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**SITE ANALYSIS FEED MATERIALS PRODUCTION
CENTER FERNALD OHIO INTERIM REPORT
SEPTEMBER 1988**

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REPORT**

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Site Analysis
Feed Materials Production Center
Fernald, Ohio

Interim Report

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NOTICE

As an interim product, this document has not gone through the complete EPIC quality assurance cycle. Any errors that are discovered during preparation of the final report will be corrected therein.

ABSTRACT

The following report contains an analysis of historical aerial photography of the U.S. Department of Energy Feed Materials Production Center (FMPC) located in Fernald, Ohio. A variety of chemical and metallurgical processes are utilized at the site for the manufacture of uranium products. Radioactive uranium wastes have been found in private residential wells located south and southeast of the site. The purpose of this analysis is to locate and describe past disposal practices at the site and to assist the Environmental Protection Agency's (EPA) Region 5 office in the Remedial Investigation/Feasibility Study (RI/FS) of FMPC.

Aerial photography of the site was obtained to represent the period from 1950 to 1988. Waste pits, sludge ponds, drums, fill areas, disturbed areas, tanks, impoundments, staining and trenches are the major features identified during the study period.

The EPA's Environmental Photographic Interpretation Center in Warrenton, Virginia, a branch of the Advanced Monitoring Systems Division of the Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, performed this study at the request of the Environmental Services Division of EPA Region 5 in Chicago, Illinois, and the Office of Emergency and Remedial Response in Washington, D.C. This interim report was completed in September 1988.

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 October 13, 1950

 April 6, 1954

 March 21, 1957

 September 11, 1962

 April 15, 1964

 September 12, 1968

 May 20, 1976

 May 10, 1983

 April 20, 1988

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The following report contains an analysis of historical aerial photography of the U.S. Department of Energy Feed Materials Production Center (FMPC) located in Fernald, Ohio. The FMPC was constructed and began operations in the early 1950's. A variety of chemical and metallurgical processes are utilized at the site for the manufacture of uranium products. Reportedly, radioactive uranium wastes have been found in private residential drinking wells located south and southeast of the site.¹ The purpose of this analysis is to locate and describe past disposal practices at the site in support of the Environmental Protection Agency's (EPA) Remedial Investigation/Feasibility Study (RI/FS).

Figure 1 depicts the site location, keyed to a photocopy of a U.S. Geological Survey (USGS) 1:24,000-scale topographic map. Site boundaries used in this analysis were determined from observations made from the aerial photography in conjunction with collateral data provided by EPA Region 5 and do not necessarily represent legal property lines or ownership.

Aerial photography of the site was obtained to represent the period from 1950 to 1988. Black and white photography from 1950, 1954, 1956, 1957, 1962, 1964, 1968, 1976, and 1983; and color photography from 1988 were analyzed for this report.² The 1956 photography was not reproduced due to insignificant change from the 1957 photography.

Throughout the study period waste disposal areas and potential burial areas were noted including: waste pits, sludge ponds, fill areas, trenches,

¹Collateral information provide by EPA Region 5. Throughout the remainder of the report, an asterisk (*) will be used to denote collateral information provided by EPA.

²A complete list of photography, maps and publications used in this report can be found in the References section.

disturbed areas, and ground scarred areas. Open storage areas containing numerous drums, debris and scrap material piles, coal storage areas, tanks and staining were also identified (see Summary section and Aerial Photo Site Analysis section for details).

The EPA's Environmental Photographic Interpretation Center in Warrenton, Virginia, a branch of the Advanced Monitoring Systems Division of the Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, performed this study at the request of the Environmental Services Division of EPA Region 5 in Chicago, Illinois, and the Office of Emergency and Remedial Response in Washington, D.C. This interim report was completed in September 1988.

SUMMARY

The FMPC covers approximately 420 hectares (1,050 acres) and has ⁴⁴⁰¹been in operation since approximately 1951. Throughout the study period waste disposal areas and a variety of potential burial areas were noted. An attempt was made to annotate features as similarly as possible to features previously identified in an initial RI/FS study¹ provided by EPA Region 5. Those features not previously identified in the RI/FS study are annotated with a dagger (+). The analysis divides the FMPC into three areas: Waste Storage Area 1, Waste Storage Area 2 and the Production Area. A brief discussion of each area for each year of analysis is provided with photos and photo overlays. Below is a summary list of features identified during the analysis. Disturbed areas, ground scars, excavated areas and cleared areas all represent potential burial areas. The majority of these were not previously included in the RI/FS. These features will be annotated throughout this analysis; however, they will be discussed only if significant activity is associated with them. They will also not be included in the summary list because they represent only possible disposal areas.

¹RI/FS Task 1, Department of Energy Feed Materials Production Center, January 30, 1987.

