

N-96-01  
II-A-145

APPENDIX D  
HIGHWAY CONSTRUCTION NOISE FIELD MEASUREMENTS  
SITE 4: I-75 (FLORIDA)

October 1981

Office of Noise Abatement & Control  
U. S. Environmental Protection Agency  
Washington, D. C. 20460

N-96-01  
II-A-145

| TECHNICAL REPORT DATA<br><i>(Please read instructions on the reverse before completing)</i>   |   |  |
|---|---|--|
| 1. REPORT NO.<br>EPA 550/9-81-314-G   | 2.  | 3. RECIPIENT'S ACCESSION NO.             |
| 4. TITLE AND SUBTITLE<br>Appendix D, Highway Construction Noise Field Measurements, Site 4: I-75 (Florida)  | 5. REPORT DATE<br>June 1981                       | 6. PERFORMING ORGANIZATION CODE          |
| 7. AUTHOR(S)<br>William R. Fuller, Ron Brown  | 8. PERFORMING ORGANIZATION REPORT NO.<br>WR 81-19 |  |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS<br>Wyle Laboratories/Wyle Research<br>2361 Jefferson Davis Highway, #404<br>Arlington, Virginia 22202   | 10. PROGRAM ELEMENT NO.                           | 11. CONTRACT/GRANT NO.<br>DOT-FH-11-9455 |
| 12. SPONSORING AGENCY NAME AND ADDRESS<br>U.S. Environmental Protection Agency, Office of Noise Abatement & Control (ANR-471)<br>Washington, D.C. 20460, and<br>U.S. Department of Transportation, Federal Highway Administration, Washington, D.C. 20590   | 13. TYPE OF REPORT AND PERIOD COVERED<br>Final    | 14. SPONSORING AGENCY CODE               |
| 15. SUPPLEMENTARY NOTES<br>Completed under an Inter-agency Agreement jointly sponsored by both EPA (Office of Noise Abatement and Control) and FHWA.  |   |  |
| 16. ABSTRACT<br><br>This study investigated the noise associated with highway construction activities. It involved the identification and examination of: highway construction activities, noise characteristics associated with highway construction activities, availability of highway construction noise abatement measures, demonstration of construction site noise abatement measures, and development of a computer-based model for use as a tool to predict the noise impact of construction activities and to plan mitigation measures. The model was developed for use on the FHWA computer (IBM 360).<br><br>A total of seven reports were prepared in this study and have been released for public distribution.<br><br>Reports (Part D through Part G) contain field data gathered at the field demonstrations at highway construction sites in: Route I-201, California; I-205, Oregon; I-95/I-395, Maryland; and I-75, Florida. They contain noise data on single and multiple pieces of equipment, provide general description of highway site activities, and activity analyses of equipment. |   |  |
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## FORWARD

This study was jointly sponsored, through an Interagency Agreement (IAG), by the Office of Noise Abatement and Control (ONAC), U.S. Environmental Protection Agency (EPA), and the Federal Highway Administration (FHWA), U.S. Department of Transportation (DOT). The study was conducted by Wyle Laboratories under contract to FHWA Contract No. DOT-FH-11-9455. Wyle Research of El Segundo, California, and Wyle Research of Arlington, Virginia, performed the study.

The object of the study was to investigate and study the noise associated with highway construction activities. The study involved the identification and examination of: highway construction activities, noise characteristics associated with highway construction activities, availability of highway construction noise abatement measures, demonstration of construction site noise abatement measures, and development of a computer-based model for use as a tool to predict the noise impact of construction activities and to plan mitigation measures. The model was developed for use on the FHWA computer (IBM 360).

The principal project officers for Wyle Laboratories on this project were Mr. William Fuller of Wyle Research in El Segundo and Dr. Kenneth Plotkin of Wyle Research of Arlington, Virginia.

The government project managers for the study were Mr. Fred Romano of FHWA, and Mr. Roger Heymann of EPA/ONAC.

