	
007	8/10	Total Residual Chlorine	0.85	mg/l	0.5	
007	8/15	Total Residual Chlorine	0.95	mg/l	0.5	
007	8/16	Total Residual Chlorine	0.60	mg/l	0.5	

simple green®

Commercial Technical Bulletin

SIMPLE GREEN® is a revolutionary new general-purpose cleaner and degreaser for any washable surface (painted or unpainted), which leaves no objectionable residue and is harmless to the environment. The product always is used with cold water and sponged, mopped or sprayed to lift food, blood, oil and grease stains and grime. Salt water works as well as fresh, if the residual salt is acceptable.

SIMPLE GREEN is *not*

Harmful to skin	—no dermal damage
Flammable	—no
Caustic	—no bleach ammonia, phenol or ethanol
Abrasive	—no
Polluting	—99.7% phosphate free
Eyes	—No occular damage or irritation.

SIMPLE GREEN is

Economical	—highly concentrated
Biodegradable	
Safe	—manufactured in accordance with and acceptable for use in meeting OSHA standards, and authorized by USDA for use in federally inspected meat and poultry plants
Antimagnetic	—leaves a static-free surface

Satisfied users in homes, hospitals, hotels and other service industries, in transportation, food processing and preparation and a multitude of other industrial fields have found SIMPLE GREEN easy to use, and cost-effective as a replacement for specialized cleansers.

MARINE AND HARBOR APPLICATIONS

One special attribute of SIMPLE GREEN is particularly important in the marine environment. The U.S. Environmental Protection Agency sets no specific standards for marine oil spill dispersants, but the Canadian government has established very strict requirements. Duke University tested SIMPLE GREEN against the Canadian standards, and found the product 17.6 times less toxic to marine life than the best of the already approved competitive dispersants. While the tests confirm the acceptability of SIMPLE GREEN as an oil spill dispersant, they also establish that its use aboard ship or at port installations poses no disposal problem. Indeed, after 24 hours, SIMPLE GREEN is neutral in its effects upon the marine environment.

General Guide to Application

SIMPLE GREEN is activated by and must be used with cold water. The degree of dilution varies with the toughness of the job—the more difficult the stain or dirt, the stronger the mixture. Encrusted grease and oil require prewetting with water, spraying with full strength SIMPLE GREEN, sometimes scrubbing, and finally rinsing to clear away the dirt which has been lifted. In the case of glass, as little as 1 part SIMPLE GREEN to 164 parts water will do the job. For use with textiles, always spot test the fabric with SIMPLE GREEN to confirm it is colorfast.

SIMPLE GREEN removes petroleum and grease, fish oil, algae, food, blood and other stains and spills from steel, brass, aluminum, chrome, glass, fiberglass, leather, plastic and textiles.

Blood, coffee, wax, adhesive tape, chewing gum, fresh paint and varnish, carbon paper, pencil marks, typewriter ribbon, computer ink and other difficult stains may require special treatment. Prewet the surface, spray on full strength SIMPLE GREEN, rub as necessary and rinse.

PBS002-09

OhioEPA
State of Ohio Environmental Protection Agency

Northwest District Office
1035 Devlac Grove Dr.
Bowling Green, Ohio 43402
(419) 352-8461

Richard F. Celeste
Governor

Re: Notice of Violation
Erie County
Nasa Plum Brook Station
Ohio EPA NPDES Permit No. 2I000002
NPDES Permit No. OH0001392

December 19, 1989

Mr. Robert P. Kozar
Chief, Plum Brook Office
NASA
6100 Columbus Avenue
Sandusky, Ohio 44870

Dear Mr. Kozar:

We are in receipt of your self-monitoring report covering the months of July and August, 1989 for the referenced facility. Our review indicates violations of the conditions of your NPDES permit. The specific instances of noncompliance are as follows:

Outfall	Date	Parameter	Reported	Units	Permit Limitation
002	7/6	Copper	80	ug/l	46
002	July Average	Copper	80	ug/l	14
003	7/6	Copper	70	ug/l	46
003	July Average	Copper	42.5	ug/l	14
004	7/18	Fecal Coliforms	2400	#/100ml	2000
004	7/12	Total Residual Chlorine	0.65	mg/l	0.50
004	7/21	Total Residual Chlorine	0.85	mg/l	0.50
004	7/26	Total Residual Chlorine	0.88	mg/l	0.50

Please inform this office, in writing, within ten days of receipt of this notification as to the reasons for the above referenced violations, as well as a description of the actions taken or proposed to prevent any further violations. Your response should include the dates, either actual or proposed, for completion of the actions.

Please be advised that failure to comply with effluent limitations and/or monitoring requirements specified in your NPDES permit may be cause for enforcement action pursuant to Ohio Revised Code, Chapter 6111. If these violations continue to occur and if satisfactory progress is not made, it may be necessary to initiate enforcement action to achieve compliance.

If there are any questions, please contact this office.

Sincerely,

Ralph J. Baker

Ralph J. Baker
Division of Water Pollution Control

/eb

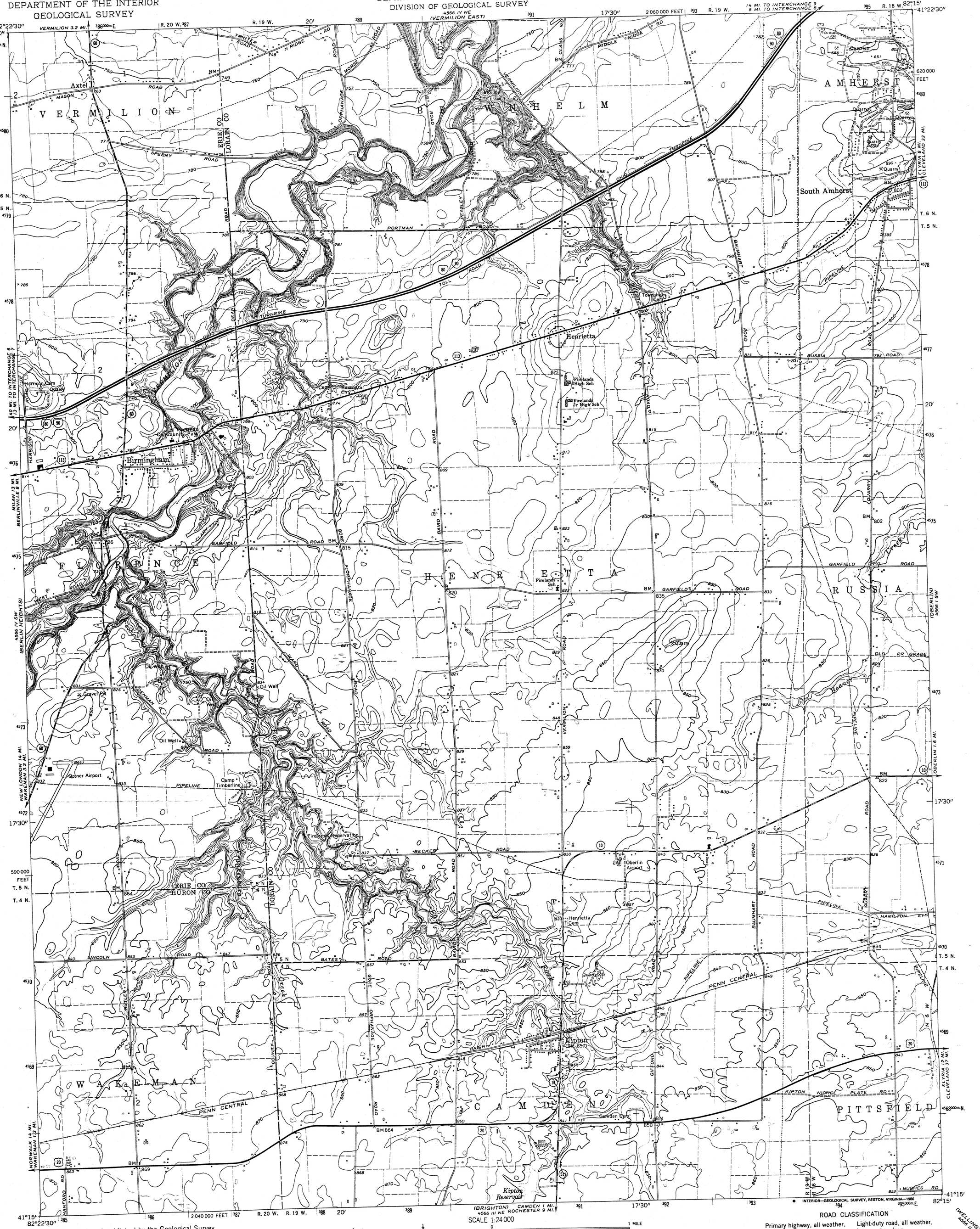
cc: Robert Phelps, Manager, Enforcement Section, DWPC, CO
File

FBS 027-12

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

KIPTON QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)
SE/4 VERMILION 15' QUADRANGLE



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1956. Field checked 1959. Revised from aerial photographs taken 1969. Field checked 1969

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Entire area lies within the Connecticut Western Reserve
Land lines established by private subdivision of the Connecticut Western Reserve

To place on the predicted North American Datum 1983, move the projection lines 2 meters south and 11 meters west as shown by dashed corner ticks

MN GN
3° 53 MILS
0°52' 15 MILS
UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 MILE
7000 FEET
1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225
OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather
Interstate Route
U. S. Route
State Route

KIPTON, OHIO
SE/4 VERMILION 15' QUADRANGLE
41082-C3-TF-024

1969

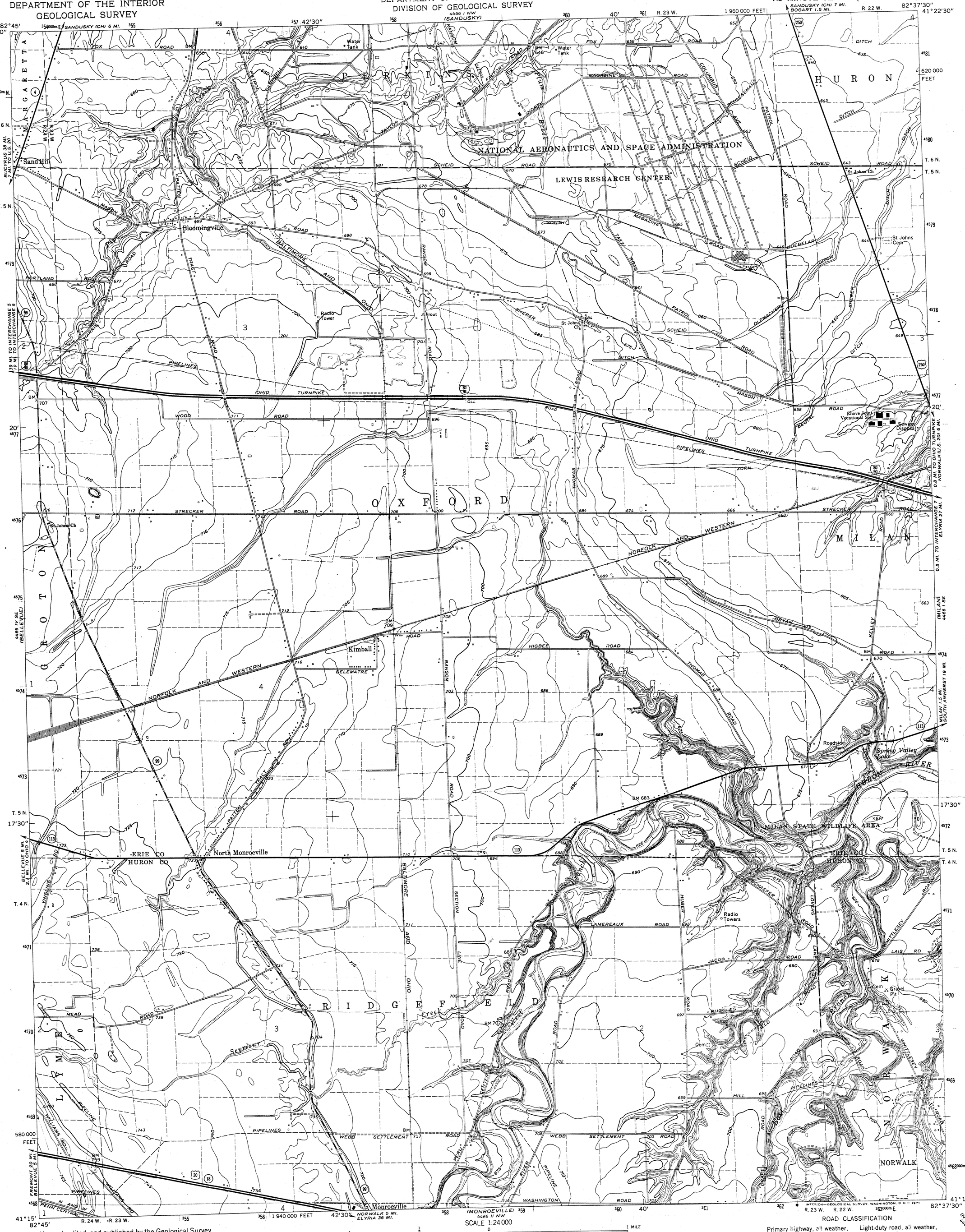
DMA 4566 IV SE—SERIES V852

PBS 027-01

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

KIMBALL QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Planimetry by photogrammetric methods from aerial photographs taken 1956. Topography by planetable surveys 1959. Revised from aerial photographs taken 1969. Field checked 1969

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Entire area lies within the Connecticut Western Reserve
Dotted land lines established by private subdivision of the Connecticut Western Reserve

UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
(MN, GN; 3° 53 MILS; 1°07' 20 MILS)

SCALE 1:24 000

CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather
Interstate Route
U. S. Route
State Route

KIMBALL, OHIO
N4115—W8237.5/7.5

1969

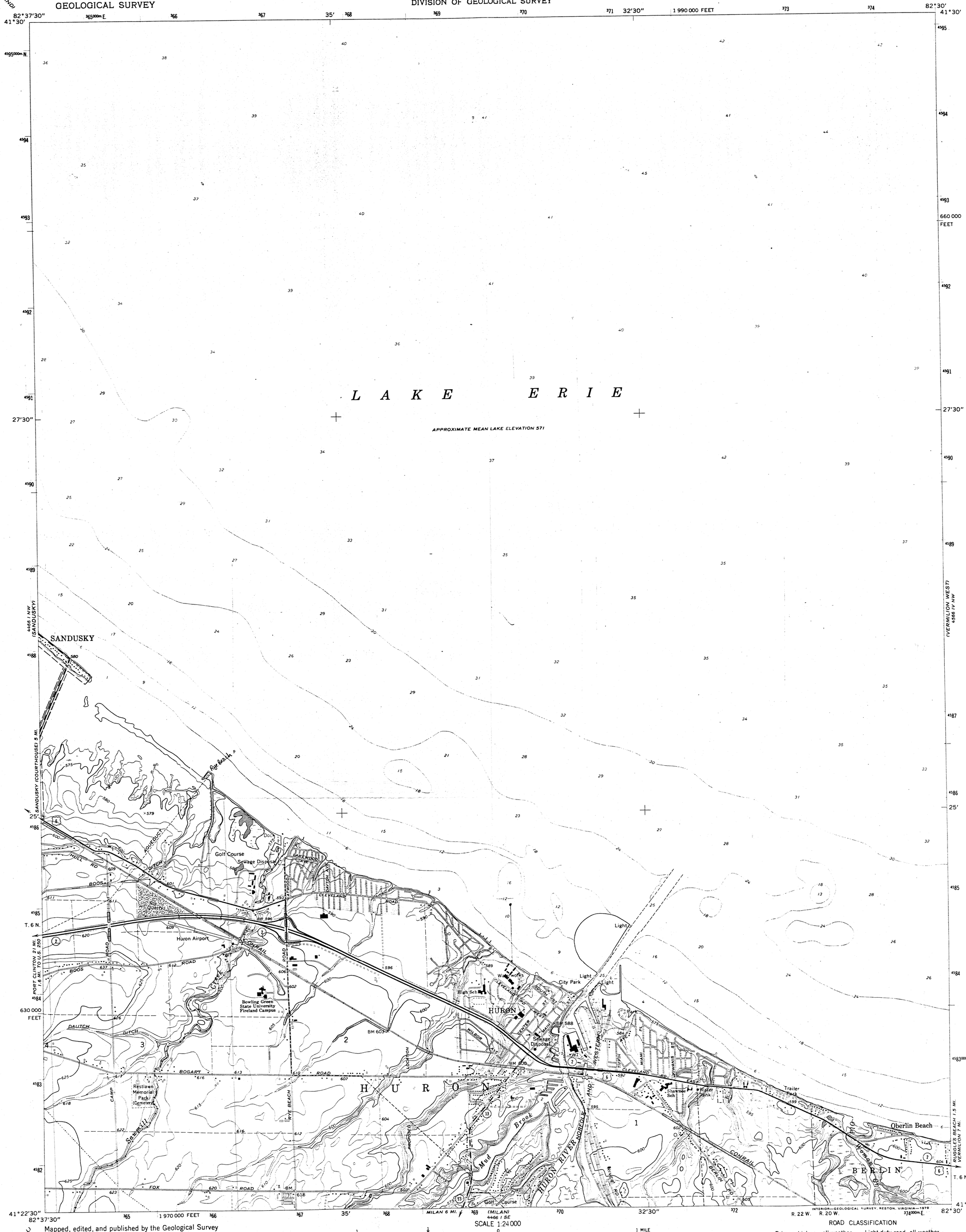
AMS 4466 I SW—SERIES V852

PBS027-11

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

HURON QUADRANGLE
OHIO–ERIE CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and USCE