Features NotedWaste Storage Area 1

	<u>Years of Activity</u>
Pit 1	1954-1968
Pit 2	1957-1964
Pit 3	1962-1968
Pit 4	1957-1988
Pit 5	1968-1988
Pit 6	Pre-1988
Burn pit	1957-1976
Landfill	1954-1988
Sludge ponds	1954-1988
Large storage tanks	1954-1988
Clear well	1962-1988

Waste Storage Area 2

Fill areas/debris	1954-1988
Stained access road	1954-1957
Pits	1954+
Light- and dark-toned material	1954-1957, 1988
Trench/ground scar	1956+
Drums	1988+
Storm water basin	1954-1988

Production Area

Tanks and drums	1954-1988
Tank cars	1954-1968
Fill areas/poss fill area	1954-1957, 1988+
Debris/scrap material/open storage	1954-1988
Impoundments	1968-1988+, 1988
Possible trench	1954+
Coal storage	1954-1988
Light-toned material	1954-1964+
Staining	1954-1968, 1983-1968+
Open trenches	1962-1964+

METHODOLOGY

A search of government and commercial sources was undertaken to obtain the best available aerial photography of the study area spanning the desired time frame. The photography and other sources of information used in this report are listed in the References section.

The analysis was performed by viewing backlit transparencies of aerial photography through stereoscopes. Stereoscopic viewing creates a perceived three-dimensional effect which, when combined with viewing at various magnifications, enables the analyst to identify signatures associated with different features and environmental conditions. The term "signature" refers to a combination of visible characteristics (such as color, tone, shadow, texture, size, shape, pattern and association) which permit a specific object or condition to be recognized on aerial photography.

Photographic prints were made from those years of aerial photographic coverage that reveal significant information about the study area. The analyst's findings are annotated on overlays to prints and/or base maps and described in the accompanying text. Site boundaries used in this analysis were determined from observations made from the aerial photography in conjunction with collateral data provided by EPA Region 5 and do not necessarily denote legal property lines or ownership.

Due to factors inherent in the photographic printing process, prints do not exhibit the level of detail that is visible in the original aerial photography. Therefore, some features identified from the aerial photography may not be clearly discernible, or even visible, on the photographic prints presented in this report.

AERIAL PHOTO SITE ANALYSIS

OCTOBER 13, 1950 (FIGURE 2)

The 1950 photography illustrates the site area before the construction of the FMPC. The majority of the site area is agricultural fields. Paddy's Creek flows through the western portion of the site and leads to the Great Miami River approximately 2.4 kilometers (1.5 miles) to the south (not shown in photo). A smaller tributary leads from near the southwest corner of the site.

An unnamed stream located outside the northeast boundary of the FMPC leads east to the Great Miami River.

APRIL 6, 1954 (FIGURE 3)

Waste Storage Area (WSA) 1

Access roads and a channelized drainage ditch lead toward Pit 1, near the center of WSA 1. Standing liquid (SL) is visible at the southwest corner of the pit, and dark- (DK) and light-toned (LT) waste material (M) appears within the pit and along its east side. A large trench (TR) has been excavated northeast of Pit 1. The trench contains standing liquid and is located in an area reportedly used as a burn pit.* A remnant pond (see Figure 2) appears between the pit and trench. Four large storage tanks (T) and open storage (OS) of material consisting of drums or containers appears south of the pit.

A landfill* (LF) is located at the northeast corner of WSA1. Light- and medium-toned material (not annotated) is visible upon the upper surface of the landfill. Two excavated pits possibly containing liquid appear south of the landfill. South of the pits are two lime sludge ponds,* both containing liquid. Ground scarred (GS) areas appear throughout WSA 1. These areas appear to be related to construction activity (borrow or fill material usage) rather than to waste disposal activity.

Paddy's Run borders WSA 1 and flows south through the FMPC to the Great Miami River, approximately 2.5 kilometers (1.5 miles) from the southern border of the site. A smaller natural tributary winds through WSA 1 and joins Paddy's Run. Several other channelized drainage channels lead from the Production Area toward Paddy's Run.

Waste Storage Area 2

The center of WSA 2 contains a large area of light- and dark-toned waste material. Reportedly, WSA 2 was used for the disposal of fly ash.* The access road leading to the waste pile is heavily stained (ST) and was likely

sprayed with oil to control dust. North of the waste pile, a crane and a vehicle (V) are working in an excavated (EX) area containing three earthen berms. Another excavated area is present northwest of the pile. A stained area of possible runoff from the waste pile is visible to the southeast. Light- and dark-toned material similar in texture and tone to that at the center of the site is visible near a graded area (GR) in the northern portion of WSA 2. A disturbed area (DA) possibly used for waste disposal is visible west of the graded area. East of the graded area is a storm water retention basin (SWB).^{*} Mounded material (MM) and a ball field (BF) appear southwest of the basin.

In the southern half of WSA 2, a fill area (FA) is present. A vehicle is visible at the fill area, although no waste material is visible here at this time. Three excavated pits are visible south of the fill area. In the far southern end of WSA 2, cleared areas and an extraction area are present.

A disturbed area and a linear trench are visible southwest of the waste pile. The trench remains throughout the study period; however, no waste disposal was noted in or near this feature. Therefore, it will no longer be discussed. An access road leads northwest from the waste pile to the edge of Paddy's Run, which flows through the western portion of WSA 2.

Production Area (PA)

The production area contains numerous buildings, tanks, tank cars (TC), drums, and a significant amount of scrap material (SM) and debris (DB).¹ A large coal storage (CS) pile is situated at the center of the PA. A possible

¹No attempt was made to inventory the buildings, tanks or drums as this information is included in a previous report. Drums appear within the open storage areas along with other containers and material and are only annotated separately on the enlargement of the Production Area taken in 1988 (see Figure 11) and when significant activity is associated with them.

impoundment (IM) is located southeast of the coal pile. This possible impoundment remains throughout the study period and will no longer be discussed.