The various technical reports completed by Wyle under this contract and submitted to FHWA have been released for public distribution by EPA.

## PREFACE

This study involved a comprehensive review of the environmental noise associated with highway construction activities. A total of seven reports have been released for public distribution. These reports are:

1. Analysis and Abatement of Highway Construction Noise, EPA 550/9-81-314-A, September 1981.
2. A Model for the Prediction of Highway Construction Noise, EPA 550/9-81-314-B, September 1981.
3. IBM 360/System Batch Version of Highway Construction Noise Model, EPA 550/9-81-314-C, September 1981.
4. Appendix A, Highway Construction Noise Field Measurements, Site 1: I-201 (California), EPA 550/9-81-314-D, September 1981.
5. Appendix B, Highway Construction Noise Field Measurements, Site 2: I-205 (Oregon), EPA 550/9-81-314-E, September 1981.
6. Appendix C, Highway Construction Noise Field Measurements, Site 3: I-95/I-395 (Maryland), EPA 550/9-81-314-F, September 1981.
7. Appendix D, Highway Construction Noise Field Measurements, Site 4: I-75 (Florida), EPA 550/9-81-314-G, September 1981.

The first two reports (Part A and Part B) might be considered the principal reports since they are relatively self-contained units on this study's efforts, the engineering studies and the computer model, respectively. In this regard, if there is to be a limited purchase of the reports, one might consider obtaining either or both of Part A and Part B, and obtaining the other reports as additional informational needs arise.

- The first report (Part A) contains all of the information from the engineering study phase of the project. It gives information on highway construction procedures, highway construction site noise characteristics, available abatement measures, and results from field demonstrations on noise abatement.

- The second report (Part B) presents a complete description of the highway noise prediction model. The report contains a description of the model's formulation and construction, a description of the program, and a user's manual.
- The third report (Part C) provides additional information to the Part B report on the highway construction noise model installed at DOT's Transportation Computer Center on an IBM 360 computer. It delineates the differences between the version of the model as installed on the IBM 360 and the two models (HINPUT and HICNOM) operating on the Wyle Computer (PDP-11). The report has additional user's manual information for use on the IBM 360, a programmer's manual describing changes in going from the PDP-11 to the IBM 360, and a maintenance manual.
- Reports 4, 5, 6, and 7 (Part D through Part G) contain field data gathered at the field demonstrations at highway construction sites in: Route I-201, California; I-205, Oregon; I-95/I-395, Maryland; and I-75, Florida. They contain noise data on single and multiple pieces of equipment, provide general description of highway site activities, and activity analyses of equipment.

## APPENDIX D

This appendix summarizes field measurements performed at the I-75 (Florida) construction site during January 1980. While the total construction encompassed 120 miles of right-of-way, the field noise measurement program focused on the St. Petersburg section, consisting of 25 miles of the I-75 project just south of the City of St. Petersburg. The highway alignment passed through flat, rural landscape, many times encountering large stands of trees. Sparse residential areas existed at various locations, but were some distance from the right-of-way. A more detailed description of the site is presented in Section 3.5 of the main report.

The following data and information are presented in this appendix:

1. General highway site description.
2. Noise measurements of activities involving single or multiple pieces of equipment; diagrams describing each activity site are included.
3. Controlled single equipment noise measurements of selected equipment.
4. Equipment activity analysis of selected equipment.

A summary of key construction noise data derived from this site is presented in Section 3.5.3 of the main report.



Measurement Site Data

Highway: I - 75

Date: Jan 1980

Site Location: Earthwork Area I - just south of St. Rd. 674, near Kuckin.