Planimetry by photogrammetric methods from aerial photographs taken 1956
Topography by planetable surveys 1959. Revised from aerial photographs taken 1969. Field checked 1969

Selected hydrographic data compiled from U. S. Lake Survey Charts 39 (1968), 363 and 364 (1967). This information is not intended for navigational purposes

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates areas in which only landmark buildings are shown

Entire area lies within the Connecticut Western Reserve. Dotted land lines established by private subdivision of the Connecticut Western Reserve

MN GN
4½° 80 MILS
1°02' 18 MILS
UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS LOW WATER 568.6 FEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

Revisions shown in purple compiled in cooperation with State of Ohio agencies from aerial photographs taken 1977. This information not field checked. Map edited 1979

Purple tint indicates extension of urban areas

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather

U. S. Route
State Route

HURON, OHIO

N4122.5—W8230/7.5

1969
PHOTOREVISED 1979
AMS 4466 I NE—SERIES V852

ERIIS
505 Huntmar Park Dr, Suite 200
Herndon, VA 20170
(703)834-0600 (800)989-0402
FAX: (703)834-0606

SITE INFORMATION

Yeager Air National Guard
2 Acre Site
Charleston, WV
Kanawha County
Job Number: 311196A
Map Plotted: Feb 9, 1999

MAP LEGEND

- Target Area
- Radii .25, .5, 1 Mi
- Hydrography
- Railroads
- Roads
- Highways
- NPL 0 Sites
- RCRIS_TS 0 Sites
- RCRIS_CA 0 Sites
- CERCLIS 0 Sites
- NFRAP 0 Sites
- RCRIS_LG 0 Sites
- RCRIS_SG 0 Sites
- ERNS 0 Sites
- HWS 0 Sites
- LRST 0 Sites
- SWF 0 Sites
- RST 0 Sites

Miles

0 0.25 0.5

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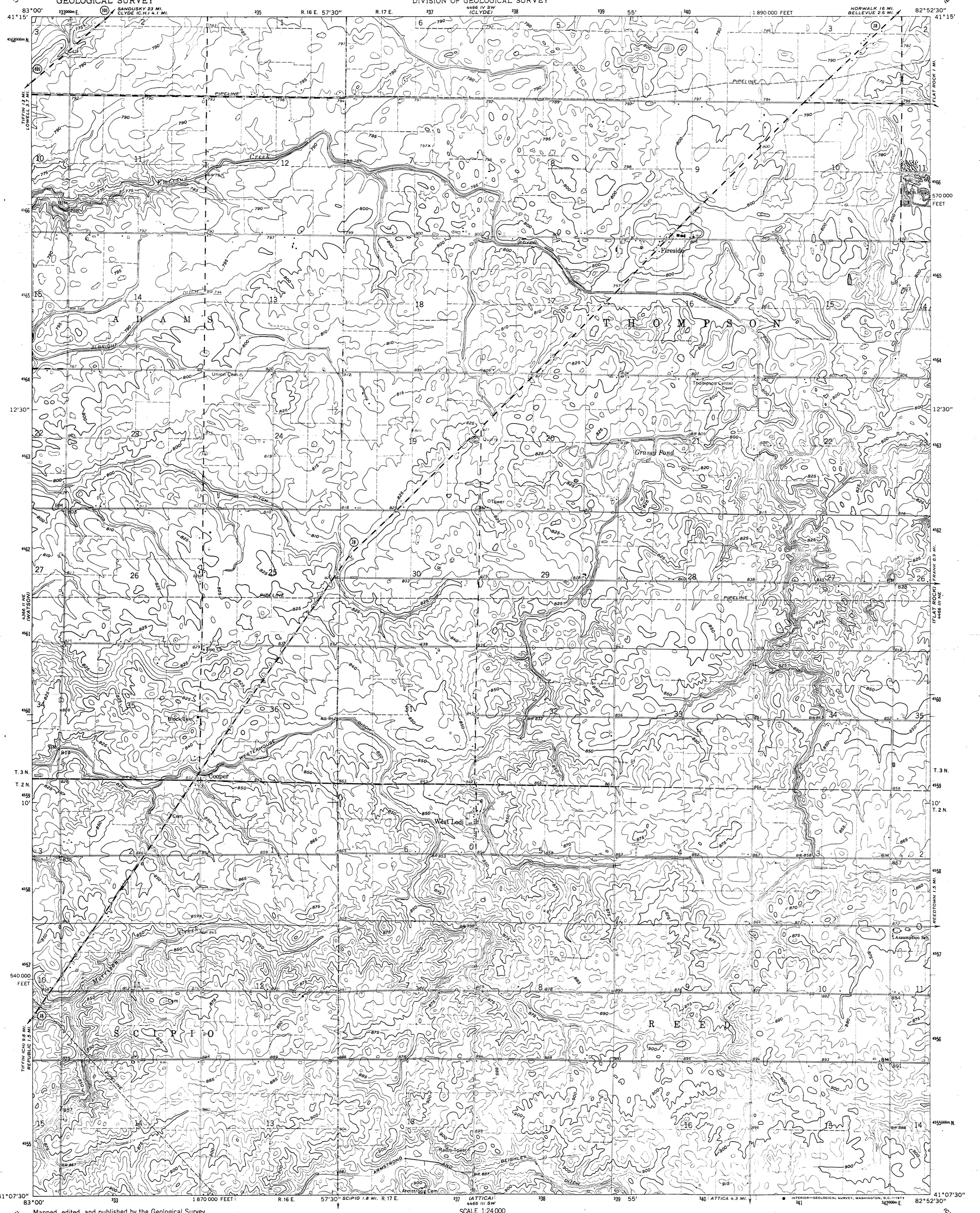
PB5027-13

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

FIRESIDE QUADRANGLE
OHIO–SENECA CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1959. Field checked 1960

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Entire area lies within Congress Lands

Land lines based on the First Principal Meridian

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

UTM GRID AND 1972 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST.

QUADRANGLE LOCATION

Revisions shown in purple compiled in cooperation with State of Ohio agencies from aerial photographs taken 1972. This information not field checked

ROAD CLASSIFICATION
Medium-duty — Light-duty
Unimproved dirt
State Route

FIRESIDE, OHIO
N4107.5—W8252.5/7.5

1960
PHOTOREVISED 1972
AMS 4466 III NW—SERIES V852

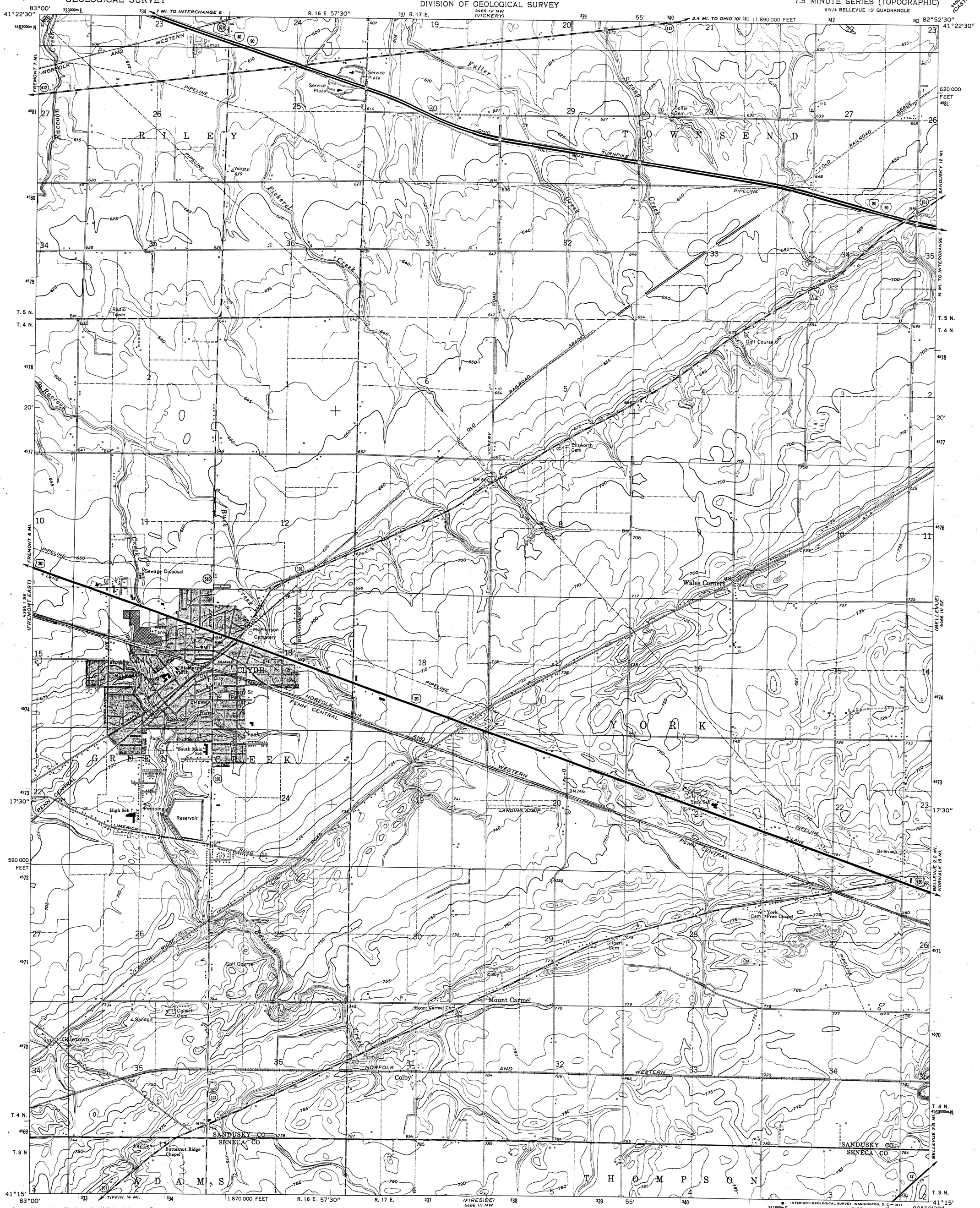
INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D.C.—1973

PBS 027-17

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

CLYDE QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)
SW/4 BELLEVUE 15' QUADRANGLE



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Planimetry by photogrammetric methods from aerial photographs taken 1956. Topography by planetable surveys 1959
Revised from aerial photographs taken 1969. Field checked 1969

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates area in which only landmark buildings are shown

Entire area lies within Congress Lands
Land lines based on the First Principal Meridian

MN GN
2½° 44 MILS
1°17' 23 MILS
UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

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FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather

Interstate Route U. S. Route State Route

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1971

CLYDE, OHIO
SW/4 BELLEVUE 15' QUADRANGLE
N4115—W8252.5/7.5

1969

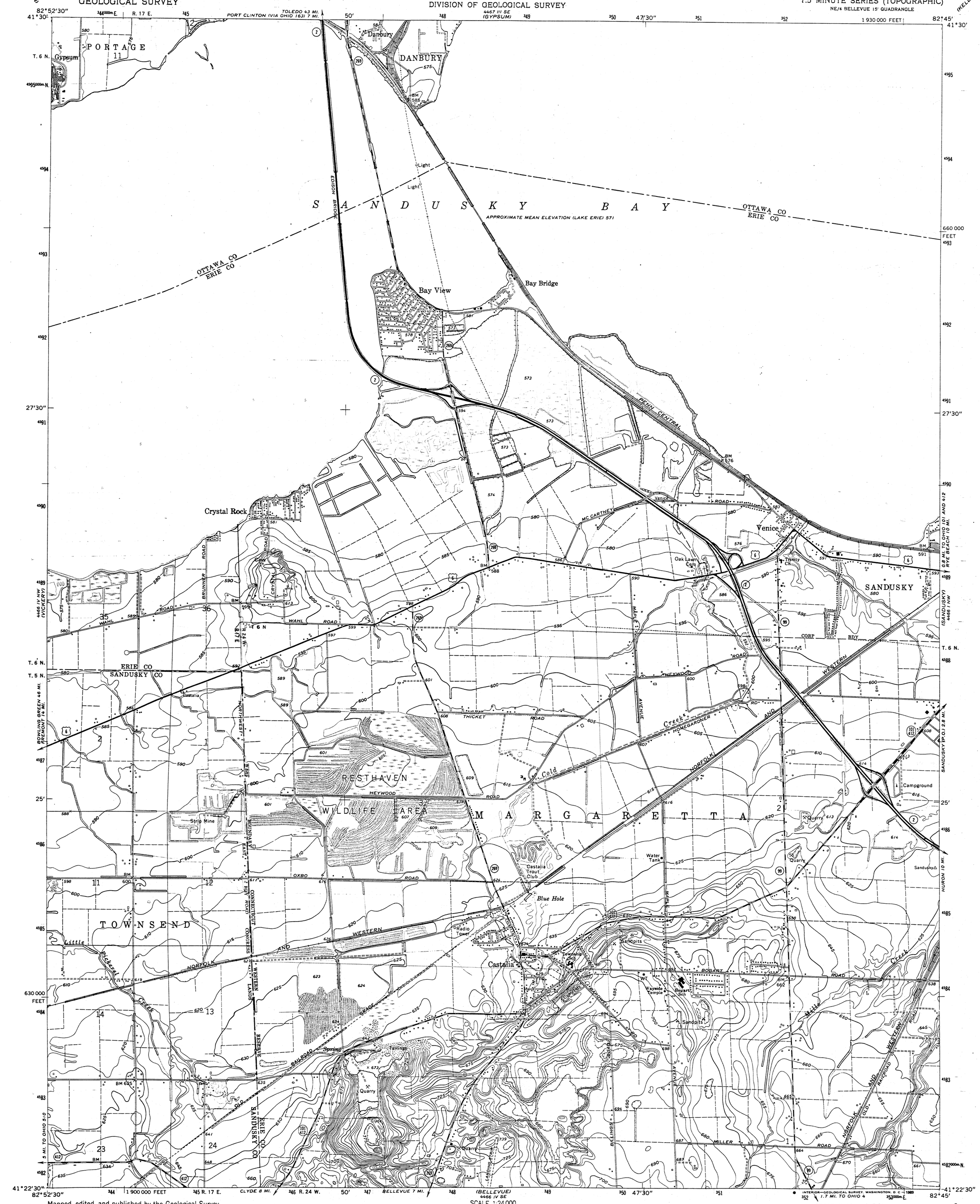
AMS 4466 IV SW—SERIES V852

PBS027-16

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

CASTALIA QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 BELLEVUE 15' QUADRANGLE



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and U. S. Lake Survey

Planimetry by photogrammetric methods from aerial photographs taken 1956

Topography by planetable surveys 1959. Revised from aerial photographs taken 1969. Field checked 1969

Selected hydrographic data compiled from U. S. Lake Survey Chart 364 (1967). This information is not intended for navigational purposes

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Dotted land lines within the Connecticut Western Reserve established by private subdivision. Land lines within Congress Lands based on the First Principal Meridian

MN GN
3° 53 MILS
1°12' 21 MILS
UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS LOW WATER 568.6 FEET

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FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

To place on the predicted North American Datum 1983 move the projection lines 1 meter south and 9 meters west as shown by dashed corner ticks

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather

U. S. Route
State Route

CASTALIA, OHIO
NE/4 BELLEVUE 15' QUADRANGLE
41082-D7-TF-024

1969

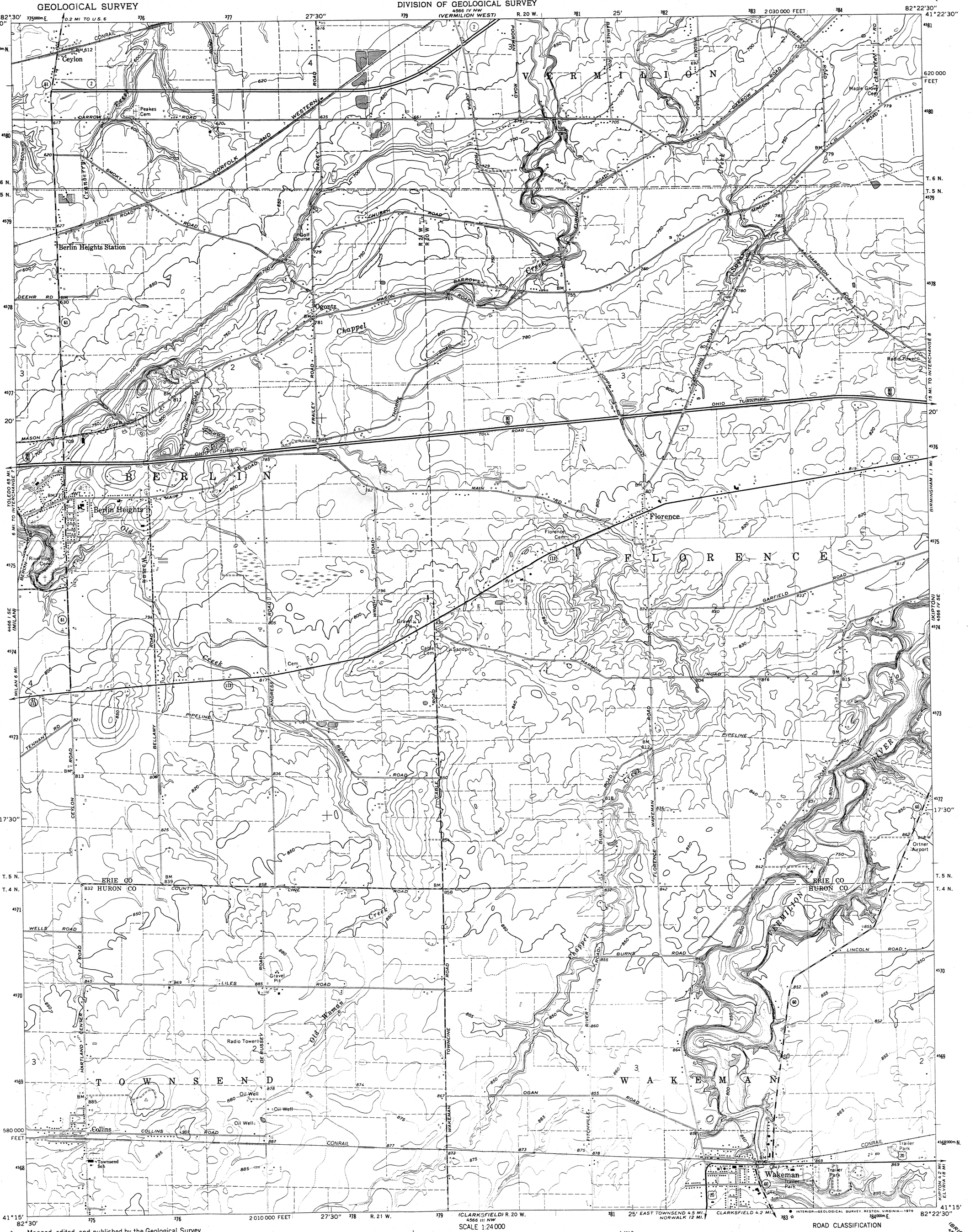
DMA 4466 IV NE—SERIES V852

PBS027-19

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

BERLIN HEIGHTS QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1956. Field checked 1959. Revised from aerial photographs taken 1969. Field checked 1969