Piles of light- and medium-toned (MT) material are present in the northern end of the PA. A fill area (not shown on Figure 3; see Figure 4) is present farther north; however, no waste material is noted here. Access roads lead to a cleared area and an L-shaped possible trench in the far northeast portion of the PA. A residence is located east of the possible trench and remains until 1964.

A heavily stained area is visible near a group of buildings and tanks at the southwest corner of the PA. The source of the staining could not be ascertained from the photography.

The southeast corner of the PA contains a sewage treatment plant (STP), which remains throughout the study period.

MARCH 21, 1957 (FIGURE 4)

Waste Storage Area 1

Pit 1 contains more waste material than noted in 1954. Standing liquid is visible in the western portion of the pit. Medium-toned possible waste material and standing liquid (not annotated) appear within Pit 2, which has been constructed from the former pond noted in 1950 and 1954. Pit 4¹ is a smaller excavated area containing standing liquid and does not appear to be used for waste disposal at this time.

The trench/burn pit* appears to have increased in size since 1954 and is segmented into three parts. The southern end contains medium-toned standing liquid (not annotated); the central segment contains dark or deep standing liquid (not annotated); and the northern end contains a stained or wet area of soil (WS) possibly emanating from a nearby vehicle. Debris is visible on the east side of the trench.

The landfill at the northeast portion of WSA1 appears relatively unchanged.

Waste Storage Area 2

Dark-toned (DK) waste material and a stained access road remain at the center of WSA 2. A significant amount of debris is visible east and southeast of the dark-toned material, and filling activity has expanded in this direction since 1954. Areas north, northwest, and northeast of the waste pile have revegetated (REV) since 1954. The excavated areas were likely filled and graded.

¹Numbering of pits is out of sequence to remain consistent with previous RI/FS report.

The three excavated pits noted in 1954 in the southern portion of WSA 2 are no longer visible. An extraction area remains in the far southern end of this area. The disturbed area noted in the western portion of WSA 2 in 1954 is no longer visible. An access road still leads to the edge of Paddy's Run, past a trench and ground scarred area that were noted on 1956 photography.

Production Area

The majority of the light- and medium-toned material noted at the north end of the site is no longer present. The cleared area now contains fill material for the construction of a ball field. A trench scar remains north of the fill area where the possible trench was noted in 1954. The fill area in the far northern end of the PA is revegetating.

Several areas of staining or wet soil are visible in the western half of the PA. Ground scarred areas appear in the eastern portion of the site. The two disturbed areas noted here in 1954 have been graded smooth and now appear as scarred areas. A possible pit is located between two scarred areas. Access roads lead to the excavated area, which has expanded, in the northeast portion of the PA.

SEPTEMBER 11, 1962 (FIGURE 5)

Waste Storage Area 1

Pit 1 has been filled and covered since 1957, although a small amount of standing liquid is visible in its southern end. Pit 2 contains a slurry of solid and liquid material. Pit 3, reportedly used as a settling basin, contains mostly liquid, although its northeast end contains solid material. A clear well (CW)* appears south of Pit 3 and remains throughout the study period. Pit 4 contains liquid and solid material. The burn pit is smaller in size than noted in 1957 and now consists of two segments. The southern segment contains standing liquid, while the northern end contains scattered debris (neither is annotated). Probable drums (D) are visible between Pits 1 and 2. A large graded area is located northwest of the pits and is likely related to the construction of the new Pit 3 and the enlarged Pit 4. A channelized drainage ditch is under construction in the north end of the site to divert drainage around the waste pit area. Pit 3 is situated over a former natural drainage channel.

A bermed area containing standing liquid is located south of the landfill in the northeast corner of WSA 1.

Waste Storage Area 2

Two fill areas containing medium-toned, fine-textured material and light-toned material possibly mixed with debris are present at the center of WSA 2. The active fill area noted east of here in 1957 is revegetating. Channelized ditches have been constructed around the fill areas, probably to keep natural precipitation off and away from the fill area. The fill area to the southeast and the extraction area in the southern end of WSA 2 are revegetating.

Access roads still lead to the edge of Paddy's Run. A disturbed area is visible near one access road north of WSA 2.

Production Area

Light-toned material is visible in the northern end of the PA. The ball field has revegetated and no longer appears in use. Staining is evident in two places in the western half of the PA and in several places in the eastern portion.

A ground scarred area containing debris is located in the northeast corner of the PA. Three groups of probable drums are visible farther south. Staining and/or standing liquid is visible near the southernmost group and may be the result of a leak or spill. A disturbed area is located east of this group of probable drums where a possible pit was noted in 1957.

Several scarred areas have revegetated since 1957. The extraction area has also been filled and is revegetating.

A series of five open trenches are present at the southwest corner of the PA. Reportedly, the trenches were used to dispose of laboratory equipment and materials containing perchloric acid.* A small amount of liquid is visible within the trenches; however, no debris is visible.