Type of Measurements:

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Community                | <input checked="" type="checkbox"/> Activity         | <input type="checkbox"/> Propagation       |
| <input checked="" type="checkbox"/> Site Boundary | <input checked="" type="checkbox"/> Single Equipment | <input checked="" type="checkbox"/> Movies |

Soil/Terrain Conditions: Flat terrain, few trees. Very wet soil

Machinery Description:

- 1 Cat D7G Dozer
- 2 Cat D8H Dozers
- 2 Cat D9G Dozers
- 4 Cat 631B Scrapers
- 4 Cat 631C Scrapers
- 1 Cat 621 Scraper (only operated occasionally)

Miscellaneous Information:

Diagrams 1-15A, B, C, D represent a closed loop excavation system where dirt is removed from borrow pit and transported to fill area along highway right-of-way.



ACTIVITY NOISE MEASUREMENTS

HIGHWAY: I-75

DATE: Jan. 1980

SITE LOCATION: Eastbrook Site I

| Sample | Location | Date | Dur. | L <sub>eq</sub> | L <sub>99</sub> | L <sub>90</sub> | L <sub>50</sub> | L <sub>10</sub> | L <sub>1</sub> |
|--------|----------|------|------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|
| A7-1   | EW-1     | 1-15 | :19  | 74.4            | 61              | 65              | 72              | 78              | 82             |
| -2     | EW-2     | 1-15 | :11  | 77.6            | 65              | 70              | 76              | 82              | 85             |
| -3     | EW-3     | 1-15 | :21  | 80.7            | 68              | 69              | 70              | 85              | 93             |
| -4     | EW-4     | 1-15 | :35  | 86.8            | 72              | 77              | 84              | 91              | 95             |
| -23    | EW-5     | 1-15 | :04  | 77.2            | 73              | 79              | 76              | 79              | 84             |
| -91    | EW-34    | 1-29 | :15  | 74.6            | 66              | 69              | 73              | 77              | 84             |
| -92    | EW-35    |      | :17  | 78.0            | 70              | 73              | 77              | 80              | 85             |
| -93    | EW-36    | ↓    |      |                 |                 |                 |                 |                 |                |
| -94    | EW-97    | ↓    |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |
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|        |          |      |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |

