United States
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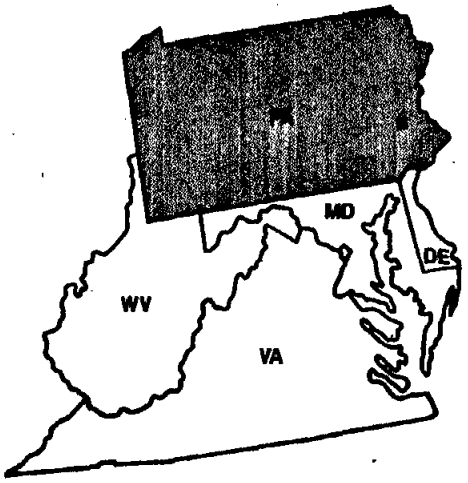
October 1990

Research and Development

EPA

Site Analysis
Crossley Farms
Hereford, Pennsylvania

EPA Region 3
and OERR



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Site Analysis
Crossley Farms
Hereford, Pennsylvania

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NOTICE

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ABSTRACT

This report presents an analysis of historical aerial photography of the Crossley Farms site, located near Hereford, Pennsylvania. The site covers approximately 33 hectares (82 acres) and lies east and north of private wells contaminated with trichloroethylene. The Environmental Protection Agency's (EPA) Region 3 requested this analysis to identify activities which may have led to the ground water contamination.

Findings of the analysis include an abandoned quarry, pits and possible pits, disturbed ground, ground scars, extraction/excavation areas, filled and graded areas, dark- and light-toned mounded material, dark- and light-toned objects, and possible debris.

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 analysis at the request of the Environmental Monitoring and Surveillance Branch of EPA Region 3 in Philadelphia, Pennsylvania, and the Office of Emergency and Remedial Response in Washington, D.C. This analysis covers the period between 1946 and 1987, and the report was completed in October 1990.

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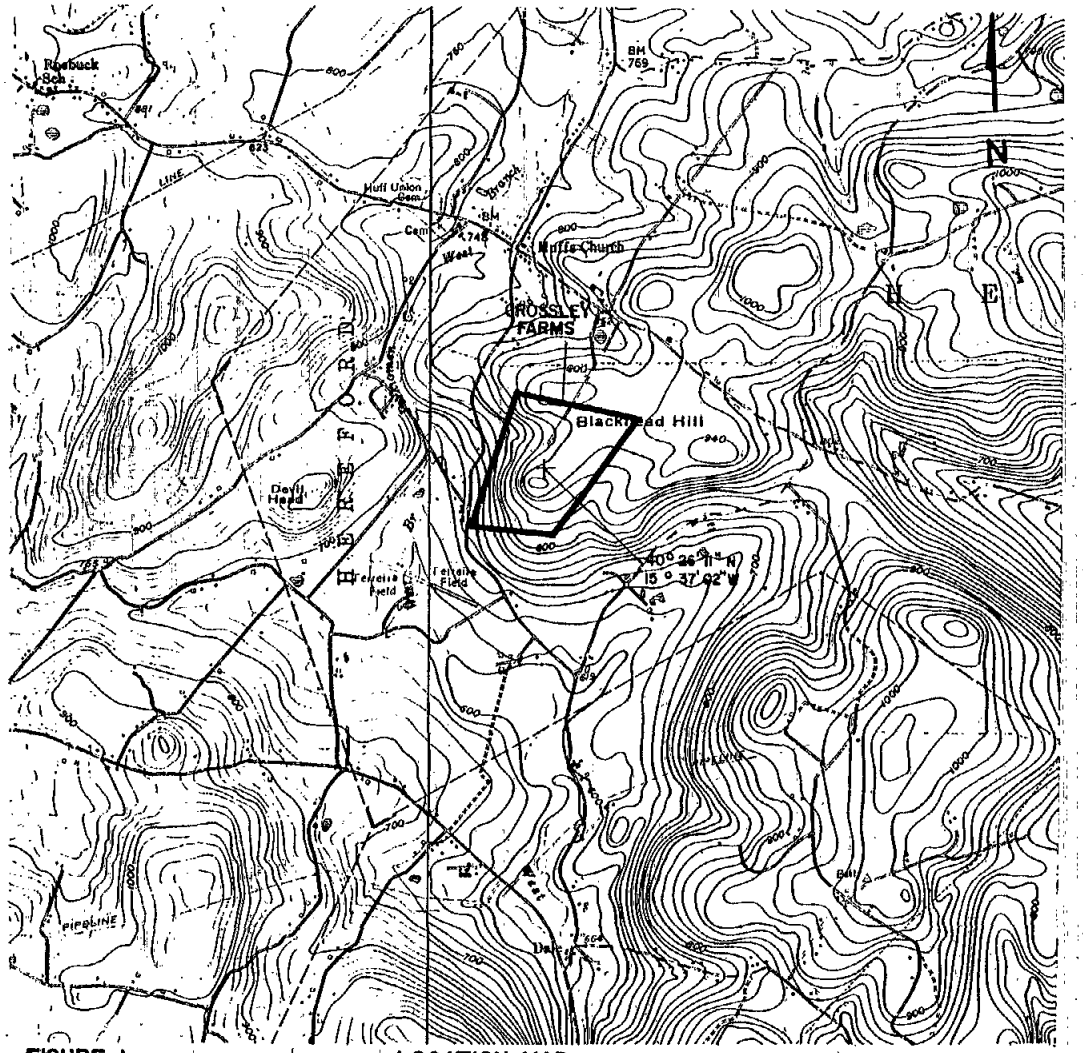