APRIL 15, 1964 (FIGURE 6)

An access road leads across Pit 1 to an area of debris and standing liquid. Pit 2 contains mostly liquid with some solid material along its southern end. Pit 3 contains a slurry of solid and liquid material. Pit 4 contains solid and liquid material. The burn pit contains a significant amount of solid, dark debris, some of which could be containers. Probable drums are visible between Pits 1 and 2. A portion of the former graded area noted in 1962 northwest of the pits is revegetating, while the eastern end is now being used for extraction. The channelized ditch north of the pits now joins Paddy's Run. The bermed area noted south of the landfill now contains mounded material, suggesting filling activity. A new berm has been constructed west of the mounded material.

A significant amount of grading and extraction activity is visible south of the four tanks within WSA 1. Equipment (E) is actively working in the area.

Waste Storage Area 2

Two fill areas remain at the center of WSA 2, although the southern fill area has expanded since 1962. Material similar to that noted in 1962 appears in the fill areas.

An extraction area is visible near one of the access roads that lead to the edge of Paddy's Run northwest of the fill area. The disturbed area noted near here in 1962 is no longer visible.

Production Area

Light-toned material remains at the northern end of the site. Staining is evident in several places within the PA and may be the result of leaks or spills. The heavy staining noted north of the coal storage area appears in an

area reportedly containing an oil burner used to burn waste motor oil, solvents, tributyl phosphate and kerosene.*

The ground scarred area containing debris remains in the northeast portion of the PA. This debris appears to consist of drums or containers. Only one group of probable drums remains farther south. Heavy staining is associated with this group of probable drums. Two disturbed areas appear farther east.

The five trenches at the southwest corner of the site remain open. Three of the trenches appear to contain standing liquid, while two others contain debris.

SEPTEMBER 12, 1968 (FIGURE 7)

Waste Storage Area 1

Pit 1 appears to be revegetating; however, an access road still leads across the former pit to an area of debris. Standing liquid is no longer present here. Pit 2 has been filled, covered and is now revegetating with low grass. Pit 3 contains a slurry of light-toned liquid and semi-solid material. Pit 4 contains solid and liquid material. The burn pit appears empty at this time except for a single vehicle. Pit 5 appears to be under construction. A portion of a liner can be seen in the eastern end of Pit 5. The area northwest of the pits now appears as a fill area, probably containing the material extracted to construct Pit 5. The landfill contains light- and dark-toned material similar to that seen south of the landfill. The bermed area noted near the landfill in 1962 is no longer visible. A large cleared, graded area is located here and farther south.

The areas south and west of the four large tanks within WSA 1 have revegetated.

Waste Storage Area 2

The fill areas noted in WSA 2 in 1964 have revegetated and a new fill area is present farther east. Similar material to that noted in 1962 is present in the fill area. A linear excavated area or channelized ditch is visible east of the new fill area.

Vehicles and equipment appear in a scarred area southwest of the new fill area. The excavated area noted near access roads northwest of the fill area is revegetating.

Production Area

Light-toned material is no longer visible in the northern end of the site. A new building and an impoundment have been constructed at the northern end of the site. The impoundment contains a tank in its center and may be used as a sump. A raised, rectangular trough (not annotated) is located east of the impoundment and looks much like a watering trough for animals.

Staining appears within the PA; however, it does not appear as heavy as that noted in 1964. One of the disturbed areas noted in the eastern end of the PA is revegetating.

The trenches visible in the southwest end of the PA in 1962 and 1964 have been filled and covered.

MAY 20, 1976 (FIGURE 8)

Waste Storage Area 1

Access roads still lead across Pit 1, although no debris is noted here. The surface of Pit 2 is scarred; however, no additional waste disposal is evident. The northern end of Pit 3 appears filled and graded, while the southern end contains solid waste material. Pit 4 contains liquid and solid material. Pit 5 contains a slurry of light-toned liquid. The burn pit area appears stained. Access roads lead into the fill area northwest of the pits and to a ground scarred area to the west, although no waste material was noted.

Large graded areas are visible east of the pits. The landfill to the northeast has expanded since 1968 and filling and debris are present farther south. Two possible trenches are visible at the landfill. The cleared areas noted south of the landfill have revegetated.

A large ditch is visible north of WSA 1; however, this may be related to agricultural activity.

Waste Storage Area 2

The fill area at WSA 2 appears similar to that noted in 1968. The excavation or channelized ditch is no longer visible.

Production Area

The drums and staining noted in the eastern end of the PA are no longer visible. Drainage rills lead away from a group of buildings at the southwest corner of the PA. The ground surface near two of these rills appears scarred and may indicate possible vegetation stress.

MAY 10, 1983 (FIGURE 9)

Pits 1, 2, 3 and the burn pit appear inactive and have sparse vegetation growing on them. Pit 4 contains light-toned solid material. Pit 5 contains light-toned liquid.

Pit 6 appears lined and contains liquid. Vehicles and equipment and probable containers or drums (not annotated) appear between Pit 4 and Pit 6 in the area reportedly used as a decontamination staging area.* The area northwest of the pits is revegetating, and a large ditch has been constructed here. Two graded areas appear south and east of the pits.

The landfill has expanded farther south.

The ditch noted north of WSA 1 in 1976 has revegetated.

Waste Storage Area 2

The fill area at WSA 2 has expanded in size since 1976. No other significant changes were noted here.

Production Area

The remaining disturbed area in the eastern portion of the PA is revegetating. At the southwest corner of the PA, two stained areas or areas of wet soil are present and the area around them appears scarred. The western area has a drainage ditch leading to it, while the eastern area has an access road nearby.