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Entire area lies within the Connecticut Western Reserve. Dotted land lines established by private subdivision of the Connecticut Western Reserve

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

MN GN
4½° 80 MILS
0°57' 17 MILS
UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

Revisions shown in purple compiled in cooperation with State of Ohio agencies from aerial photographs taken 1977. This information not field checked. Map edited 1979

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather

Interstate Route
U. S. Route
State Route

BERLIN HEIGHTS, OHIO

N4115—W8222.5/7.5

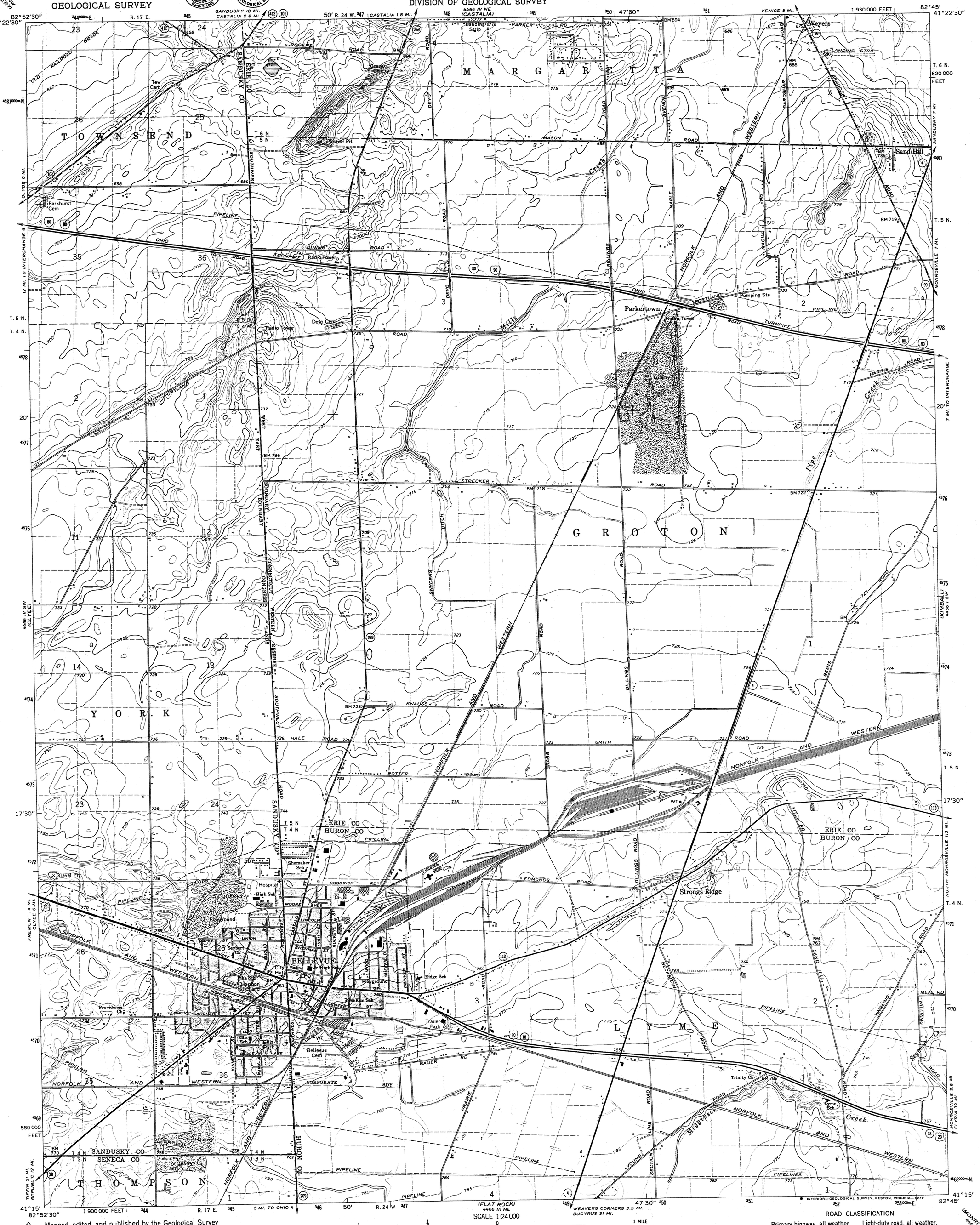
1969
PHOTOREVISED 1979
AMS 4566 IV SW—SERIES V852

PBS 027-18

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

BELLEVUE QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Planimetry by photogrammetric methods from aerial photographs taken 1956. Topography by planetable surveys 1959. Revised from aerial photographs taken 1969. Field checked 1969

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates area in which only landmark buildings are shown

Dotted land lines within the Connecticut Western Reserve established by private subdivision. Land lines within Congress Lands based on the First Principal Meridian

BELLEVUE, OHIO

N4115—W8245/7.5

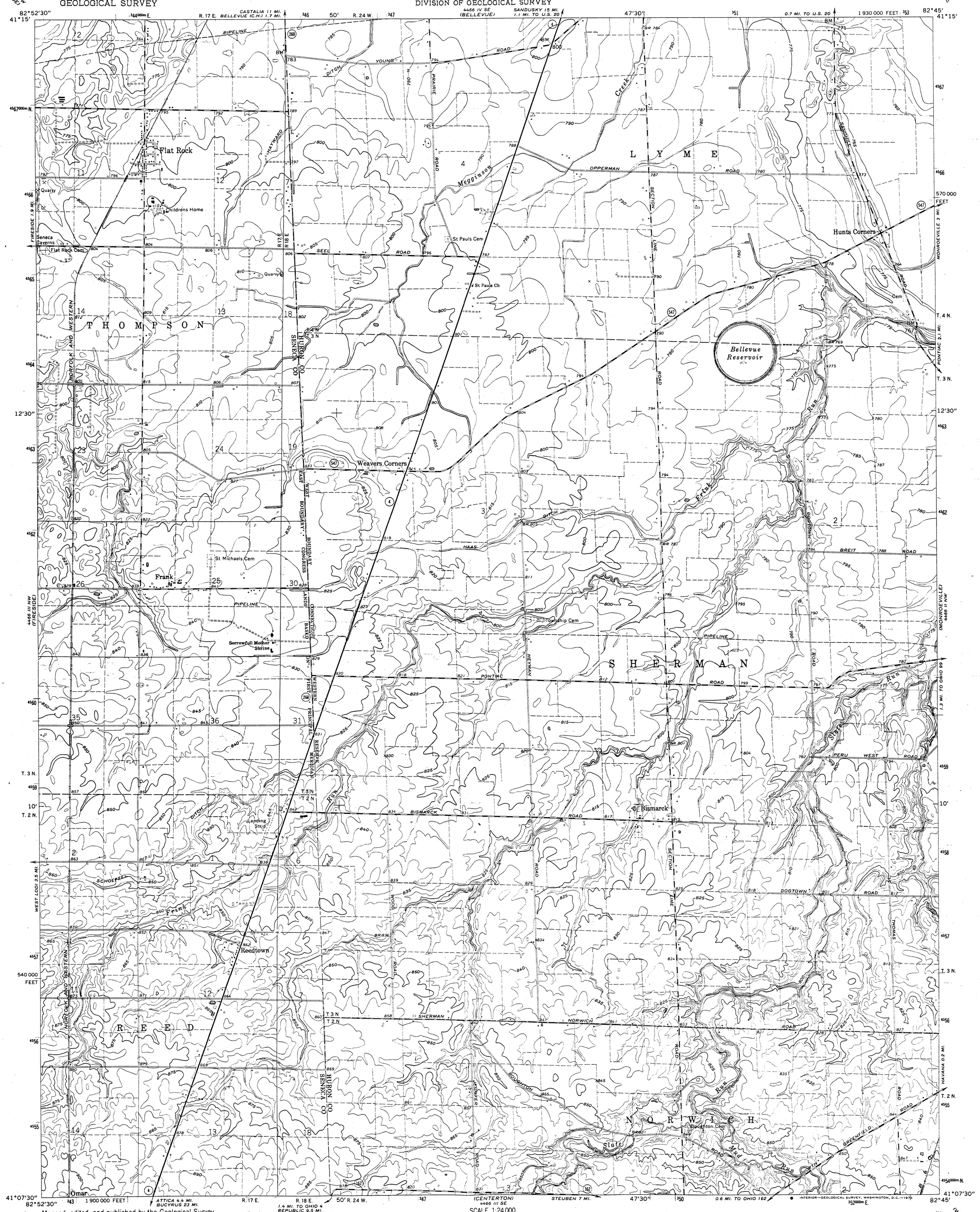
1969
PHOTOREVISED 1979
AMS 4466 IV SE—SERIES V852

PBS 027-14

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

FLAT ROCK QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1959. Field checked 1960

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Land lines west of Connecticut Western Reserve based on the First Principal Meridian. Dotted land lines established by private subdivision of the Connecticut Western Reserve

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

UTM GRID AND 1972 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 5 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

Revisions shown in purple compiled in cooperation with State of Ohio agencies from aerial photographs taken 1972. This information not field checked

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
State Route

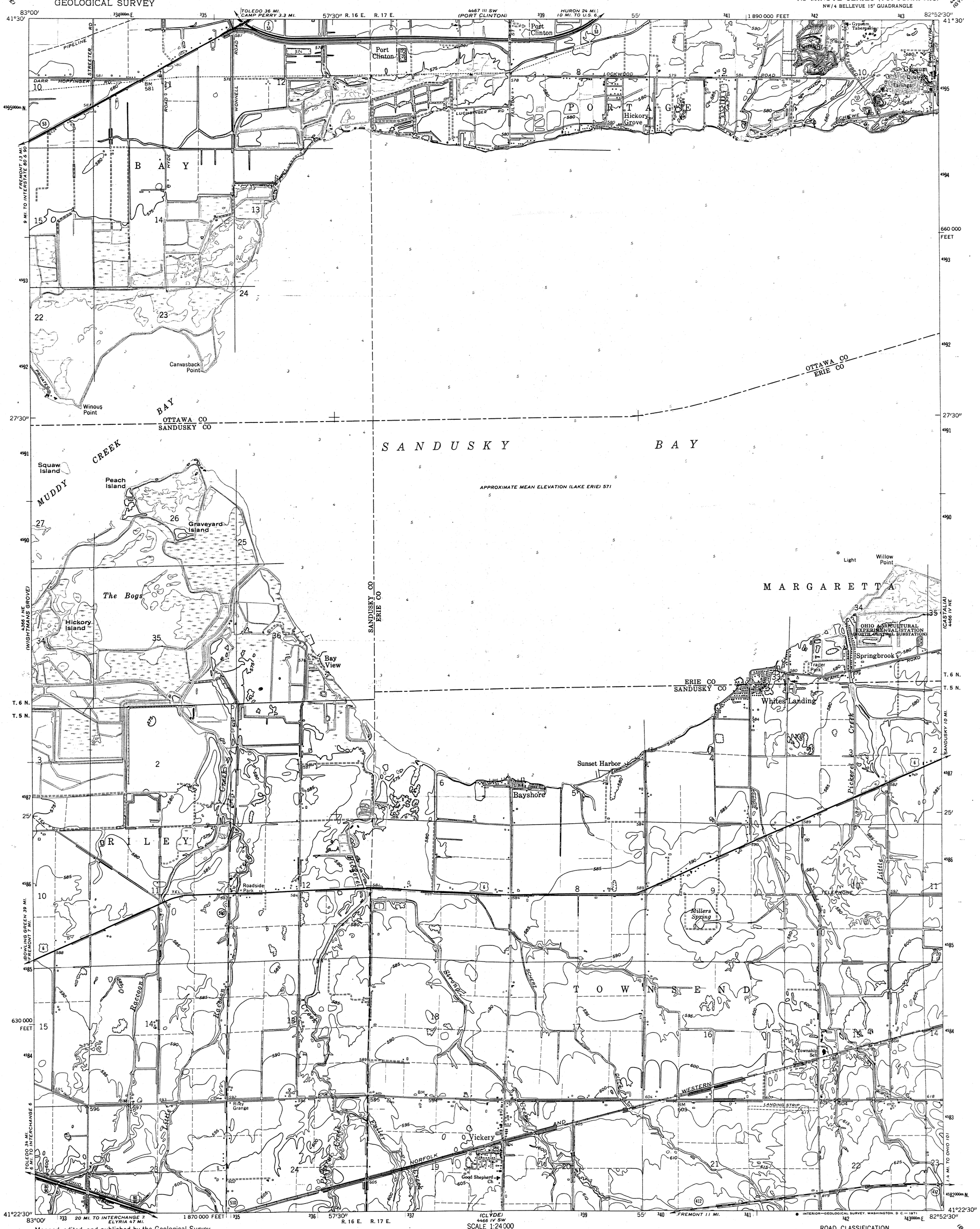
FLAT ROCK, OHIO
N4107.5—W8245/7.5

1960
PHOTOREVISED 1972
AMS 4466 III NE—SERIES V852

PBS027-07

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

VICKERY QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)
NW/4 BELLEVUE 15' QUADRANGLE



Mapped, edited, and published by the Geological Survey
Revised in cooperation with State of Ohio agencies

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1956. Field checked 1957. Revised from aerial photographs taken 1969. Field checked 1969

Selected hydrographic data compiled from U. S. Lake Charts 36 (1965), 39 (1968), and 364 (1967). This information is not intended for navigational purposes

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Entire area lies within Congress Lands
Land lines based on the First Principal Meridian

MN GN
2½° 44 MILS
1°17' 23 MILS
UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 5 FEET.
DATUM IS MEAN SEA LEVEL
SOUNDINGS IN FEET—DATUM IS MEAN LOW LAKE LEVEL 568.6 FEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Secondary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Unimproved road, fair or dry weather

Interstate Route
U. S. Route
State Route

VICKERY, OHIO
NW/4 BELLEVUE 15' QUADRANGLE
N4122.5—W8252.5/7.5

1969

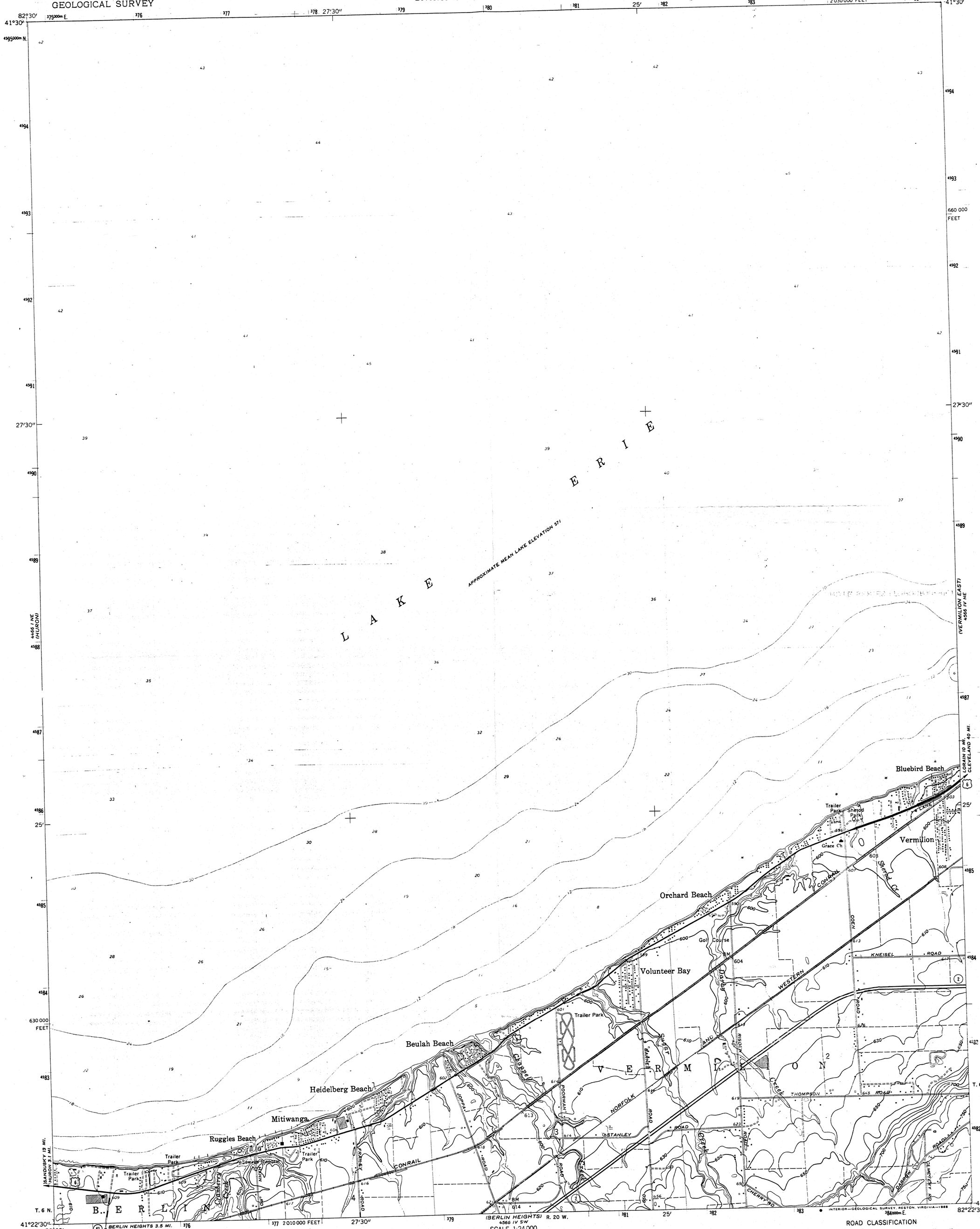
AMS 4466 IV NW—SERIES V852

PBS 027-08

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

VERMILION WEST QUADRANGLE
OHIO—ERIE CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1956. Field checked 1959
Revised from aerial photographs taken 1969. Field checked 1969

Selected hydrographic data compiled from U. S. Lake Survey Chart 36 (1965)
This information is not intended for navigational purposes

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Entire area lies within the Connecticut Western Reserve
Dotted land lines established by private subdivision of the Connecticut Western Reserve

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

MN GN
4½° 80 MILS
0°57′ 17 MILS
UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

To place on the predicted North American Datum 1983, move the projection lines 1 meter south and 10 meters west as shown by dashed corner ticks

SCALE 1:24 000

1 MILE — 7000 FEET — 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS LOW WATER 568.6 FEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

Revisions shown in purple compiled in cooperation with State of Ohio agencies from aerial photographs taken 1977 and other source data. This information not field checked. Map edited 1979.