SAMPLES MAY BE TOO CONTAMINATED BY NEAR-FIELD PASS-BYS





SINGLE EVENT LEVELS  
SINGLE EQUIPMENT/PROPAGATION NOISE MEASUREMENTS

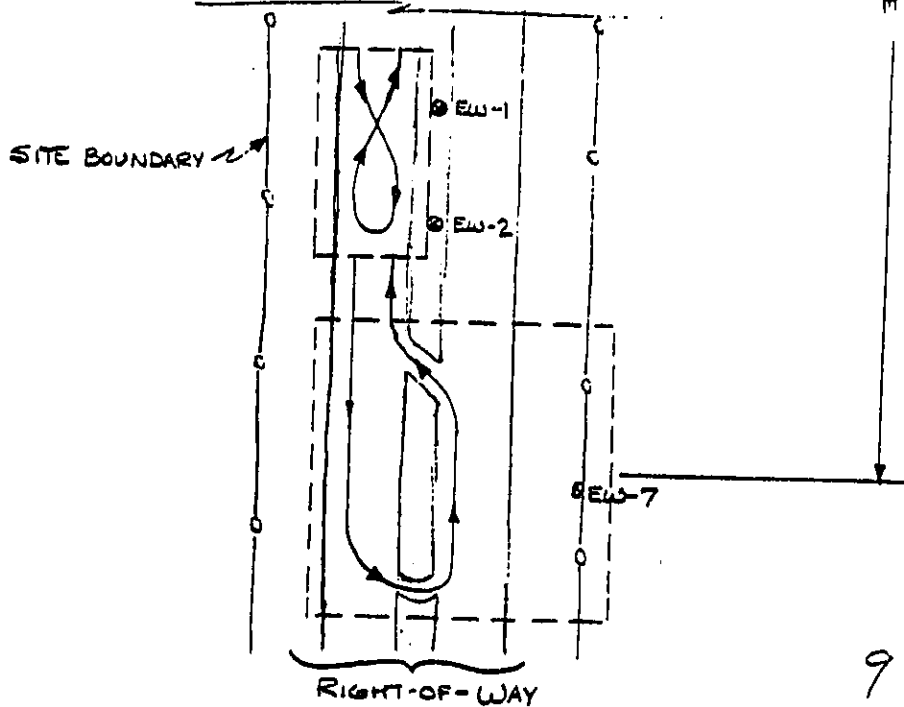
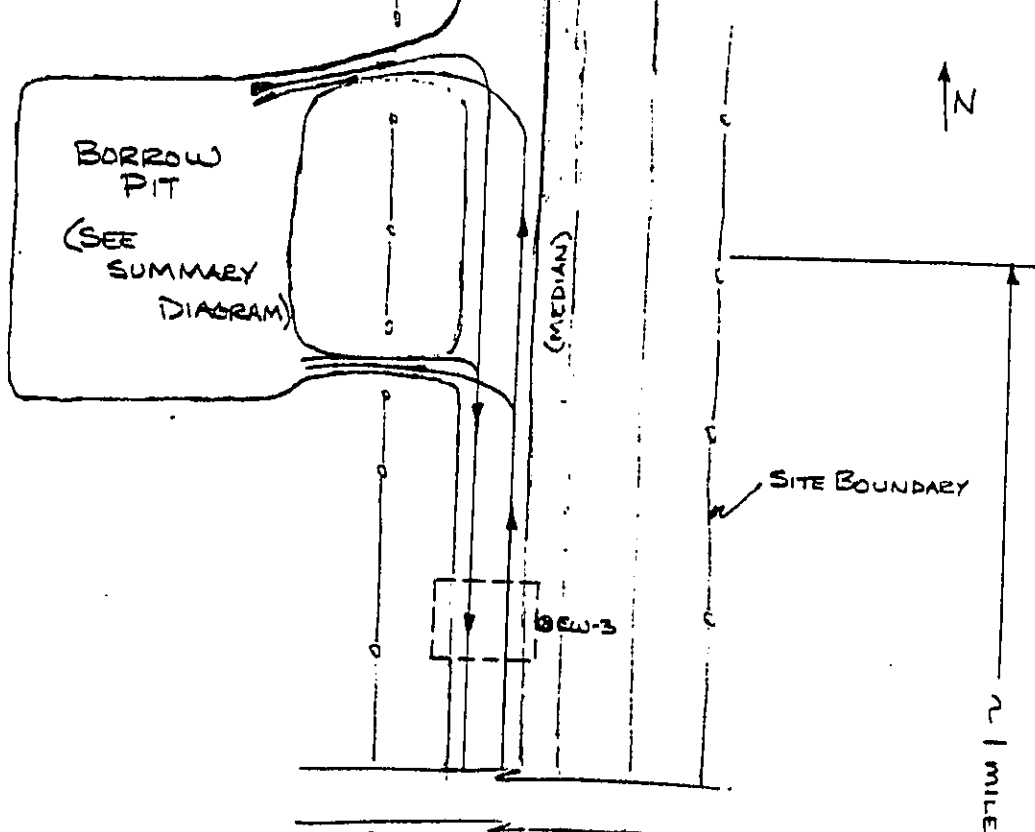
HIGHWAY: I - 75