APRIL 20, 1988 (FIGURE 10)

Significant change has occurred within WSA 1 since 1983. Pit 4 is covered, although no vegetation is visible on its surface. Pit 5 contains a greenish liquid and some solid material. Pit 6 contains debris on its western end, and the remainder is filled with liquid.

The area north and northwest of the pits appears graded and disturbed and contains numerous vehicles and equipment. The landfill has expanded since 1983 (see Figure 11).

A large biodenitrification surge lagoon* and two raised impoundments have been constructed since 1983. All of these have liners; however, they do not contain solid or liquid waste at this time.

Waste Storage Area 2

The eastern fill area at WSA 2 has expanded since 1983 and appears to contain a uniform, grey fine-textured material (fly ash*). Another fill area is developing in the area formerly used for waste disposal west of the fly ash. Light-toned and dark-toned mounded material and drums are present here. The area east of the drums appears disturbed. Light-toned objects appear near access roads that lead to Paddy's Run northwest of WSA 2. A larger stormwater retention basin has been constructed in the north end of WSA 2.

Production Area

See Figure 11.

APRIL 20, 1988 (FIGURE 11)

Production Area

Staining, standing liquid and numerous tanks and drums appear throughout the PA. Exposed debris is visible at the landfill just outside the northwest corner of the PA. East of the landfill a possible fill area and graded area appear in a storage area, suggesting burial.

An area of pits and several linear excavated trenches at the northeast corner of the PA may be related to RI/FS work. A new impoundment has been constructed south of the coal storage area.

Standing liquids appear to be emanating from an impounded tank area at the southwest corner of the PA. Farther south a fill area is evident. Although no waste material is evident within the fill material, debris is visible nearby. Orange-red and black staining is present north and east, respectively, from the fill area. A long, linear mound of material is visible farther east.

A pit and a mound appear in the southeast end of the PA.

Excavated areas and a pit are present southwest of the PA.

REFERENCES

AERIAL PHOTOGRAPHY

<u>Date</u>	<u>Agency</u>	<u>Mission Code</u>	<u>Agency Frame #</u>	<u>Orig. Scale</u>	<u>EPIC Frame #</u>
October 13, 1950	ASCS ¹	BCH	3G:153-155	1:20,000	19958-19960
April 6, 1954	DIA ²	M-155	68,69	1:20,000	19872,19873
April 19, 1956	DIA	WCLR	24-30	1:10,000	19861-19867
March 21, 1957	DIA	56AFM10	17-19	1:26,000	19875-19877
September 11, 1962	ASCS	BBZ,BCH	76-78	1:20,000	19961-19963
April 15, 1964	USGS ³	VAYB	2:45,46	1:24,000	19749,19750
September 12, 1968	ASCS	BBZ,BCH	IJJ:200-202	1:20,000	19964-19966
May 20, 1976	SCS ⁴	39017	176:89,90	1:38,000	20202,20203
May 10, 1983	ASCS	39017	182:15-17	1:40,000	19967-19969
April 20, 1988	EPIC ⁵	88/026	1-35	1:6,000	88/026:1-35

MAP

<u>Source</u>	<u>Name</u>	<u>Scale</u>	<u>Date</u>
USGS	Shandon, OH	1:24,000	1974

¹Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture

²Defense Intelligence Agency, U.S. Department of Defence

³U.S. Geological Survey, U.S. Department of the Interior

⁴Soil Conservation Service, U.S. Department of Agricultural

⁵Environmental Photographic Interpretation Center, U.S. Environmental Protection Agency

LEGEND

B	- Building
BF	- Ball Field
CS	- Coal Storage
CW	- Clear Well
D	- Drums
DA	- Disturbed Area
DB	- Debris
DK	- Dark-Toned
E	- Equipment
EX	- Excavation/Extraction
FA	- Fill Area
GS	- Ground Scar
GR	- Graded Area
LF	- Landfill
LT	- Light-Toned
M	- Material
MM	- Mounded Material
MT	- Medium-Toned
OS	- Open Storage
PA	- Production Area
SM	- Scrap Material
ST	- Stain
STP	- Sewage Treatment Plant
T	- Tank
TC	- Tank Car
V	- Vehicles
WS	- Wet Soil
WSA	- Waste Storage Area
---	- Access Road
////	- Berm
→→→	- Channelized Drainage
→→→	- Drainage
---	- Historical Boundary
////	- Sloped Edge of Fill or Excavated Face
—	- Study Area Boundary