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather
U. S. Route
State Route

VERMILION WEST, OHIO

41082-D4-TF-024

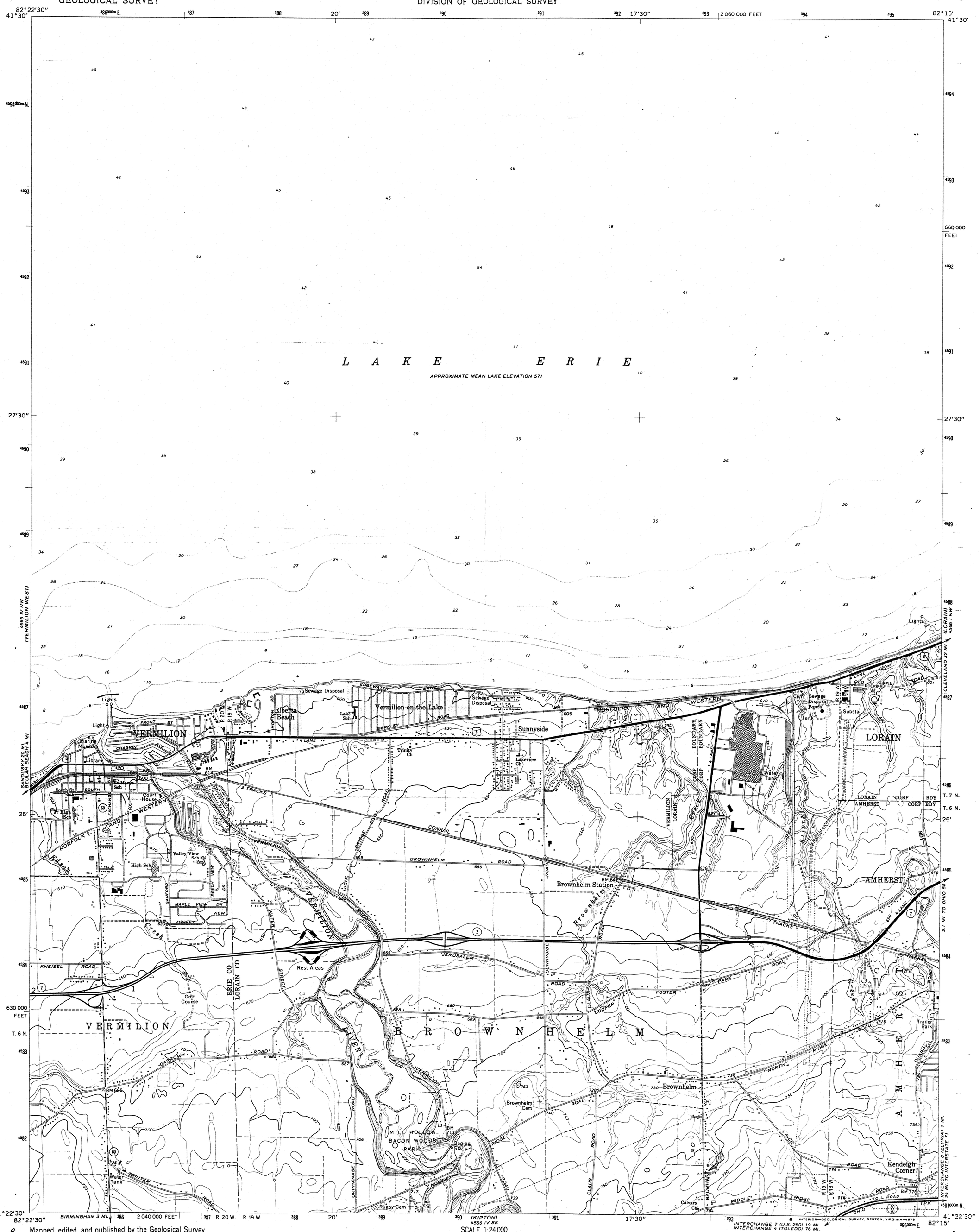
1969
PHOTOREVISED 1979
DMA 4566 IV NW—SERIES V852

PBS027-09

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

VERMILION EAST QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1956. Field checked 1959. Revised from aerial photographs taken 1969. Field checked 1969

Selected hydrographic data compiled from U. S. Lake Survey Chart 35 (1968)
This information is not intended for navigational purposes

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates areas in which only landmark buildings are shown

Entire area lies within the Connecticut Western Reserve. Dotted land line

MN GN
4½° 80 MILS
0°52' 15 MILS
UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS LOW WATER 568.6 FEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

Revisions shown in purple compiled in cooperation with State of Ohio agencies from aerial photographs taken 1977 and other source data. This information not field checked. Map edited 1979.

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather

Interstate Route
U. S. Route
State Route

VERMILION EAST, OHIO

N4122.5—W8215/7.5

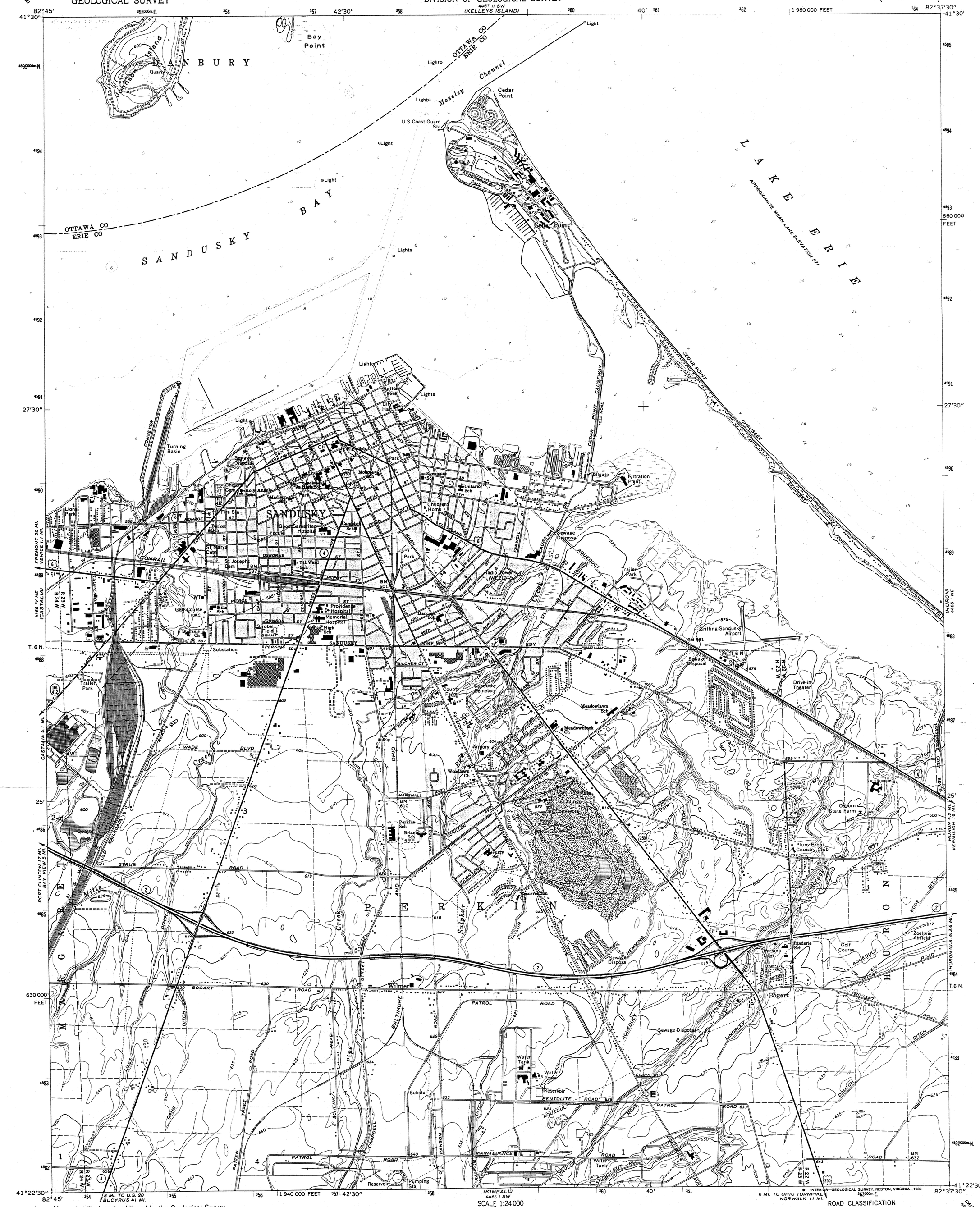
1969
PHOTOREVISED 1979
AMS 4566 IV NE—SERIES V852

PBS027-02

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

SANDUSKY QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Planimetry by photogrammetric methods from aerial photographs taken 1956
Topography by planetable surveys 1959. Revised from aerial photographs taken 1969. Field checked 1969

Selected hydrographic data compiled from U. S. Lake Survey Charts 364 and 365 (1967). This information is not intended for navigational purposes

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates areas in which only landmark buildings are shown

Entire area lies within the Connecticut Western Reserve. Dotted land lines established by private subdivision of the Connecticut Western Reserve

MN GN
4½° 80 MILS
1°07′ 20 MILS

UTM GRID AND 1979 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

To place on the predicted North American Datum 1983 move the projection lines 1 meter south and 9 meters west as shown by dashed corner ticks

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS LOW WATER 568.6 FEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225
OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

Revisions shown in purple compiled in cooperation with State of Ohio agencies from aerial photographs taken 1977 and other source data. This information not field checked. Map edited 1979.

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather
U. S. Route
State Route

SANDUSKY, OHIO
41082-D6-TF-024

1969
PHOTOREVISED 1979
DMA 4466 I NW—SERIES V852

PBS 027-04

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

MILAN QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1956. Field checked 1959. Revised from aerial photographs taken 1969. Field checked 1969

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates areas in which only landmark buildings are shown

Entire area lies within the Connecticut Western Reserve
Dotted land lines established by private subdivision of the Connecticut Western Reserve

MN GN
3° 53 MILS
1°02' 18 MILS
UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
1 MILE
7000 FEET
1 KILOMETER

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

To place on the predicted North American Datum 1983 move the projection lines 1 meters south and 10 meters west as shown by dashed corner ticks

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather
Interstate Route
U. S. Route
State Route

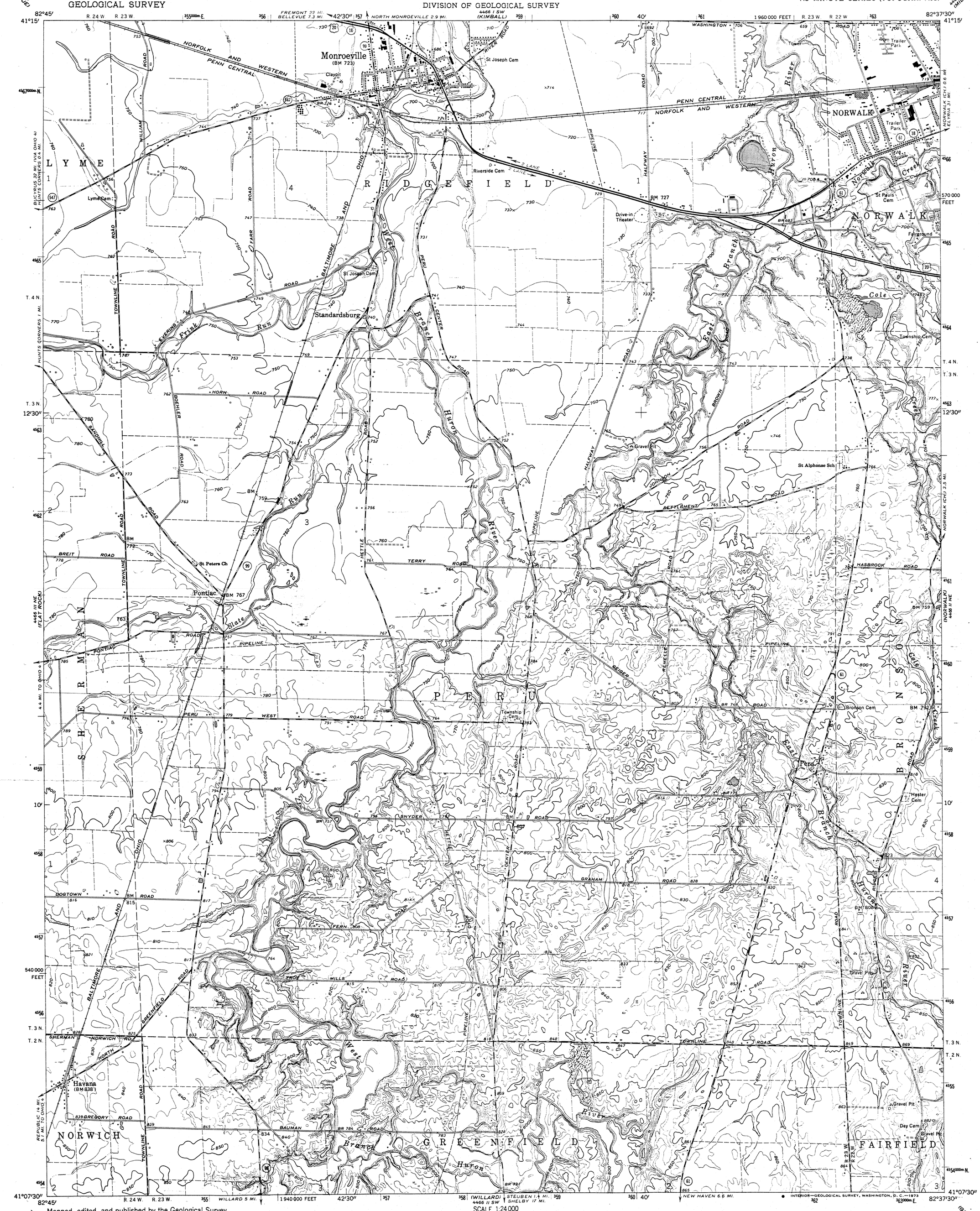
MILAN, OHIO
41082-C5-TF-024
1969
DMA 4466 I SE—SERIES V852

PBS027-03

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

MONROEVILLE QUADRANGLE
OHIO–HURON CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by photogrammetric methods
Aerial photographs taken 1959. Field check 1960

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks,
zone 17, shown in blue

Entire area lies within the Connecticut Western Reserve
Dotted land lines established by private
subdivision of the Connecticut Western Reserve

Fine red dashed lines indicate selected fence and field lines where
generally visible on aerial photographs. This information is unchecked

MN
GN
3½°
62 MILS
1°07′
20 MILS

UTM GRID AND 1972 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

Revisions shown in purple compiled in cooperation with
State of Ohio agencies from aerial photographs taken
1972. This information not field checked