FIGURE 1
CROSSLEY FARMS

LOCATION MAP
MANATAWNY & EAST GREENVILLE, PA QUADS

APPROX. SCALE 1:24,000

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INTRODUCTION

An analysis of historical aerial photography was performed for the Crossley Farms site, located near Hereford, Pennsylvania. The site covers approximately 33 hectares (82 acres) centered on Blackhead Hill, which is part of a working farm.[1] The site is east and north of private wells which have been found contaminated with trichloroethylene. The purpose of this analysis is to assist the Environmental Protection Agency's (EPA) Region 3 in identifying activities which may have led to the ground water contamination.

Findings of the analysis include an abandoned quarry,[1] pits and possible pits, disturbed ground, ground scars, excavated areas, dark- and light-toned mounded material, dark- and light-toned objects, and possible debris.

Figure 1 shows the site location, registered to a photocopy of a U.S. Geological Survey (USGS) 1:24,000-scale topographic quadrangle map. Site boundaries used in this analysis were determined from observations made from the aerial photography in conjunction with collateral data supplied by EPA Region 3 and do not necessarily denote legal property lines or ownership.

Aerial photography of the site was obtained to represent the period from 1946 to 1987.[2] Historical black and white photography from 1946, 1955, 1958, 1964, 1969, 1971, and 1980; color infrared photography from 1984; and color photography from 1987 were used for this analysis. Tree canopies covered approximately one-half of the study area on the 1958, 1964, 1971, 1984 and 1987 photography, precluding detailed analyses for those years.

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 analysis at the request of the Environmental Monitoring and Surveillance Branch of EPA Region 3 in Philadelphia, Pennsylvania, and the Office of Emergency and Remedial Response in Washington, D.C. This analysis covers the period between 1946 and 1987, and the report was completed in October 1990.

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[1]Collateral information supplied by EPA Region 3.

[2]A complete listing of maps and photography used in this report is provided in the References section.

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METHODOLOGY

A search of government and commercial sources was undertaken to obtain the best available aerial photography of the site 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 site. The analyst's findings are annotated on overlays to prints 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 supplied by EPA Region 3 and do not necessarily denote legal property lines or ownership.

An approximate scale has been calculated for each print. The scale is expressed as a ratio of the distance between two points on the print and the same two points on the ground (e.g., 1:20,000, where 1 refers to a unit of distance on the print). This ratio is considered an approximate scale because the accuracy of distance measurements is limited by factors such as the image distortion intrinsic to aerial photography, the expansion or shrinkage of the print, and the precision of the measuring device. The approximate scale represents an average of several calculations rounded to the nearest hundred.

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.