4401

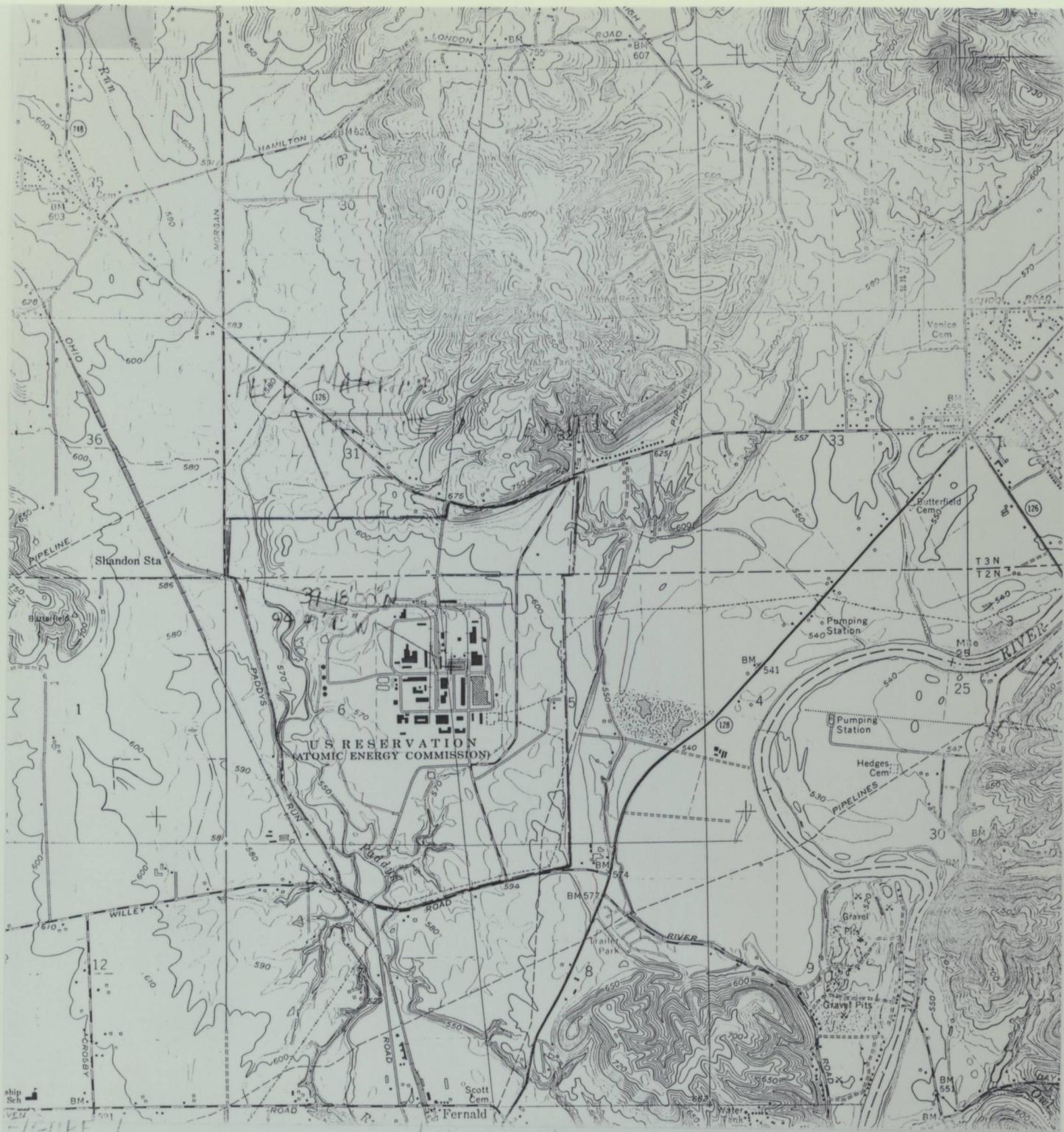


FIGURE 1
FMPC

WIND... 111 x 516 1:24,000

29

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10-13-50

BCH-3G-



FIGURE 2
FMPC

OCTOBER 13, 1950

APPROX. SCALE 1:9,000

30



FIGURE 4
DOE FEED MATERIALS

MARCH 21, 1957