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
U. S. Route — State Route

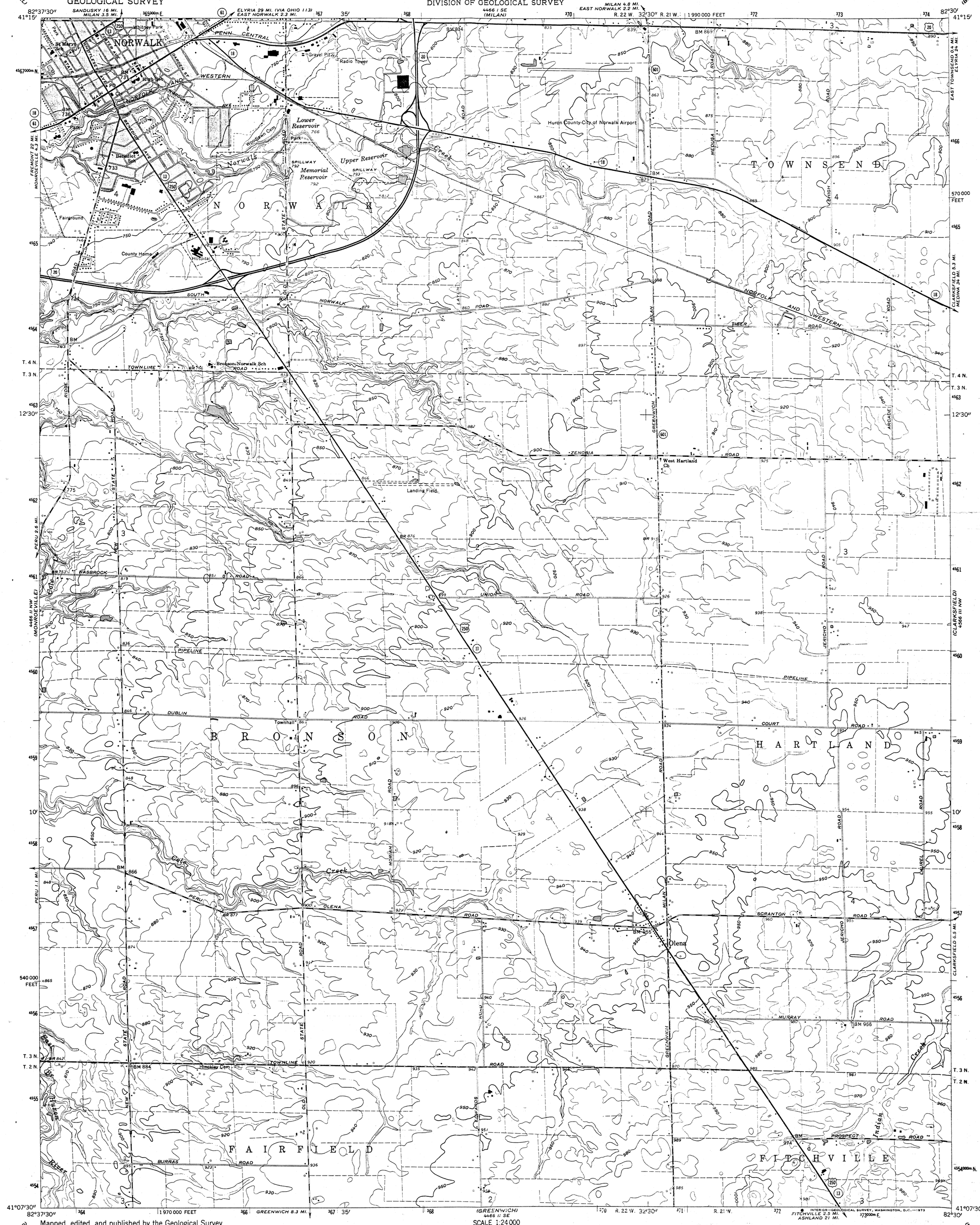
MONROEVILLE, OHIO
N4107.5—W8237.5/7.5

1960
PHOTOREVISED 1972
AMS 4466 II NW—SERIES V852

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

NORWALK QUADRANGLE
OHIO–HURON CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by photogrammetric methods
Aerial photographs taken 1959. Field check 1960

Polyconic projection. 1927 North American datum
10,000-foot grid based on Ohio coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks,
zone 17, shown in blue

Entire area lies within the Connecticut Western Reserve
Dotted land lines established by private survey
subdivision of the Connecticut Western Reserve

Red tint indicates area in which only landmark buildings are shown

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

MN GN
3½° 62 MILS
1°02' 18 MILS
UTM GRID AND 1972 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

OHIO
QUADRANGLE LOCATION

Revisions shown in purple compiled in cooperation with State of Ohio agencies from aerial photographs taken 1972. This information not field checked

Purple tint indicates extension of urban areas

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
U. S. Route — State Route

NORWALK, OHIO
N4107.5—W8230/7.5

1960
PHOTOREVISED 1972
AMS 4466 II NE—SERIES V352

APPENDIX E. 1991 PLUM BROOK STATION CHEMICAL INVENTORY

NASA Plum Brook Station

Chemical Inventory Report

6/19/91

RETAINED - ITEM NUMBER ORDER

tem	Loc	Chemical Name Manufacturer	H A Z	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
57	9208	Freon 22 DuPont	Y	25-30 lb. cylinders	Young	Retain / /	No	Dichlorodifluoromethane
59	9208	Gloss, Exterior		1-5 gal container		Retain / /		
60	9208	Kerosene		6-55 gal drums		Retain / /		
62	9208	Solvent, 140 Varsol	Y	7-55 gal drum		Retain / /	No	
68	9208	Oil, Transformer		1-55 gal drum	Young	Retain / /	No	Non-PCB
69	9208	Oil, Lubricating		2-1 gal containers	Boesch	Retain / /	No	
70	9208	Undercoat		1-5 gal container		Retain / /		
71	9208	Oil, Ursa Super 3 Motor Oil		3-55 gal drum	Boesch	Retain / /	No	
76	9208	Oil, Shell Turbo-T		1-55 gal drum	Boesch	Retain / /	No	Retain - in use.
77	9208	Oil, Factovis 43 Hydraulic & Lubricating Oil		5-55 gal drum	Boesch	Retain / /	No	
78	9208	Oil, Hydraulic Houghton		1-5 gal container	Boesch	Retain / /	No	
79	9208	Propane		2 cylinders		Retain / /		
80	9208	Oil, Vacuum Pump		2-55 gal drums		Retain / /		
81	9208	Oil, Lubricating		2-55 gal drum	Boesch	Retain / /	No	
82	9208	Polyseal		1-5 gal container		Retain / /		
83	9208	Oil, Porta Power		2-1 gal container		Retain / /		

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
197	1431	Poly El ph 976 Grace Dearborn	Y	1-55 gal. barrel		Retain / /	No	Cooling tower chem, will not be needing, new - never opened.
198	1411	Adhesive, sealant Dow Corning		7-90 mL Tubes		Retain / /		Elec Shop Cabinet
199	1491	Roach & Ant Killer Claire	Y	1-15 oz. spray can		Retain / /	No	
207	9211	Chlorea Granular Rhodia Inc. Chipman Div.	Y	100 pounds	Boesch	Retain / /	No	Herbicide
208	9151	Round-Up Monsanto	Y	98 gal.	Boesch	Retain / /	No	Herbicide
210	9151	Spike Elanco	Y	48 pounds	Boesch	Retain / /	No	Herbicide
211	9151	Hatrex Nineo Shell	Y	250 pounds	Boesch	Retain / /	No	Herbicide
212	9151	Dacamine, 4D SDS Biotech Corp.	Y	10 gal.	Boesch	Retain / /	No	Insecticide/Herbicide
214	1411	Oil, Shielding Window	N	1-55 gal. barrel		Retain / /	No	Outside disassembly area.
216	9151	Cythion Smith-Douglas	Y	3 gal.	Boesch	Retain / /	No	Herbicide
217	9151	Pyrenone SMCP	Y	1/2 gal.	Boesch	Retain / /	No	Emulsifiable
219	9151	Vaporsector West		3 gal.	Boesch	Retain / /	No	Pesticide
226	9151	Diazinon, 14G Howard Johnson Ent.	Y	300 pounds	Boesch	Retain / /	No	Insecticide
227	8133	Oil 15 Trane		Unknown		Retain / /		Shop Compressor Oil
228	1411	Sand	N	1 small box		Retain / /	No	Outside shop.
229	1191	Amberlite Rohn and Hass Co.	N	1 canvas bag		Retain / /	No	Fill.

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
289	1112	Drierite W.A. Hammond Drierite Co.	N	1- 1 lb. glass jar		Retain / /	No	
292	7143	Grease, Dow Corning High Vacuum Grease Dow Corning		1-8 oz plastic conta	Herman	Retain / /	No	Eletronics Lab.
297	9151	Oil, Prime Oil		2.5 gal		Retain / /		
299	3211	Paint, misc. colors So-Sure	Y	13 oz. spray cans		Retain / /	No	Approximately 32 cans throughout facility.
300	3211	Paint, misc. colors So-Sure	Y	10.5 oz spray cans		Retain / /	No	Approximately 60 cans throughout facility.
301	3211	Cleaner, T.M.C. Cleaner (Rosin Flux Remover) I.E. DuPont de Nemours		1-16 oz spray can		Retain / /	No	In cabinet; mez. level.
303	3211	Vibra-Tite N.D. Industries		1-1.014 oz.		Retain / /	No	Storage area; ramp level.
304	3211	Locks Nuts Permatex Industrial		1-1.69 oz spray bott		Retain / /	No	Ramp lebel, crib.
306	7132	Oil, Motor Oil Unknown	N			Retain / /	No	For use in Station vehicles.
308	3211	Energol HL-68 Oil Inc.	N	1-55 gal barrel	Narain	Retain / /	No	Full; mez. level; hydr./lub. oil, to be moved to 9208 for Ga
309	3211	Oil, Diffusion Unknown	N	7-1 pint jars	Narain	Retain / /	No	Mez. level; tape reads either 701, 702, 703, 704, 705, 706,
310	3211	Oil, 10-08 Unknown	N	1-1 gal. contaier		Retain / /	No	Ramp level.
311	3211	Ethylene Glycol Stargex Chem. Inc.	Y	1-55 gal barrel		Retain / /	No	Full; ramp level.
312	7143	Hydrochloric Acid VWR	Y	1-9 lb.	Hite	Retain / /	No	
313	3211	Trichloroethane Ashland Chemicals	Y	1-55 barrel		Retain / /	No	Ramp level.
314	3211	Sundis 968 Sun Refining & Marketing Co.		1-55 gal barrel		Retain / /	No	Full; ramp level.

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
347	3211	Flux, Brazo Brand Union Carbide		1-1 pint can		Retain / /	No	In cabinet, ramp level.
349	3211	Thermo Compound Wakefield Eng. Inc.		1-3 pint container		Retain / /	No	In cabinet; ramp level.
353	3211	Solvent, Heavy Duty Solvent Flux Remover Miller-Stephenson		10-16 oz spray cans		Retain / /	No	Ramp level.
357	3211	Sealing Compound and Hardner Steven Ind.		4 cans		Retain / /	No	Storage area; ramp level.
361	3211	Lubricant, Dry Bonded Film Air Cure Lubricant McLube		1-16 oz spray can		Retain / /	No	Storage area; ramp level.
363	3211	X-Tenda True Cut Saw Inc.		3-16 oz spray can		Retain / /	No	
365	3211	Cleaner, Glass Cleaner, Regular Light House for the Blind	N	1-8 oz container		Retain / /	No	Storage area; ramp level.
367	3211	Lube, Cutting Fluid Anchor Lube Anchor Chemical Co.		1-8 oz bottle		Retain / /	No	Storage area; ramp level.
388	1411	Soldering paste, nokorode The M.W. Dunton Co.		13-1.7 oz tubes	Johnson	Retain / /		Shop Tool Crib.
396	1411	Form-a-Gasket Permatex Co.		6-3 oz tubes;12-4 oz		Retain / /		Shop Tool Crib
398	1411	Lubricant Fluorocarbon Bulk Chemical co.		4-16 oz Spray cans		Retain / /		Paint Locker
404	1411	Anti-Seize & Sealing Rector seal Corporation		3-4 oz Tubes		Retain / /		Tool Crib Cabinet
405	3211	Varsol Unknown	Y	1-55 gallon drum	Graebner	Retain / /		Mechanical room.
407	3211	Oil, 704 Diffusion		2-1 gal paint cans		Retain / /	No	Marked on tape; storage area; ramp level.
409	1411	Lubriplate Fiskc Brothers Refining Co.		8-14.5 oz tubes		Retain / /		Tool Crib Cabinet
412	3211	Paint, Spray Green Growco	Y	1-12 oz spray can		Retain / /	No	Storage area; ramp level.

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
448	1411	Adhesive Polymeric Systems, Inc		22-2.8 oz tubes		Retain / /		Tool Crib Cabinet
450	3211	Primer, Zinc Chromate DuPont	Y	1-1 gal can		Retain / /	No	Storage area; ramp level.
454	1411	Super Blue Kendall Refining Co.		9-1 lb containers		Retain / /		Tool Crib Cabinet
455	3211	Sealer, Granitex Floor Sealer Devoe Paint	Y	2-5 gal can		Retain / /	No	Ramp level, will be used in chem. storage bldg.
458	1411	Lock Nuts Permatex Industries		8-1.69 oz Bottles		Retain / /		Shop Tool Crib
474	7133	Oil, 30-W Motor Oil Shell	N	Approx. 20 gal.	Boesch	Retain / /	No	
475	7131	Transmission Fluid, 11 D Dextron ATF Shell	N	Approx. 30 gal.	Boesch	Retain / /	No	
476	7131	Hydraulic Fluid, C-3 Shell	N	Approx. 30 gal.	Boesch	Retain / /	No	
477	7131	Super Agitene Gray Mills Corp.	Y	30 gal.	Boesch	Retain / /	No	
478	7131	Cleaner, Carburator Cleaner Berryman	Y	4 gal.	Boesch	Retain / /	No	
479	7131	Hydraulic Fluid Shell	N	Approx. 40 gal.	Boesch	Retain / /	No	
480	7131	Hydraulic Fluid, Emergol HLP 68 Sohio	N	Approx. 20 gal.	Boesch	Retain / /	No	
481	7131	Oil, 10-W-30 Motor Oil Pennzoil	N	Approx. 50 gal.	Boesch	Retain / /	No	
482	7131	Oil, 15-W-40 Motor Oil URSA Super Plus	N	Approx. 35 gal.	Boesch	Retain / /	No	
483	7131	Ethylene Glycol Full Force Universal	Y	Approx. 50 gal.	Boesch	Retain / /	No	
484	7131	Kerosene, Propellant Unknown	Y	1-45 gallon drum	Boesch	Retain / /	No	

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
504	9168	Powder Fyr-Fyter	N	1-50 lb. pail	Casper	Retain / /	No	
505	9168	Powder, Multi-Purpose Ansul	N	5-50 lb. pails	Casper	Retain / /	No	
506	9168	Powder, Metl-X Ansul		5-50 lb. pails	Casper	Retain / /	No	
507	9168	Cold Clean 500 Adair Equip. Co.		2-5 gal. pails	Casper	Retain / /	No	
509	9168	Paint, Yellow Fox Valley Systems	Y	12-18 oz. cans	Casper	Retain / /	No	
510	9168	Paint, White Latex Baltimore Paint Co.	Y	1-1 gal. can	Casper	Retain / /	No	
512	9168	Paint, Orange Lyle Van Patten Co. Inc.	Y	1-5 gal. pail	Casper	Retain / /	No	
513	9168	Purple K Ansul		30-5 gal. pail	Casper	Retain / /	No	
514	9168	Purple K Fry Fytr		7-5 gal. pail	Casper	Retain / /	No	
518	7233	Toner, Dry Powder Toner Xerox	Y	4 3kg bottles	Casper	Retain / /	No	Rm 101
520	7233	Protein Base Fire Fighting Foam Unknown		1-5 gal pail	Casper	Retain / /	No	Rm 102
521	7233	Lubricant, Dakota Tank Saver & Lubricant Sigler Co.		1-gal.	Casper	Retain / /	No	Rm. 102; to prevent rust in fire water tanks
522	7233	Anhydrous CaSO4 W.A. Hammond Drierite Co.		4-5 lb. jar	Casper	Retain / /	No	Rm. 102; for reactor windows
523	7233	Firewater Conc., 4X The Fire Water Co.		3-1 qt. bottles	Casper	Retain / /	No	Rm 102; for fire extinguishers
528	7233	Sealant, RTV Dow Corning	Y	1-32 oz. tube	Casper	Retain / /	No	Rm. 102
530	7233	Pipe Joint Compound J.C. Whitlam Mfg. Co.	Y	1-1 lb. can	Casper	Retain / /	No	Rm. 102

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
564	7233	Cleaning Packets Georgia Steel & Chem.	Y	1-Box of 100	Casper	Retain / /	No	Mezz.; to clean respirators
565	7233	Cleaner - Sanitizer MSA	Y	1-box of 25 1 oz. pa	Casper	Retain / /	No	Mezz.; to clean respirators
566	7233	Anti-Fogging Solution MSA	Y	15-4 oz. bottles	Casper	Retain / /	No	Mezz.; to clean glasses
567	7233	Propane Turner or Medina	Y	4-14 oz. cylinders	Casper	Retain / /	No	Mezz.
569	7233	Fog Pruf MSA		2-1 gal. bottles	Casper	Retain / /	No	Mezz.; used in goggle cleaning stations
572	7233	Paint, Federal Safety Rust-Oleum	Y	4-1 gal. can	Casper	Retain / /	No	Mezz; misc. colors
575	7233	Paint, Misc. Miscellaneous	Y	4-1 quart cans	Casper	Retain / /	No	Mezz.
576	7233	Paint, Blue Sherwin Williams	Y	1-1 quart can	Casper	Retain / /	No	Mezz.
580	7233	Paint, Red Rust-Oleum	Y	1-1 pint can	Casper	Retain / /	No	Mezz.
581	7233	Paint Miscellaneous	Y	3-8 oz. can	Casper	Retain / /	No	Mezz.
582	7233	Stain, Wood DuPont	Y	1-8 oz. can	Casper	Retain / /	No	Mezz.
583	7233	Paint, Aluminum Rust-Oleum	Y	1-8 oz. can	Casper	Retain / /	No	Mezz.
586	7233	Enamel, Black Imperial	Y	1-2 oz. can	Casper	Retain / /	No	Mezz.
588	7233	Paint, Aluminum Rust-Oleum	Y	1-13 oz. can	Casper	Retain / /	No	Mezz.
594	3411	Acetone		1 Squeeze Bottle		Retain / /		Fire Cabinet #2
595	7233	Enamel, Flat White Testors	Y	1-32 oz. can	Casper	Retain / /	No	Mezz.