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Color infrared film has been reproduced for the 1984 photography (Figure 9). Normal color film records reflected energy in the blue, green, and red portions of the electromagnetic spectrum. Color infrared film differs in that it is sensitive not only to reflected blue, green, and red energy, but also to reflected energy in the infrared portions of the electromagnetic spectrum; however, the blue energy is filtered out and only the green, red, and infrared energy is recorded. When color infrared film is processed, it displays "false" colors that do not correspond with true colors of the features photographed. For example, features that are highly reflective in the infrared portion of the spectrum, such as healthy green vegetation, appear red to magenta on color infrared film. The false color displayed by a feature is produced in accordance with the proportions of infrared, green, and red energy it reflects. These proportions are referred to as the feature's "spectral reflectance characteristics." To interpret the true color of a particular feature accurately from color infrared film, a knowledge of the spectral reflectance characteristics of that feature is required. This information is not readily available for the majority of features identified in this report. Therefore, unless otherwise indicated, no attempt is made to interpret the true colors of features identified on the color infrared film analyzed for this year.

The terms "possible" and "probable" are used to indicate the degree of certainty of signature identification. "Possible" is used when only a few characteristics are discernible or these characteristics are not unique to a signature. "Probable" is used when incrementally more characteristics are discernible. No qualifying terms are used when the characteristics of a signature allow for a definite feature identification.

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AERIAL PHOTO SITE ANALYSIS

NOVEMBER 19, 1946 (FIGURE 2)

The quarry on Blackhead Hill does not appear to be operating now or for the duration of the study period. The only distinguishing features this year are an access road and quarry rubble. The quarry rubble will continue to be annotated but is no longer discussed unless a significant change is noted.

AR100293

LEGEND

- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EX - Excavation/Extraction
- FA - Fill Area
- GR - Graded Area
- GS - Ground Scar
- LT - Light-Toned
- M - Material
- MM - Mounded Material
- O - Object
- REV - Revegetated
- Access Road
- Site Boundary

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FIGURE 2
CROSSLEY FARMS

NOVEMBER 19,1946

APPROX. SCALE 1:3,600

AR100294

APRIL 23, 1955 (FIGURE 3)

A small area of disturbed ground (DG) is seen in the southwestern portion of the site at the base of Blackhead Hill. New access roads are also apparent.

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AR100295

LEGEND

DB - Debris
DG - Disturbed Ground
DR - Dark-Toned
EX - Excavation/Excavation
FA - Fill Area
GR - Graded Area
GS - Ground Scar
LR - Light-Toned
M - Material
MM - Mounded Material
O - Organic
REV - Revegetated
Access Road
Site Boundary

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FIGURE 3
CROSSLEY FARMS APRIL 23, 1955 APPROX. SCALE 1:3,700

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OCTOBER 24, 1958 (FIGURE 4)

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A new area of disturbed ground, including a possible pit, is located east of the quarry rubble at the base of Blackhead Hill. The disturbed ground previously noted in the southwestern portion of the site now contains a pit. This feature may represent extraction (EX) activity. Just south of the possible extraction activity is more disturbed ground, including a possible pit.

AR100297

LEGEND

- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EX - Excavation/Extraction
- FA - Fill Area
- GM - Graded Area
- GS - Ground Scar
- LT - Light-Toned
- M - Material
- MM - Mounded Material
- O - Object
- RDV - Revegetated
- Access Road
- Site Boundary

ORIGINAL
(Red)

FIGURE 4
CROSSLEY FARMS OCTOBER 24, 1958 APPROX. SCALE 1:3,500

AR100298

JUNE 17, 1964 (FIGURE 5)

The rubble area appears lighter-toned than it did in 1958. An access road leads to the center of the rubble area. The tonal difference and the presence of the access road suggest additional material may have been added to this area.

The disturbed ground east of the quarry rubble appears unchanged. The pit is no longer discernible in the possible extraction area in the southwestern part of the site. A ground scar (GS) is noted where disturbed ground was seen in 1958.

ORIGINAL (Red)

AR100299

LEGEND

- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EX - Excavation/Extraction
- FA - Fill Area
- GR - Graded Area
- GS - Ground Scar
- LT - Light-Toned
- M - Material
- MM - Mounded Material
- O - Object
- RAV - Bankjacketed
- Access Road
- Site Boundary

ORIGINAL
(Red)

FIGURE 5
CROSSLEY FARMS JUNE 17, 1964 APPROX. SCALE 1:3,500

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MAY 2, 1969 (FIGURE 6)

A large pit now comprises half of the disturbed ground east of the quarry rubble. A pit is again seen in the possible extraction area in the southwestern part of the site. Otherwise, this area appears unchanged. The ground scar seen just south of this pit in 1964 is no longer present.