Approx. SCALE 1:4,200

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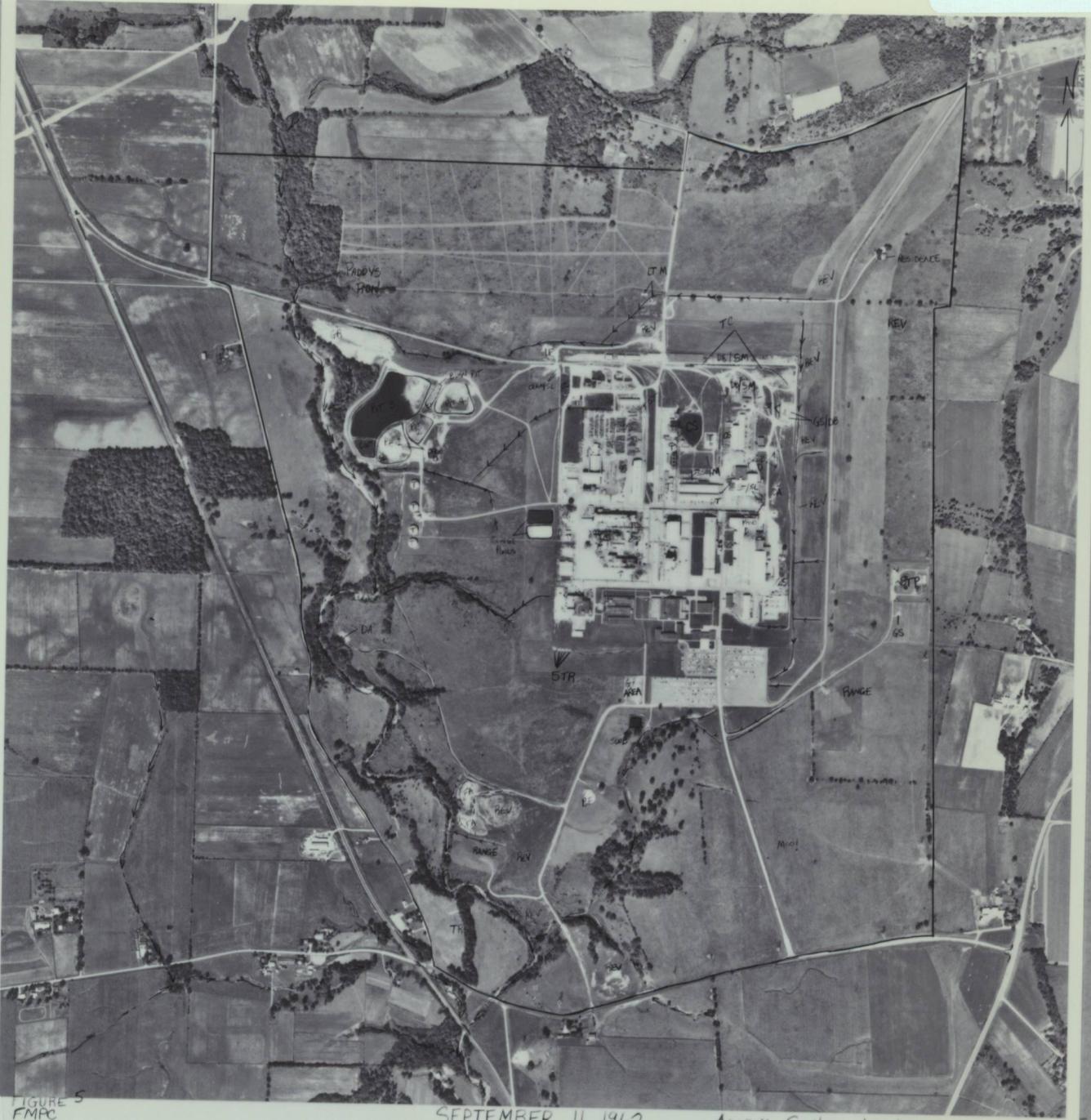


FIGURE 5
FMPC

SEPTEMBER 11, 1962

APPROX SCALE 1: 6,500

33

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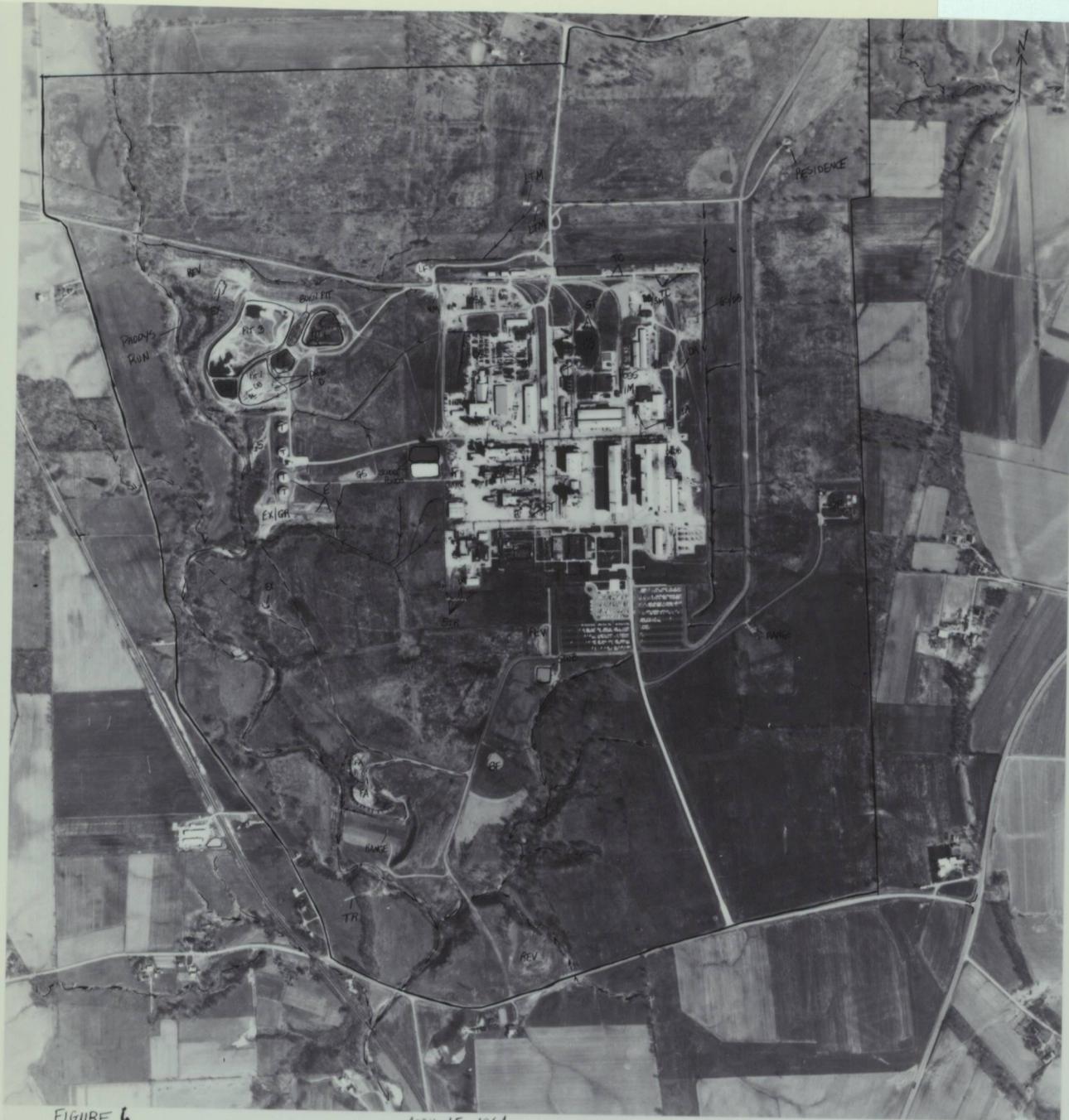