DATE: Jan 1980

SITE LOCATION: Earthwork Site I

| Sample | Location | Date | Equipment           | L <sub>max</sub> @<br>50 ft. | L <sub>max</sub> @<br>60 ft. | L <sub>max</sub> @<br>80 ft. |
|--------|----------|------|---------------------|------------------------------|------------------------------|------------------------------|
| 47-3   | EW-1     | 1-15 | 631C Scrapie: Empty |                              | 92                           |                              |
|        |          |      | 631C Empty          |                              | 94                           |                              |
|        |          |      | 631B Full           |                              | 92                           |                              |
|        |          |      | 631B Full           |                              |                              | 94                           |
|        |          |      | 631C Full           |                              |                              | 92                           |
|        |          |      | 631C Full           |                              |                              | 84                           |
|        |          |      | 631B Empty          |                              | 92                           |                              |
|        |          |      | 631C(?) Full        |                              |                              | 90                           |
|        |          |      | 631C Empty          |                              | 94                           |                              |
|        |          |      | 631B Empty          |                              | 93                           |                              |
|        |          |      | 631C Full           |                              |                              | 95                           |
|        |          |      | 631C Empty          |                              |                              | 90                           |
|        |          |      | 621 Full            |                              |                              | 92                           |
|        |          |      | 631C Full           |                              | 92                           |                              |
|        |          |      | 631C Empty          |                              | 94                           |                              |
|        |          |      | 621 Empty           |                              |                              | 95                           |
|        |          |      | 631C Full           |                              |                              | 89                           |

SUMMARY DIAGRAM  
(NOT TO SCALE)



SUMMARY DIAGRAM: BORROW PIT  
(NOT TO SCALE)

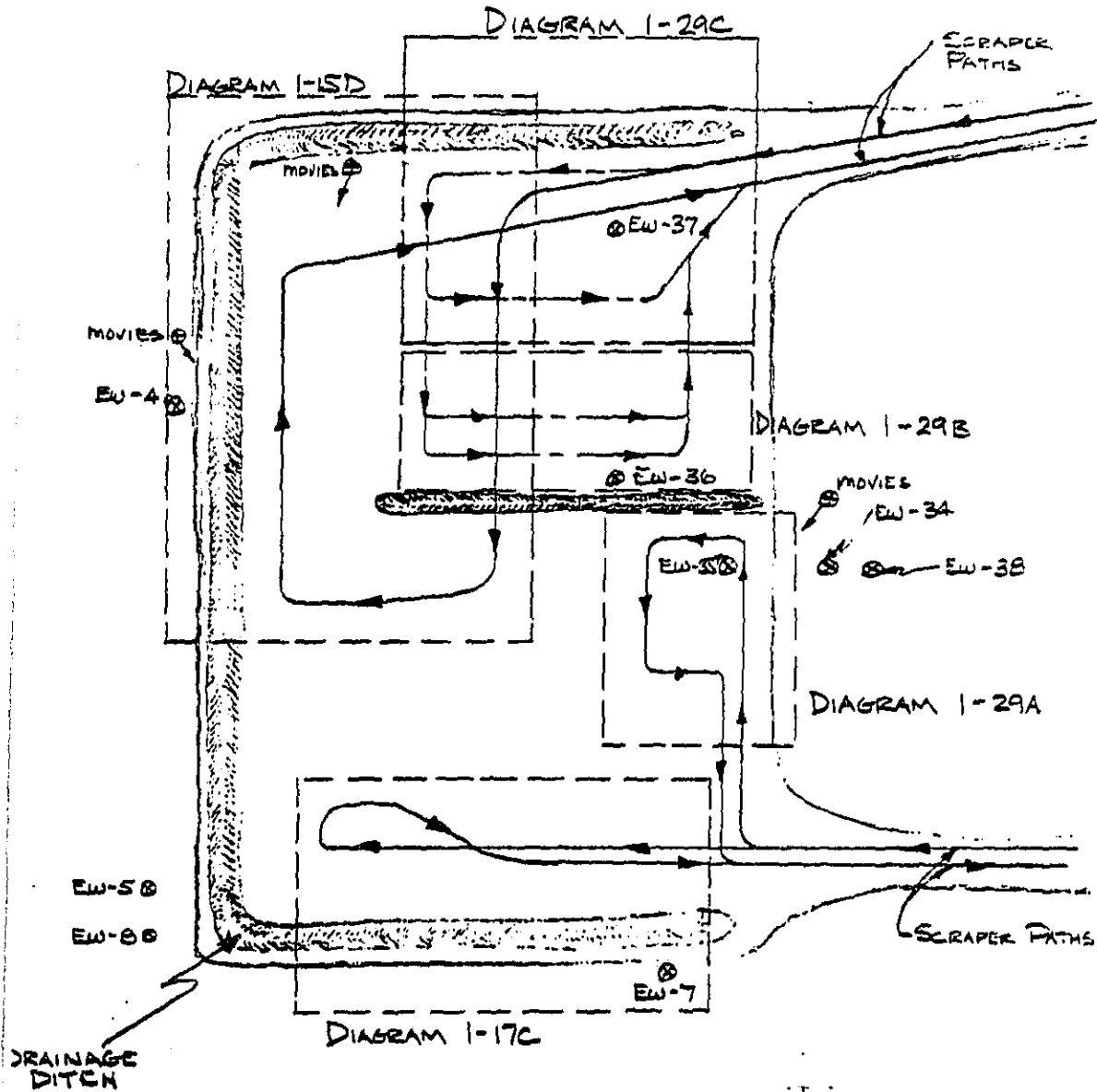
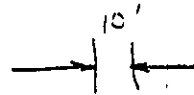
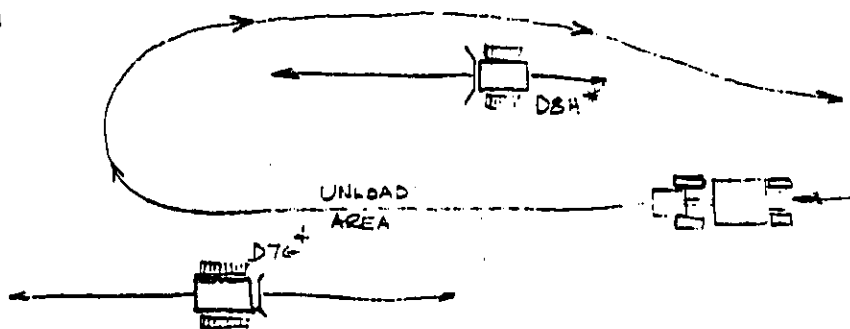