ORIGINAL (Red)

AR100301

LEGEND

DB - Debris
DG - Disturbed Ground
DR - Dark-Toned
DX - Excavation/Extraction
FA - Fill Area
GR - Graded Area
GS - Ground Scar
LR - Light-Toned
M - Material
MM - Mounted Material
O - Object
NDV - Revegetated
Access Road
Site Boundary

ORIGINAL
(Red)

FIGURE 6
CROSSLEY FARMS

MAY 2, 1969

APPROX. SCALE 1:3,600

AR100302

JULY 18, 1971 (FIGURE 7)

Activity appears to have increased around the pit located east of the quarry rubble. The area south of the pit appears to have been backfilled (FA) and graded (GR). Dark-toned (DK) material (M) seen along the southern edge of the pit appears to be fresh fill material.

The pit/possible extraction area in the southwestern portion of the site is revegetating.

A pit and an area of disturbed ground are seen outside the northeast corner of the site. Other features located farther east, which are not covered by the photo, include two large trenches, dark- and light-toned mounded material, several dark-toned objects, and several vehicles. This activity is very similar to possible disposal activity seen in the northeastern portion of the site in 1980.

ORIGINAL (Red)

AR100303

LEGEND

DB - Debris
DG - Dismantled Ground
DK - Dark-Toned
EX - Excavation/Extraction
FA - Fill Area
GR - Graded Area
GS - Ground Scar
LT - Light-Toned
M - Material
MM - Mounted Material
O - Object
RDV - Revegetated
Access Road
Site Boundary

ORIGINAL
(Red)

FIGURE 7
CROSSLEY FARMS JULY 18, 1971 APPROX. SCALE 1:3,600

AR100304

APRIL 23, 1980 (FIGURE 8)

Possible disposal activity is noted in the northeastern portion of the site. Findings include a large, deep pit containing possible debris (DB), dark- and light-toned (DF) mounded material (MM), several dark-toned objects (O), one light-toned object, and a small pit.

Two new pits are seen in the area east of the quarry rubble, which has expanded southward. Most of the northern portion of this area has been filled and graded, with the exception of a small pit.

A small possible pit is seen in the quarry rubble at the summit of Blackhead Hill. The pit previously seen in the southeastern portion of the site has revegetated (REV) and may have been filled. This pit will no longer be annotated or discussed. Just south of the revegetated pit is a rectangular feature (not annotated) which does not appear on later photography.

The pit, disturbed ground, and related features noted outside the northeast corner of the site in 1971 are no longer present.

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FIGURE 8
CROSSLEY FARMS APRIL 23, 1980 APPROX. SCALE 1:3,600

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JULY 13, 1984 (FIGURE 9)

A faint ground scar is the only trace of the possible disposal activity seen in the northeastern portion of the site in 1980. Excavation activity east of the quarry rubble may be ongoing; the only distinguishing feature is a pit. The pit seen previously in the quarry rubble is not visible.