FIGURE 6
DOE FEED MATERIALS

APRIL 15, 1964

APPROX. SCALE 1:5,700

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FIGURE 7
FMPC

SEPTEMBER 12, 1968

Approx. Scale 1:6,500

35

-44 0 1

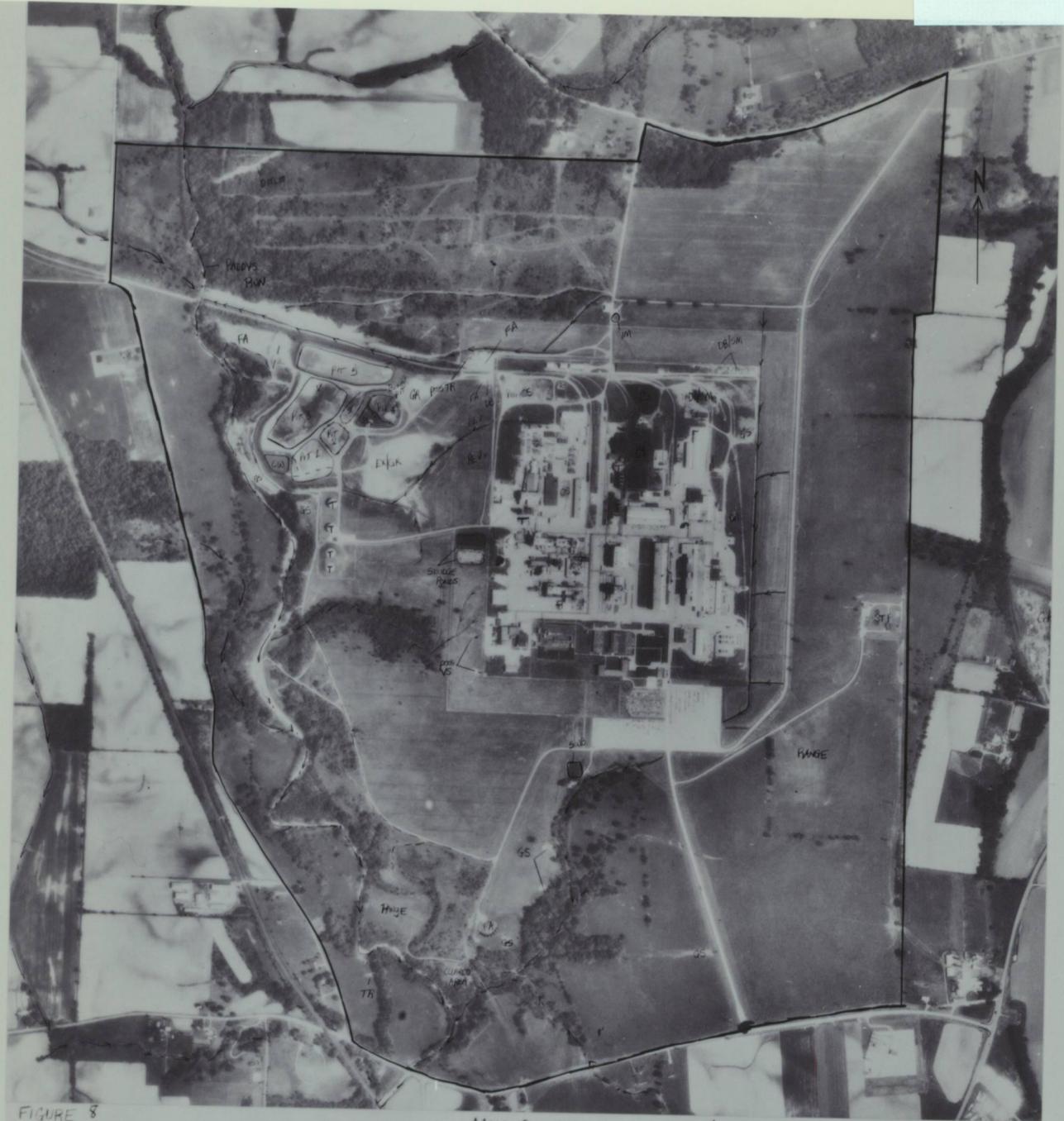


FIGURE 8
FMPC

MAY 20, 1976

Approx. SCALE 1: 5, 600

36

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FIGURE 10
DOE FEED MATERIALS

April 20, 1986

Approx SCALE 1:6,800

38