Item	Loc	Chemical Name Manufacturer	H A Z	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
614	3411	Sealant, Oxygen Thread Rectorseal Corp.		6-4 oz tubes	Graebner	Retain / /		Part Cabinet #1
615	7233	Paint Thinner Dean & Barry	Y	1-16 oz. can	Casper	Retain / /	No	Mezz.
616	3411	Cleaner, Tub & Tile San-Bay Co.		1-19 oz spray can		Retain / /		Locker Room
617	7233	Turpentine NASCO	Y	1-32 oz. can	Casper	Retain / /	No	Mezz.
618	3411	Permatex #2 Form-A-Gasket		1-3 oz tube	Graebner	Retain / /		Part Cabinet #1
619	7233	Paint, Spray Miscellaneous	Y	124-13 oz. cans	Casper	Retain / /	No	Mezz.
620	3411	Cleaner, Bowl San-Bay Co.		1 qt jug		Retain / /		Locker Room
623	3411	1750 Patch/Flash/Seal Weather Barrier Systems, Inc.		1 gallon		Retain / /		Area 103, Fire Cab #1
625	3411	Detergent/disinfectant, ZAP Unit Chemical Corp.		1 pt bottle		Retain / /		Locker Room
629	2812	Alcohol, Denatured Alcohol Genium Publishing	Y	1-1 gal. can		Retain / /	No	Office
630	2812	Lacquer, Clear LHB Industries	Y	1-13 oz. spray can		Retain / /	No	Flammable cabinet, Shop
631	2812	70 PSI Chemtronics, Inc.	Y	18-14 oz. spray can		Retain / /	No	Flam Cabinet #2
632	2812	Hard Hat Rust-Oleum		1-15 oz. spray can	Mechanics	Retain / /	No	Several cans in Flammable cabinet, Shop
633	2812	Blue Shower Tech Spray	Y	2-12 oz. spray can		Retain / /	No	
634	1411	Enamel, Industrial Acrylic Spray on Products		24-12 oz Spray cans		Retain / /		Elec Cage
635	2812	Dichlorodifluoromethane Chemicals	Y	1-12 oz. spray can		Retain / /	No	K control, Shop

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
658	2811	Stay-Clean Flux Paste J.W. Harris, Inc.		unknown	Mechanic	Retain / /	No	Southwest corner of building
659	2811	Cleaner, Rosin Flux Remover Hi Tech TMC Clean Spray On	Y	unknown		Retain / /	No	Welding booth metal cabinet shop
661	2811	Lubricant, Dry Spray On		3-16 oz cans		Retain / /	No	Cabinets in shop
662	2811	Tru-Cut Saw Tru-Cut Saw, Inc.	Y	4 cans		Retain / /	No	Shop
663	2811	Chemtronics 70 PSI Chemtronics, Inc.	Y	unknown		Retain / /	No	Cabinet #1 Shop
664	2811	Adhesive 4799 Industrial 3M Scotch Grip	Y	32 oz.		Retain / /	No	Cabinet #1 shop
665	2811	Primer, Red Oxide Spray On	Y	11 cans		Retain / /	No	Cabinet #1 Shop
666	2811	Foster 30-35 H.B. Fuller Company		1 Gallon		Retain / /	No	Cabinet #1 Shop
667	2811	Cement, PVC E Z Weld	Y	1-1 Gallon Can		Retain / /	No	Shop area.
668	2811	Dichlorodifluoromethane Bulk Chemicals	Y	3-12 oz		Retain / /	No	Cabinet #1 Shop, K Control Room
670	2811	Flouroglide FB Norton Performance Plastics		16-6 oz. spray cans		Retain / /	No	Cabinet tool crib
671	1411	MolyBDenum Disulfide		1-12 oz bottle		Retain / /		Tool Crib Cabinet
672	2811	Acetone Baddley Chemicals, Inc.		4 gal		Retain / /	No	Flammable Cabinet #2
673	2811	Freon 12 (dichlorodifluoromethane) NAPA	Y	1-14 oz. can		Retain / /	No	Cabinet tool crib
674	2811	Molybdenum Disulfide Noah Technologies, Inc.	Y	1-10 oz. bottles		Retain / /	No	K Control
675	2811	Varsol Chemical Solvents, Inc.	Y	1-5 gallon wash tank		Retain / /	No	Near Southeast exit of shop, used to clean parts

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
696	9208	Molecular Sieve	Y	2-55 gal drums	Koontz	Retain / /	No	K-site Chemical
697	2811	Freon	Y	1-55 gal drum	Koontz	Retain / /	No	Outside Building.
698	2811	Ethylene Dichloride	Y	1 small can		Retain / /	No	Flammable cabinet #2
699	2812	Adhesive Rubber Base Steven Industries	Y	2 cans		Retain / /	No	Tool crib supply cabinet, K Control
700	2811	Sealing Comp. Steven Industries	Y	1 can		Retain / /	No	Tool crib supply cabinet
701	2811	Form A Gasket No. 2 - 2B Permatex	Y	3 tubes		Retain / /	No	Tool crib
702	2811	Prussian Blue Permatex		1 tube		Retain / /	No	Tool crib supply cabinet
703	2811	Removable Thread Locker 242 Loctite	Y	5-1.69 oz. bottles		Retain / /	No	Throughout the facility
704	2811	Lube, Anti-Seize Lube Permatex	Y	1-8 oz bottle		Retain / /	No	Shop
705	2811	Oil, Super "X" Vacuum Pump Oil Kinney		5-1 gallon bottle		Retain / /	No	Cabinet #1 shop, 4 gal full, 1 almost empty
706	2811	Oil, Cutting Unknown		4 gallons		Retain / /	No	Cabinet #1 shop
707	2811	Hydraulic #5606 Not marked		1/2 gallon		Retain / /	No	Cabinet #1 shop
708	2811	Oil, Pneumonic Tool Oil Not marked		1/2 gallon		Retain / /	No	Cabinet #1 shop, can labeled with sticker
709	2811	Lubriplate Fiske Brothers Refining Co.		1 gal. can		Retain / /	No	cabinet shop #1
710	2811	Sealant, High Vacuum Leak Sealant Kurt J. Lesker Co.		2-16 oz. spray can		Retain / /	No	Flammable cabinet #2
711	1411	Adhesive, sealing compound		4-1.75 oz tubes		Retain / /		Elec Shop Cabinet

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
729	2811	Enamel, Aluminum Acrylic Spray On	Y	6 Spray cans		Retain / /	No	Flammable cabinet shop
730	2811	Primer, Clean metal primer Rust-oleum	Y	4-12 oz. spray cans		Retain / /	No	Flammable cabinet shop
731	2811	Primer, Red Oxide Spray On	Y	30-12 oz. spray cans		Retain / /	No	Flammable cabinet shop
732	2811	Lacquer, misc LHB Industries So-Sure	Y	Misc Quantities		Retain / /	No	Flammable cabinet shop
733	2811	Lacquer, Green type 2 TTL-50G Spray-O-Matic	Y	1-13 oz. spray can		Retain / /	No	Flammable cabinet shop
734	2811	Mil spec 23690 beige Randolph	Y	2-16 oz. spray cans		Retain / /	No	Flammable cabinet shop
735	2811	Oil, Unknown light weight oil Peeco, Inc	Y	16 oz. can		Retain / /	No	North Entrance, Bench top
736	2811	Great Stuff Insta-Form Products, Inc.	Y	1-12 oz. spray cans		Retain / /	No	
737	2811	Adhesive, Bondstrand Epoxy Adhesive AMERON	Y	3 oz.		Retain / /	No	Tool Crib Cabinet
738	2811	Static Guard Alberto-Culver Company	Y	2-6 oz. spray cans		Retain / /	No	
739	2811	Penetrant, 711 Penetrant Spray On	Y	28-12 oz. spray cans	Mechanics	Retain / /	No	Throughout facility.
740	2811	Cleaner & rosin flux remover, TMC Spray On	Y	Unknown		Retain / /	No	Flammable cabinet shop
741	2811	Mo S2 108 McLude McGee Industries	Y	2-16 oz. spray can		Retain / /	No	Flammable cabinet shop, Control Room
742	2811	Blue Layout Fluid Spray On	Y	1-10 oz. spray cans		Retain / /	No	Flammable cabinet shop
743	2811	Cleaning Solvent, Trichlorothfluorethane Bulk Chemicals	Y	7-13 oz. spray cans		Retain / /	No	K-Control
744	2811	Ink, Blue Steel Ink Do All Co.	Y	1-12.4 oz. spray can		Retain / /	No	Flammable Cabinet

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
761	2811	Paint, dark machine gray Rust-Oleum	Y	28-15 oz. cans		Retain / /	No	Flammable cabinet
762	3411	Detergent, Pine oil detergent/disinfectant Lighthouse for the Blind	Y	1 gallon		Retain / /	No	Room 104 locker room
763	3411	Paint, misc. colors Rust-Oleum	Y	2 cans		Retain / /	No	Area 103 fire cabinet 1
765	3411	Paint, Red Primer Spray On	Y	22 spray cans		Retain / /	No	Area 103 fire cabinet 1
766	3411	MoS2 108 McGee Industries	Y	8 cans		Retain / /	No	Area 103 fire cabinet 1
767	3411	Penetrant, 711 Penetrant Spray On	Y	5 cans		Retain / /	No	Fire cabinet 1, Area 103
768	3411	Paint, misc. colors LHB Industries	Y	75 spray cans		Retain / /	No	Area 103 fire cabinet 1
773	3411	MS-220 Aero-Duster Miller-Stephenson Chemical Co.		1 can		Retain / /	No	Area 103 fire cabinet 1
774	3411	Flouroglide FB Norton Performance Plastics	Y	9 cans		Retain / /	No	Area 103 fire cabinet 1
775	3411	Leak Tek Unknown		1/2 gal		Retain / /	No	Area 103 fire cabinet 1
776	3411	Anti-Skid Coating Garon Products, Inc.		4-1 gallon		Retain / /	No	Area 103 fire cabinet 1
777	3411	Paint, Alkyd Enamel Sherwin Williams		1 gallon		Retain / /	No	Area 103 fire cabinet 1, color MC-57 spice
778	3211	Houghto-Safe 1055 E.F. Houghton		5-55 gal. drums	Graebner	Retain / /		Mechanical room.
780	3411	Sealant, Silicone RTV Sealant Dow-Corning	Y	2 tubes		Retain / /	No	Fire cabinet 2
781	3411	Oil, Air compressor oil unknown		2 gallons		Retain / /	No	Area 103 fire cabinet 2, identified with black marker
787	3411	Adhesive, 4799 Industrial adhesive 3M		1 quart		Retain / /	No	Area 103, Fire cabinet 2

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
817	3232	Ethylene Glycol Grace Dearborn	Y	4-55 gallon drums		Retain / /	No	For boilers
818	3232	CC450 Water treatment Calgon	Y	15 gallons		Retain / /	No	One gallon opened
819	3232	CC540 Scale dissolver Calgon	Y	18-5 gallon cans		Retain / /	No	To be used at HTF.
820	3232	CC2000 Inhibitor Calgon	Y	8-5 gallon cans		Retain / /	No	One can opened
821	3232	CC300T Oxidizer Calgon	Y	5 gallon can		Retain / /	No	
822	3231	Water test kit Chemetrics		1 kit		Retain / /	No	
828	3211	Sulfuric Acid - in batteries NIFE	Y	92 Batteries		Retain / /	No	Batteries in Electric Room.
829	3211	Solvent Miller Stephenson	Y	1 can		Retain / /	No	Elect. room
831	3211	Blue Stuff Tech Spray	Y	1-8 oz. spray can		Retain / /	No	Inst. room
832	3211	Cleaner, Contac GC Electronics	Y	1-6 oz. spray can		Retain / /	No	Inst. room
834	1411	Trichloroethane Chemical Solvents	Y	1-55 gal. drum		Retain / /	No	Assembly Area
835	1411	Acetone Lewis Stock	Y	1-55 gal. drum	Johnson	Retain / /	No	Assembly Area.
836	1411	Solvent, Waste Unknown	Y	55 gallons		Retain / /	No	Assembly room by door #1, to be disposed of when full
837	1411	Oil, Waste Unknown	N	55 gallons		Retain / /	No	Assembly room by door #1, to be disposed of when full
839	1411	Trichlorofluoromethane (Freon 11) Kaiser Chem.	Y	9-30 gallon drums		Retain / /	No	Cyro room, will be moved
842	9208	Acetone Phipps Products Corp.	Y	2-55 gal. drums		Retain / /	No	

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
862	1411	Paint, spray Unknown	Y	23 spray cans	Johnson	Retain / /	No	Elect. shop cabinet
863	1411	Petroleum Nap Chemical Solvents, Inc.		55 gal drum		Retain / /		Door #1
864	1411	Adhesive rubber Clifton Adhesive	Y	2 pints	Lenhart	Retain / /	No	Elect. shop cabinet
865	1411	Zinc It C.R.C. Chemicals, Inc.	Y	1 gallon	Lenhart	Retain / /	No	Elect. shop cabinet
866	1411	Paint Unknown	Y	5 spray cans	Lenhart	Retain / /	No	Elect. shop cabinet
867	1411	Phenoline 305 Finish Pt A Carboline Co.		3 gal		Retain / /		Clean Room
868	1411	Tru-Cut X-Tender		27-13 ioz cans		Retain / /		Room 106
869	1411	Flux, Stay Clean Flux J.W. Harris Co., Inc.		2-32 oz. bottles		Retain / /	No	Shop tool crib cabinet
870	1411	Paint Unknown	Y	47 spray cans		Retain / /	No	Cryo room, elect. crib
871	1411	Solvent, Degreasing VaKamp Corp.	Y	1/2 gallon		Retain / /	No	Cryo room cabinet
872	1411	Adhesive Cynoacrylate Loctite Corp.	Y	14 oz.		Retain / /	No	Tool crib cabinet
873	1411	Solvent, Loctite Loctite Corp.	Y	2-12 oz. spray cans		Retain / /	No	Tool crib cabinet
874	1411	Sealing Compound Steven Industries		4 pints		Retain / /	No	Tool crib cabinet
875	1411	Loctite Loctite Corp.	Y	3 oz.		Retain / /	No	Tool crib cabinet
876	1411	Sealant, RTV Sealant 736 Dow Corning	Y	36 tubes		Retain / /	No	Tool crib cabinet
877	1411	Silicone Ultrasil Ohio Sealants, Inc.	Y	11 tubes		Retain / /	No	Tool crib cabinet

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
900	1411	Sulfuric Acid Hukill Chemicals	Y	30 gallons		Retain / /	No	Boiler room, cooling tower water pH control, concentrated
901	1411	Exfoam 442 Grace Dearborn	N	2 gallons		Retain / /	No	Boiler room, silicone anti-foam
903	1411	Dearborn 537 Grace Dearborn	Y	100 gallons		Retain / /	No	Boiler room, Closed system inhibitor
904	1411	Dearborn 537 Grace Dearborn	Y	15 gallons		Retain / /	No	Boiler room, closed system inhibitor day tank
905	1411	IPL 900 UOP Water Services		30 gallons		Retain / /	No	Boiler room, fuel oil treatment
908	1411	Descaler "G" Unknown	Y	5 gallons		Retain / /	No	Boiler room, hydraulic acid for scale remover
909	1411	G-30 UOP		20 gallons		Retain / /	No	Boiler room, steam and return line treatment amines
910	1411	A-90 UOP		15 gallons		Retain / /	No	Boiler room, phosphate additive, similar to Dearborn 278
911	1411	IPL-650 UOP		25 gallons		Retain / /	No	Boiler room, Alkalinity builder, similar to Dearborn 150
912	1411	Alcohol, Isopropyl Alcohol Mallinkrodt		1000 mL		Retain / /		Room 106
913	1411	Trichlorofluoromethane (Freon 11) Genetron Dupont	Y	200 lbs.		Retain / /	No	Boiler room, refrigerant for chillers
914	1411	Refrigerant 11 Allied DuPont	Y	100 lbs.		Retain / /	No	Boiler room, refrigerant for chillers
915	1411	Refrigerant 11 Allied DuPont	Y	100 lbs.		Retain / /	No	Boiler room, refrigerant for chillers
916	1411	Trichlorodifluoromethane Allied DuPont	Y	50 lbs.		Retain / /	No	Boiler room, in chillers CH-2.3-3
917	1411	Solvent, Stoddard Solvent Standard Oil		15 gallons		Retain / /	No	Boiler room, parts washer
919	1411	Adhesive, #2002 Adhesive Grant Wilson, Inc.		2 quarts		Retain / /	No	Boiler room, armour flex, flexulation