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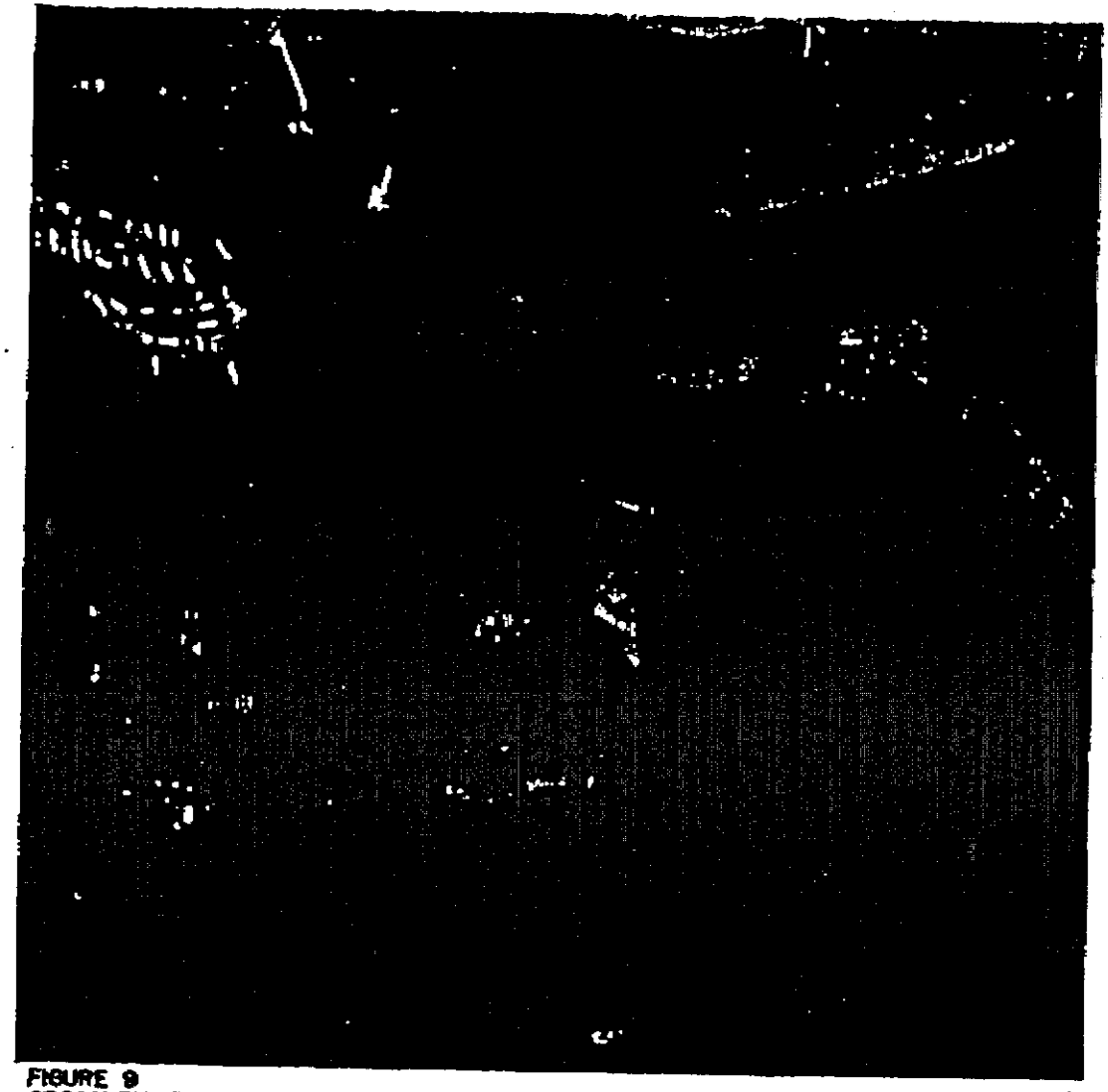

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FIGURE 9
CROSSLEY FARMS

JULY 13, 1984

APPROX. SCALE 1:5,100

AB100308

AUGUST 21, 1987 (FIGURE 10)

The site has changed very little since 1984. The faint ground scar, seen where possible disposal activity was located in 1980, is still seen. The quarry rubble and excavated area to the east are revegetating.

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AR100309

FIGURE 10
CROSSLEY FARMS AUGUST 21, 1987 APPROX. SCALE 1:3,500

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REFERENCES

ORIGINAL (Red)

AERIAL PHOTOGRAPHY

Date	Agency	Mission Code	Agency Frame #	Orig. Scale	EPIC Frame #
November 19, 1946	ASCS[1]	AHJ	2D:30-32	1:20,000	30839-30841
April 23, 1955	USGS[2]	GS-V11	1:109,110	1:24,000	5136,5137
October 24, 1958	ASCS	AHJ	8R:19,20	1:20,000	17755:001,002
June 17, 1964	ASCS	AHJ	4EE:167,168	1:20,000	5474;27116:105
May 2, 1969	USGS	VCEY	1:214-216	1:24,000	30832-30834
July 18, 1971	ASCS	AHJ	3MM:96,97	1:20,000	27116:100; 30928:11
April 23, 1980	SCS[3]	42011	578:35,36	1:40,000	2716:97,98
July 13, 1984	USFS[4]	84/082	599-602	1:32,500	84/082:599-602
August 21, 1987	EPA[5]	87/042	7005,7008, 7040,7041	1:3,500	87/042:7005, 7008,7040,7041

MAPS

Source	Name	Scale	Date
USGS	East Greenville, PA	1:24,000	1973
USGS	Manatawny, PA	1:24,000	1973

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

[2] U.S. Geological Survey, U.S. Department of the Interior

[3] Soil Conservation Service, U.S. Department of Agriculture

[4] U.S. Forest Service, U.S. Department of Agriculture

[5] U.S. Environmental Protection Agency

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