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
936	1411	Buffer solution ph 10.0 Grace Dearborn		1 1/2 quart		Retain / /	No	Room 103 glass lab, code 572
937	1411	Conductance standard Grace Dearborn		2 quarts		Retain / /	No	Room 103 glass lab, code 578
938	1411	Conductance standard Grace Dearborn		3 quarts		Retain / /	No	Room 103 glass lab, code 575
939	1411	Conductance standard Grace Dearborn		3 quarts		Retain / /	No	Room 103 glass lab, code 577
940	1411	Conductance standard Myron and Co.		1 quart		Retain / /	No	Room 103 glass lab
941	1411	Muriatic acid UOP	Y	1 pint		Retain / /	No	Room 103 glass lab, conductivity cont. ph cont. sensor clean
942	1411	Sodium thiosulfate Grace Dearborn	Y	2 oz.		Retain / /	No	Room 103 glass lab, code 550 water analysis
943	1411	Indicator, xylenol orange Grace Dearborn	Y	1 oz.	Tyren	Retain / /	No	Room 103 glass lab, code 562 water analysis.
944	1411	Hydrochloric acid Grace Dearborn	Y	2 oz.		Retain / /	No	Room 103 glass lab, code 595 water analysis
945	1411	Suppressor, interference suppressor Grace Dearborn	Y	2 oz.	Tyren	Retain / /	No	Room 103 glass lab, code 899 water analysis
946	1411	Thorium nitrate Grace Dearborn		2 oz.		Retain / /	No	Room 103 glass lab, code 904 water analysis
947	1411	Neutralizing solution Grace Dearborn		2 oz.		Retain / /	No	Room 103 glass lab, code 567 water analysis
948	1411	DPD free chlorine reagent Hach Chemical Co.	Y	150 pillows		Retain / /	No	Room 103 glass lab, code 602 water analysis
949	1411	DPD total chlorine reagent Hach Chemical Co.	Y	50 pillows		Retain / /	No	Room 103, code 603 water analysis
950	1411	Potassium persulfate powder pillows Hach Chemical	Y	100 pillows		Retain / /	No	Room 103 glass lab, water analysis
951	1411	Phosver 3-phosphate reagent powder pillows Hach Chemicals	Y	100 pillows		Retain / /	No	Room 103 glass lab, water analysis

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
968	3131	Propane, Propellant Chemscope Co.	Y	1 spray can	Young	Retain / /	No	Paint locker
969	3131	Gold leaf finish Sheffield-Bronze	Y	1 can	Young	Retain / /	No	Paint locker
970	3131	Ink, Blue Steel Ink Do All Co.		1 spray can	Young	Retain / /	No	Paint locker
971	3131	Molykote G spray Dow Corning		2 spray cans	Young	Retain / /	No	Paint locker
972	3131	Molykote G paste Dow Corning		1 can	Young	Retain / /	No	Paint locker
973	3131	Quick Freeze Miller Stephenson	Y	1 spray can	Young	Retain / /	No	Paint locker
974	3131	Freon T-B1 cutting fluid Miller Stephenson	Y	1 spray can	Young	Retain / /	No	Paint locker
975	3131	Metalax Sherwin Williams		14 gallons	Young	Retain / /	No	Basement locker 893
976	3131	Paint, Misc. LHB Industries	Y	78 spray cans	Young	Retain / /	No	Paint locker
977	3131	Paint, Misc. Rust-Oleum Corp.	Y	7 spray cans	Young	Retain / /	No	Paint locker
978	3131	Paint, Five Star National Aerosol Products	Y	3 spray cans	Young	Retain / /	No	Paint locker
979	3131	Trichloroethane Vulcan Materials	Y	110 gallons	Young	Retain / /	No	Back room, B-1 shop
980	3131	Dow Corning fluid 200 Dow Corning		1 can	Young	Retain / /	No	Tool cage
981	3131	Cleaner, MS-260 cleaner Miller Stephenson	Y	1 spray can	Young	Retain / /	No	Tool cage
982	3131	Dichlorodifluoromethane Atlantic Chemical	Y	1 spray can	Young	Retain / /	No	Tool cage
983	3131	Flux, Stainless Steel Flux Superior Flux & Mfg Co.	Y	1/2 qt	Young	Retain / /	No	Tool cage

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1000	3131	Cleaner, Hand cleaner Makoon Products		5-1 lb. cans	Young	Retain / /	No	Basement, locker 882
1001	7143	Oil, Neats Foot Stevens Ind.		1-1 pt can	Herman	Retain / /		
1002	8133	Silicone Lub Plus, Wet type 3M		2-15 oz cans	Young	Retain / /		
1003	3131	Adhesive, Cove Base Adhesive Midland Chicago Co.	Y	1 quarts	Young	Retain / /	No	Basement, locker 893
1004	3131	Leak detector for oxygen T.O. Bateman Co.	N	.75 gallon	Young	Retain / /	No	Basement, locker 3
1005	3131	Solvent, Slipry Sol Thomas Industries		3 spray cans	Young	Retain / /	No	Basement, locker 3
1006	3131	Lube, Slipry Lube Thomas Industries		1 spray can	Young	Retain / /	No	Basement, locker 3
1007	3131	Lubricant, Yellow 77 Ideal Industries		1 spray can	Young	Retain / /	No	Basement, locker 3
1008	3131	Flux, Soldering & Tinning Flux Ruby Chemical Co.	Y	1 quart	Young	Retain / /	No	Basement, locker 3
1012	3131	Flux solding paste L.B. Allen Co.	Y	1 quart can	Young	Retain / /	No	Welding bench
1013	3131	Flux, No. 114 Flux Burdox Co.	Y	1/2 qt. jar	Young	Retain / /	No	Welding bench
1014	7143	Oil, Instrument		1-400 mL	Herman	Retain / /		
1015	3131	Flux, Brazing Union Carbide Co.	Y	1 can	Young	Retain / /	No	Welding bench
1016	3131	Nozzle shield anti-spatter Welco Chemicals		1 spray can	Young	Retain / /	No	Welding bench
1017	3131	Spar-Urethane Minwax Co., Inc.	Y	.5 quart can	Young	Retain / /	No	Back room, shelf
1018	3131	Ethylene glycol Unknown	Y	50 gallons	Young	Retain / /	No	Welding bench, use in boiler room

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1041	8561	Compound #227 Joint for V.C. & rubber cables P.L.M. Products		2 gallon can	Young	Retain / /	No	
1042	8561	Strypeeze Savogran Co.		1 quart	Young	Retain / /	No	
1043	8561	Trichloroethane Unknown	Y	1 gallon can	Young	Retain / /	No	
1044	8561	Paint, G.E. Clyptal Paint G.E. Co.	Y	2-1 gallon can	Young	Retain / /	No	#2704A blue/gray USA #24 gloss enamel
1046	8561	Oil, Hydraulic Unknown	N	5 gallon can	Young	Retain / /	No	1/4 full
1047	8561	Oil, Hydraulic #5606C Unknown	N	5 gallon can	Young	Retain / /	No	2/3 full
1048	1411	Leak Tek American Gas & Chem. Inc.	N	16 fl. oz.	Johnson	Retain / /	No	Non toxic type oxygen formula 16-ox.
1049	9209	Lacquer, NYBCO yellow N.Y. Bronze Powder Co., Inc.	Y	4 pint spray can	Ruffing	Retain / /	No	
1050	9209	Lubricant, Molykote 557 Lubricant Dow Corning Co.		16 oz.	Ruffing	Retain / /	No	
1052	9209	L.P. Gas containers Unknown	Y	78 ea.	Ruffing	Retain / /	No	stored ICC# 4BA240 DOT# 4BW240
1053	9209	Super dry nitrogen Airco	Y	8 ea.	Ruffing	Retain / /	No	Stored ICC# 3A2015
1054	9209	Lubricant Fiske Brothers Refining Co.		5 lb. can	Ruffing	Retain / /	No	about 1 lb. left in can
1055	2831	Activated Alumina Unknown	Y	8 gal	Ruffing	Retain / /	No	
1056	9209	Oil, Lubricating Unknown	N	1 small oil can	Ruffing	Retain / /	No	
1057	2831	Alkalinity Builder Unknown	Y	15 gal	Ruffing	Retain / /	No	Dearborn 152
1058	9209	Lacquer, Acrylic Unknown	Y	2 spray can	Ruffing	Retain / /	No	

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1086	7141	Film remover Xerox	Y	1-32 oz. can		Retain / /	No	For copier, room 116
1087	7141	Toner, Ektaprint 90 blue toner Kodak		4 boxes		Retain / /		Room 116.
1088	7141	Cleaner, Aerosol Kleer Clear	Y	1-6 oz. can		Retain / /	No	Room 118
1090	7141	Lubricant, Super penetrating lubricant Duro Plastic		1-2 oz. bottle		Retain / /	No	Room 118
1091	7141	Solvent, Adhesive activating solvent Metal Craft, Inc.	Y	8-8 oz. cans		Retain / /	No	Room 104
1092	7141	Bee, wasp, hornet killer San-Bay Co.	Y	1-12 oz. can		Retain / /	No	Room 121
1093	7141	Penetrating catalyst Blaster Div.		1-13 oz. can		Retain / /	No	Room 121
1094	7141	Insecticide, Indoor/Outdoor Insecticide San-Bay Co.	Y	1-14 oz. can		Retain / /	No	Room 103
1095	7141	PD activator Bruning	Y	12-250 ml bottles		Retain / /	No	Room 213, for printer copier
1096	7141	Cleaner, Retec Type B Film Cleaner Thompson-Hayward Co.	Y	3-5 gallon cans		Retain / /	No	Room 135, film library
1097	7141	Static spray Inmac		1-32 oz. bottle		Retain / /	No	Room 135, film library
1098	7141	Aero-Duster Miller Stephenson		1-16 oz. can		Retain / /	No	Room 135, film library
1099	7141	Cleaner, Video and audio tape head cleaner Comprehensive Video Supply Cor		1-8 oz. can		Retain / /	No	Room 135, film library
1100	7141	Cleaner, Desk & Office Cleaner 3M	Y	1-15 oz. can		Retain / /	No	Room 134, film library
1101	7141	Steel Sheen San-Bay Co.	Y	3-17 oz. cans		Retain / /	No	Janitor's supply
1103	7141	Cleaner, Window San-Bay Co.		1-2 gallon jug		Retain / /	No	Janitor's supply

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1132	7141	Metal polishing cream North American Polish Corp.	Y	1-16 oz. bottle		Retain / /	No	Janitor's supply
1133	7141	Unknown Unknown		1-16 oz. spray bottl		Retain / /	No	White liquid, janitor's supply
1135	7141	Unknown Unknown		1-5 gallon container		Retain / /	No	Container marked "Kinney Super X", janitor's supply
1136	7141	Adhesive, Cove base adhesive Midland Chicago Corp.	Y	1-32 oz. container		Retain / /	No	Janitor's supply
1137	7141	Enamel Semi-Gloss Blue Sherwin Williams	Y	1-1 gallon can		Retain / /	No	Janitor's supply
1138	7141	Paint, Unknown paint Unknown	Y	1-1 gallon can		Retain / /	No	Marked E.B. wall, janitor's supply
1139	7141	Metal primer, white Dean & Barry	Y	1-1 gallon can		Retain / /	No	Janitor's supply
1140	7141	Oil, Capella Oil Texaco		1-5 gallon can		Retain / /	No	Basement
1141	7141	Refrigerant 113 Kaiser Chemicals	Y	1-200 lb. barrel		Retain / /	No	Basement
1142	7141	Racon 113 Racon Inc.	Y	1-200 lb barrel		Retain / /	No	Basement
1143	7141	Unknown Unknown		7-55 gallon barrels		Retain / /	No	Marked "save glycol" , basement
1146	7141	Ground clay Oil-Dri Corp. of America	N	1-25 lb. bag		Retain / /	No	Basement
1147	7141	Refrigerant 22 Trane	N	1-2.5 gallon bottle		Retain / /	No	Basement
1148	7141	Oil, Capella oil Texaco	N	3-1 gallon cans		Retain / /	No	Basement
1149	7141	Degreasing solvent Virginia KMP Corp.	Y	2-1 gallon cans		Retain / /	No	Basement
1150	7141	Primer, Rust-Oleum metal primer Rust-Oleum Corp.	Y	1-13 oz. can		Retain / /	No	Basement

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1291	8133	Cleaner, PVC Cleaner Hercules		1 pt		Retain / /		Shop
1292	8133	Anchorlube Anchor Chemical Co.		8 oz.	Young	Retain / /	No	Shop, lubricant
1293	8133	Find leak detector Lester Laboratories		8 oz.	Young	Retain / /	No	Shop, leak detector
1294	8133	Stay-Clean J. W. Harris Co.	Y	2 oz.	Young	Retain / /	No	Shop, flux
1295	8133	Simple Green Unknown	N	3 gallons	Young	Retain / /	No	Shop, cleaner
1296	8133	Leak Tek Unknown	N	1/2 gallon	Young	Retain / /	No	Shop, leak detector
1297	8133	Virginia 10 Virginia KMP Corp.		2.5 gallons	Young	Retain / /	No	Shop, degreaser
1298	8133	Oil, Vacuum pump oil Kinney Vacuum		3 quarts	Young	Retain / /	No	Shop
1299	8133	Stay-Silv Unknown	Y	16 oz.	Young	Retain / /	No	Shop, flux
1300	8133	Brazo-Flux L-Tech	Y	2 lbs.	Young	Retain / /	No	Shop, flux
1301	8133	T + 2 Rectorseal		2 pints	Young	Retain / /	No	Shop, pipe and head compound
1302	8133	Adhesive, Insulation adhesive Virginia KMP Corp.	Y	2 pt	Young	Retain / /	No	Shop, adhesive
1303	8133	Acid test kit Sporlan Valve Co.		7 kits	Young	Retain / /	No	Shop, freon-oil acid test kit
1304	8133	Adhesive, 4799 Adhesive 3M	Y	1 qt	Young	Retain / /	No	Shop, adhesive
1305	8133	Locks nuts Permatex		3 oz.	Young	Retain / /	No	Shop, thread lock
1306	8133	Adhesive CPIO-VI-CRYL		1.5 gal		Retain / /		Shop

tem	Loc	Chemical Name Manufacturer	H A Z	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
338	1141	Absorbent, oil and grease absorbent Unknown	N	3/4 bag	Young	Retain / /	No	Elevator Room
1339	1132	Ionac chem. 5 cu. ft. Ionac Chem.		3/4 container	Young	Retain / /	No	
1354	3131	Dow Corning 795 Dow Corning Corp..		15-10.3 oz tubes		Retain / /		Toolcage
1367	2831	Nitrite test solution Grace Dearborn		2 quarts	Young	Retain / /	No	Chem. test bench, #592
1368	2831	Reagent, Total hardness reagent Grace Dearborn		5 quarts	Young	Retain / /	No	Chem. test bench, #521
1369	2831	Potassium iodide/iodate Grace Dearborn		1 gal	Young	Retain / /	No	Chem test bench, #533
1370	2831	Sulfuric acid Grace Dearborn	Y	4 quarts	Young	Retain / /	No	Chem. test bench, #555
1371	2831	Indicator, Total hardness indicator Grace Dearborn		2 oz.	Young	Retain / /	No	Chem. test bench, #519
1372	2831	Indicator, Starch acid indicator powder Grace Dearborn		4 oz.	Young	Retain / /	No	Chem. test bench, #552
1373	2831	Indicator, Nitrite indicator Grace Dearborn		2 oz.	Young	Retain / /	No	Chem. test bench, #590
1374	2831	Indicator, Calcium indicator Grace Dearborn		3 oz.	Young	Retain / /	No	Chem. test bench, #509
1375	2831	Buffer, Calcium buffer Grace Dearborn		12 oz.	Young	Retain / /	No	Chem. test bench, #507
1376	2831	Buffer, Odorless buffer Grace Dearborn		16 oz.	Young	Retain / /	No	Chem. test bench, #516
1377	2831	Specific conductance standard 50 umhos Grace Dearborn		1 quart	Young	Retain / /	No	Chem. test bench, #578
1378	2831	Titrant, Low hardness titrant Grace Dearborn		1 quart	Young	Retain / /	No	Chem. test bench, #597
1379	2831	Specific conductance standard 4000 umhos Grace Dearborn		1 quart	Young	Retain / /	No	Chem. test bench, #577

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1417	1121	Neutralizing solution Grace Dearborn		7 oz.	Young	Retain / /	No	Basement, #567
1418	1121	Potassium iodide/iodate N/126 Grace Dearborn		1 1/2 quarts	Young	Retain / /	No	Basement, #533
1419	1121	Sulfuric acid N/50 Grace Dearborn	Y	1 1/2 gallon	Young	Retain / /	No	Basement, #555
1420	1121	Sodium hydroxide sodium bisulfite Grace Dearborn	Y	20 gallons	Young	Retain / /	No	Basement, #154
1422	1112	Amberlite monobed ion exchange resin XE-150 Rohm & Hass	Y	43 lb. container	Young	Retain / /	No	Hot Lab
1423	1132	Oil, window oil for bubbler Unknown	N	5 gallon container	Young	Retain / /	No	
1428	1132	Duolite ion exchange resin Diamond Shamrock Chem.	Y	235 net weight	Young	Retain / /	No	
1430	1133	Absorbent, oil and grease absorbent Unknown	N	1/4 bag	Young	Retain / /	No	
1432	1133	Absorbent material Oil Dry Corp.	N	10-50 lb. bags	Young	Retain / /	No	
1434	1136	Ammonium perchorate Hooker Chem. Corp.	Y	2-30 gal. drums	Young	Retain / /	No	Save For NASA
1454	1921	Cement, roof cement Johns Manville	Y	1-5 gallon can	Graebner	Retain / /	No	
1455	1921	Sealer, water sealer Thompsons	Y	1-5 gallon can	Graebner	Retain / /	No	
1456	1921	Alkyd undercoater Sherwin Williams	Y	2 - 5 gallon cans		Retain / /	No	
1458	1921	Paint, alkyd barn paint Sherwin Williams	Y	1-5 gallon can		Retain / /	No	
1459	1921	Mineral spirits Elroy Turpentine Co,	Y	2 1/2 gallon contain		Retain / /	No	
1460	1921	Paint, miotone base (brown) Sherwin Williams	Y	1 gallon		Retain / /	No	

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1486	8133	Lube, Marine lube "A" Lubriplate		3/4 lb.	Young	Retain / /	No	
1488	8133	Ink, recorder:Black Leeds & Northrup		4 ounces	Young	Retain / /	No	#125063
1489	8133	Ink, recorder:Black Leeds & Northrup		2 ounces	Young	Retain / /	No	#125055
1490	8133	Vibra-Tite ND Industries		1 ounce	Young	Retain / /	No	
1491	7143	Clor-n-oil 50 Dexsil		10 kits	Hite	Retain / /	No	
1492	8133	Sealant, Silicone sealant Dow Corning	Y	15-10 oz. cartridges	Young	Retain / /	No	#795
1493	8133	Mortar, super 3000 bonding mortar Unknown	Y	1 gallon	Young	Retain / /	No	For boiler mortar
1494	8133	Sealant, foam Malcklanburg-Duncan	Y	12 ounces	Young	Retain / /	No	
1495	8133	LPS #3 Holt Lloyd		10 ounces	Young	Retain / /	No	
1496	8133	Lube, Electrical use lube CRC Chemicals		14 ounces	Young	Retain / /	No	
1497	8133	Lubricant, LB 302 lubricant LeBro Chemical		15 ounces	Young	Retain / /	No	
1498	8133	Lubricant, Moly kote lubricant Dow Corning		2-16 oz. cans	Young	Retain / /	No	#557
1499	8133	Lubricant, TFE dry lubricant Spray On Products		12 ounces	Young	Retain / /	No	#00708
1500	8133	Krylon let-go Borden		15 ounces	Young	Retain / /	No	#1332
1502	8133	Bostic Marine Grade Bostic		40.5 fl oz	Young	Retain / /		
1503	7143	MS-122 flourocarbon Miller-Stephenson	Y	16 ounces	Herman	Retain / /	No	

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1538	7143	Cleaner/Polish, Stainless steel San Bay Co.	Y	2-10 ounces	Hite	Retain / /	No	
1539	7143	Cleaner/Polish, Stainless steel Johnson Wax	Y	17 ounces	Hite	Retain / /	No	
1540	7143	Drain opener, liquid Dorex	Y	14 ounces	Hite	Retain / /	No	
1541	8133	Rust & scale remover sizzle (HCL) Hercules	Y	32 ounces	Young	Retain / /	No	
1542	8133	ZLN 100 AB Chance		2-5 oz	Young	Retain / /	No	
1544	8133	Lubricating compound, Never-seez Bostik		3 ounces	Young	Retain / /	No	
1545	8133	Vibra-Tite ND Industries		2-10 oz. bottles	Young	Retain / /	No	
1547	8133	Aviation form-a-gasket Permatex		2 ounces	Young	Retain / /	No	
1548	8133	Cleaner, Contact Cleaner CRC Chemicals	Y	2-15 oz. cans	Young	Retain / /	No	
1550	8133	Acetone Unknown	Y	2 ounces	Young	Retain / /	No	
1551	8133	Lubricating oil (light) Unknown		2 ounces	Young	Retain / /	No	
1553	8133	Silicone Heat Sink Compound Archer		1-6.5 grams	Young	Retain / /		
1554	8133	Propane fuel, Medina Redro Co.	Y	2 ounces	Young	Retain / /	No	
1555	8133	Propane fuel, Tornado Turner	Y	14 ounces	Young	Retain / /	No	
1556	8133	Contact Re-Nu Miller-Stephenson	Y	8 ounces	Young	Retain / /	No	
1557	7143	Copper sulphate M.C. Miller	Y	32 ounces	Hite	Retain / /	No	

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1581	8133	Leak detector J.B. Whitecavage		1 ounces	Young	Retain / /	No	
1582	8133	Lubricant Minneapolis-Honeywell		3 ounces	Young	Retain / /	No	
1584	8133	Soldering paste flux Kester		2 ounces	Young	Retain / /	No	
1586	8133	Encapsulating resin Dow Corning		1 lb.	Young	Retain / /	No	
1587	8133	Curing agent Dow Corning	Y	2 ounces	Young	Retain / /	No	
1592	8133	Tube coat GC Electronics	Y	8 ounces	Young	Retain / /	No	
1593	8133	Grease, High vacuum grease Dow Corning		3-2 oz. containers	Young	Retain / /	No	
1594	8133	Heat sink compound silicone Archer	Y	6.5 gm tube	Young	Retain / /	No	
1595	8133	Heat sink compound silicone Dow Corning	Y	3 ounces	Young	Retain / /	No	
1596	8133	Cement, Duco cement DuPont Co.	Y	5-1.75 oz tubes	Young	Retain / /	No	
1597	8133	Blue goop Swagelok		2 ounces	Young	Retain / /	No	
1599	1441	Alcohol Unknown	Y	3 ounces	Johnson	Retain / /	No	In brown plastic bottle.
1600	8133	Epoxy Hardman	Y	19-3.5 gm packets	Young	Retain / /	No	
1602	7143	Cation-anion resin Unknown		5 gallon bucket	Hite	Retain / /	No	
1604	8133	Paint, undercoat Sherwin Williams	Y	5 gallons	Young	Retain / /	No	
1606	8133	Solvent degreaser 10-089 Hastings Fiberglass	Y	1/2 pint	Young	Retain / /	No	

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1627	7143	Sodium iodide EM Science	Y	70 g	Hite	Retain / /	No	
1628	7143	Sodium Phosphate, dibasic J.T. Baker Chemical Co.	Y	8 ounces	Hite	Retain / /	No	
1630	7143	Sulfamic acid Fisher Scientific	Y	1-100 g., 1-25 g.	Hite	Retain / /	No	
1631	7143	Neutra acid Ajax Floor Products	Y	4-1 quart containers	Hite	Retain / /	No	
1632	7143	Neutra base Ajax Floor Products	Y	4-1 quart containers	Hite	Retain / /	No	
1635	7143	Potassium bi-iodate G. Frederick Smith Chemical Co	Y	2 ounces	Hite	Retain / /	No	
1636	7143	Manganous sulfate Fisher Scientific	Y	1 kg.	Hite	Retain / /	No	
1637	7143	Ferroin indicator solution Anderson Laboratories	Y	17 oz.	Hite	Retain / /	No	
1639	7143	Soap, Surgical soap West Chemical Products, Inc.	Y	12 ounces	Hite	Retain / /	No	
1641	7143	Buffer, pH 4.01 buffer salt Fisher Scientific		64 packets	Hite	Retain / /	No	
1642	7143	Buffer, pH 10.4 buffer salt Fisher Scientific		40 packets	Hite	Retain / /	No	
1647	7143	Buffer, pH 7.41 buffer salt Fisher Scientific		21 packets	Hite	Retain / /	No	
1664	7143	Zap San Bay Co.	Y	8 ounces		Retain / /	No	
1666	7143	Monobasic potassium phosphate Fisher Scientific	Y	15 ounces	Hite	Retain / /	No	
1667	7143	Aluminum chloride J.T. Baker Chemical Co.	Y	300 g	Hite	Retain / /	No	
1668	7143	Potassium iodide J.T. Baker Chemical Co.	Y	5 ounces	Hite	Retain / /	No	

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1690	7143	Potassium iodide Fisher Scientific	Y	3 lbs.	Hite	Retain / /	No	
1691	7143	Sulfuric acid Fisher Scientific	Y	4-9 lbs. ea	Hite	Retain / /	No	
1694	7143	Drierite W.A. Hammond Dierite Co.		misc sizes	Hite	Retain / /	No	
1695	7143	Liquinox Alconox, Inc.	Y	1 gal.	Hite	Retain / /	No	
1696	7143	Alconox detergent Alconox, Inc	Y	Misc. quantity	Hite	Retain / /	No	
1697	7143	Alcotabs Alconox, Inc.		1-100 tabs ea.	Hite	Retain / /	No	
1698	7143	Drierite disposable cartridges W.A. Hammond Drierite Co.		2-1 lb ea	Hite	Retain / /	No	
1700	7143	Sodium Sulfate, Anhydrous Hach		3 oz	Hite	Retain / /		ACS Grade
1702	7143	Alcohol, Ethyl alcohol 190 proof Publiker Industries	Y	1/5 gallon	Hite	Retain / /	No	
1703	7143	Alcohol, Ethyl alcohol 200 proof Publicker Chemical	Y	1/5 gallon	Hite	Retain / /	No	
1704	7143	Glycerin Fisher Scientific	Y	3 gal.	Hite	Retain / /	No	
1705	7143	Acetone Fisher Scientific	Y	3/4 gallon	Hite	Retain / /	No	
1706	7143	Aerosol OT solution Fisher Scientific	Y	4-1 pint ea	Hite	Retain / /	No	
1707	7143	Phenolphthalein Mallinckrodt Chemical Works	Y	3/4 lb	Hite	Retain / /	No	
1708	7143	Starch, soluble Fisher Scientific		2-8 oz.,2-1 lb.	Hite	Retain / /	No	
1709	7143	Starch, soluble Mallinckrodt Chemical Co.		1 lb	Hite	Retain / /	No	

em	Loc	Chemical Name Manufacturer	H A Z	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
730	7143	Manganous sulfate Unknown	Y	200 ml	Young	Retain / /	No	Reagant-mixed
731	7143	Alkali-iodide azide Unknown	Y	600 ml	Hite	Retain / /	No	Reagant-prepared
732	7143	Sulfuric acid Unknown	Y	15 ml	Hite	Retain / /	No	
733	7143	Sulfuric acid (1+9) Unknown	Y	50 ml	Hite	Retain / /	No	Reagant-mixed
734	7143	Decomplexing reagant for ammonia Unknown	Y	200 ml	Hite	Retain / /	No	Reagant-mixed
737	7143	Oxygen electrode solution Beckman Instruments Inc	Y	30 ml	Hite	Retain / /	No	
738	7143	Sodium thiosulfate Unknown	Y	500 ml	Hite	Retain / /	No	Reagant-mixed
1739	7143	Freon 113 Hach	Y	5-16 oz	Hite	Retain / /	No	Electronic Grade
740	7143	Potassium Dichromate 0.0417M Unknown	Y	200 ml	Hite	Retain / /	No	Reagant-mixed
1741	7143	Potassium Dichromate 0.00417M Unknown	Y	800 ml	Hite	Retain / /	No	Reagant-mixed
1742	7143	Sulfuric acid w/AGSO4 Unknown	Y	1500 ml	Hite	Retain / /	No	Reagant-mixed
1743	7143	0.1N Potassium biniodate solution Unknown	Y	500 ml	Hite	Retain / /	No	Reagant-prepared
1744	7143	0.025N Potassium biniodate solution Unknown	Y	800 ml	Hite	Retain / /	No	
1745	7143	Lautyl tryptose tubes Hach	Y	314 tubes	Hite	Retain / /	No	
1746	7143	EC medium tubes Hach		161 tubes	Hite	Retain / /	No	
1747	7143	Dechlorinating reagant pillows Hach	Y	107 pillows	Hite	Retain / /	No	

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1768	7143	Alcohol 200 proof Unknown	Y	1/2 gallon	Hite	Retain / /	No	
1770	7143	Ammonia, pH adjusting Orion		500 ml	Hite	Retain / /		
1772	7143	Buffer Solution 7.41 pH Unknown		300 ml	Hite	Retain / /	No	Reagant-prepared
1773	7143	Buffer solution 4.01 pH Unknown		600 ml	Hite	Retain / /	No	Reagant-prepared
1775	7143	Buffer Solution 7.0 pH Unknown		50 ml	Hite	Retain / /	No	Lab pH kit, Reagant-prepared
1776	7143	1.0N sodium hydroxide Unknown	Y	500 ml	Hite	Retain / /	No	Reagant-prepared
1777	7143	Sulfuric acid for total phosphorous Unknown	Y	1000 ml total	Hite	Retain / /	No	
1778	7143	6N sodium hydroxide Unknown	Y	400 ml	Hite	Retain / /	No	Reagant-prepared
1779	7143	Standard phosphate solution Unknown	Y	900 ml	Hite	Retain / /	No	Reagant-prepared
1781	7143	Sulfuric acid for ortho phosphates Unknown	Y	600 ml	Hite	Retain / /	No	Reagant-prepared
1782	7143	Nitrate solution, stock Unknown	Y	500 ml	Hite	Retain / /	No	Reagant-prepared
1783	7143	Sodium chloride for nitrates Unknown	Y	200 ml	Hite	Retain / /	No	Reagant-prepared
1784	7143	Sulfuric acid for nitrates Unknown	Y	10 ml	Hite	Retain / /	No	Reagant-prepared
1785	7143	Brucine sulfanilic acid Unknown	Y	.5 ounce	Hite	Retain / /	No	Reagant-prepared
1787	7143	Ammonium molybdate Unknown	Y	50 ml	Hite	Retain / /	No	Reagant-prepared
1788	1788	Potassium Antimonyl Tartrate Aldrich		100 g	Hite	Retain / /		

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1808	7143	0.05 Sodium carbonate Unknown	Y	300 ml	Hite	Retain / /	No	Reagant-prepared
1809	7143	3N Nitric acid Unknown	Y	0	Hite	Retain / /	No	Reagant-prepared
1810	7143	EDTA buffer Unknown		10 ml	Hite	Retain / /	No	Reagant-prepared
1811	7143	Indicator, Eriochrome black T indicator Unknown	Y	100 ml	Hite	Retain / /	No	Reagant-prepared
1812	7143	Titrant, Standard EDTA titrant Unknown	Y	350 ml	Hite	Retain / /	No	Reagant-prepared
1813	7143	Hardness standard Unknown	Y	750 ml	Hite	Retain / /	No	Reagant-prepared
1814	7143	1+1 Hydrochloric acid Unknown	Y	450 ml	Hite	Retain / /	No	Reagant-prepared
1815	7143	3N Ammonium hydroxide Unknown	Y	150 ml	Hite	Retain / /	No	Reagant-prepared
1820	7132	Gasoline Unknown	Y	3700 gallons		Retain / /	No	For use in Station vehicles, 8,000 gal UST.
1822	5131	Activated Alumina Alcoa	Y	11 flats	LeRC	Retain / /	No	Storage #8223 and #9002.
1827	5411	Unknown Unknown		1-16 oz. squeeze bot		Retain / /	No	Probably oil, boiler room
1828	5411	Ethylene glycol Unknown	Y	1-55 gal. drum		Retain / /	No	Boiler room
1830	5431	Penetrant, 711 Penetrant Spray On	Y	1-16 oz. spray can		Retain / /	No	
1832	5431	Octodix 52 Unknown		4-5 gal. cans		Retain / /	No	Hydraulic lubricating oil
1833	5431	Grease, Alvania Grease Shell		1-5 gallon can		Retain / /	No	
1835	8951	Oil, Fuel Oil	Y	5,000-10,000 gallons		Retain / /	No	East tank, 200,000 gal. capacity, heating oil.

Item	Loc	Chemical Name Manufacturer	HAZ	Quantity CAS/RTECS	User	Status Date	Samp. Req.	Comments
1966	8132	Oil, Fuel Oil	Y	400 gallons		Retain / /		550 gallon above ground storage tank, inside building.
1967	8132	#2 Diesel	Y	135 gallons		Retain / /		150 gal. above ground storage tank, inside building.
1968	8133	Oil, #2 Diesel Fuel Oil Unknown	Y	175 gallons		Retain / /	No	250 gal. above ground storage tank, heating oil.
1969	8133	Oil, Fuel Oil	Y	275 gallons		Retain / /		250 gal. above ground storage tank.
1970	8133	Diesel Fuel Unknown	Y	125 gallons		Retain / /	No	250 gal. above ground storage tank, emergency diesel pump.
1971	8952	#2 Diesel Unknown	Y	empty		Retain / /	No	West, 200,000 gal. above ground storage tank, heating oil.
1972	8951	ERBS Fuel Unknown	Y	11,000 gallons		Retain / /	No	East tank, partly buried 12,000 gal. storage tank.
1973	8951	Blending Fuel Unknown	Y	7,500 gallons		Retain / /	No	West tank, partly buried 12,000 gal. storage tank.
1975	2811	Adhesive Cement Samereisen	Y	1 qt can		Retain / /	No	North Wall by entrance
1977	9156	Oil, Mineral Oil Unknown	N	21-55 Gal. Drums		Retain / /	No	From 1141.
1979	2621	HE 150 Mech. Pump Fluid Leybold Heraeus Inc.	N	4-1 Gal. Containers		Retain / /	No	
1987	8133	Liquid Scale Dissolver Calgon Vestal Lab	Y	20 Gallons		Retain / /	No	20 gallons mixed and diluted with water
1988	7141	Toner, Type 248 3M		2-7.05 oz. container		Retain / /	No	Room 213
1989	7141	Developer, Premix Type 252 3M		1-5 lb. 8 oz.		Retain / /	No	Room 139
1990	3461	Sulfuric Acid - in batteries Unknown	Y	Batteries		Retain / /	No	
1991	7234	Sulfuric Acid - in batteries Unknown	Y	Batteries		Retain / /	No	

NASA Plum Brook Station

Chemical Inventory Report

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RETAINED - ITEM NUMBER ORDER

END of REPORT