DIAGRAM 1-ISA  
 Fill Operation  
 9:30 am



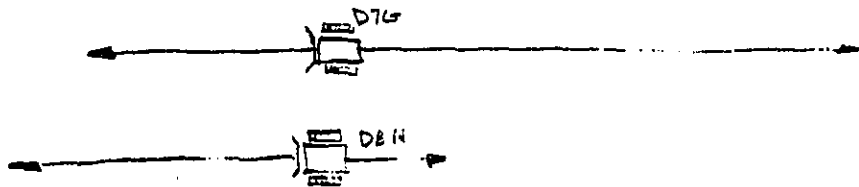
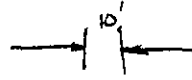
LOOSE, WET SOIL  
 FLAT



angle #1 (+1003)  
 mic 0  
 DBH Dopee running

- Cat D7G with screen engine enclosure
- Cat D7E with screen enclosure
- Cat 631C & B Scrapers } 13 scrapers in 15 minutes
- 621 Scraper

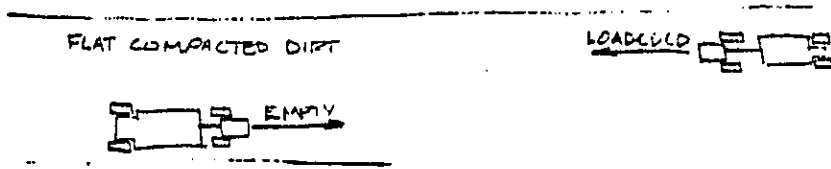
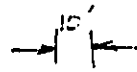
DIAGRAM 1-15B  
10:00am  
FULL OP.  
Same equipment as 1-15A



Analogue \*2

DIAGRAM 1-15C  
Scraper panels

Cat 621  
Cat 631B  $\frac{1}{2}$  C



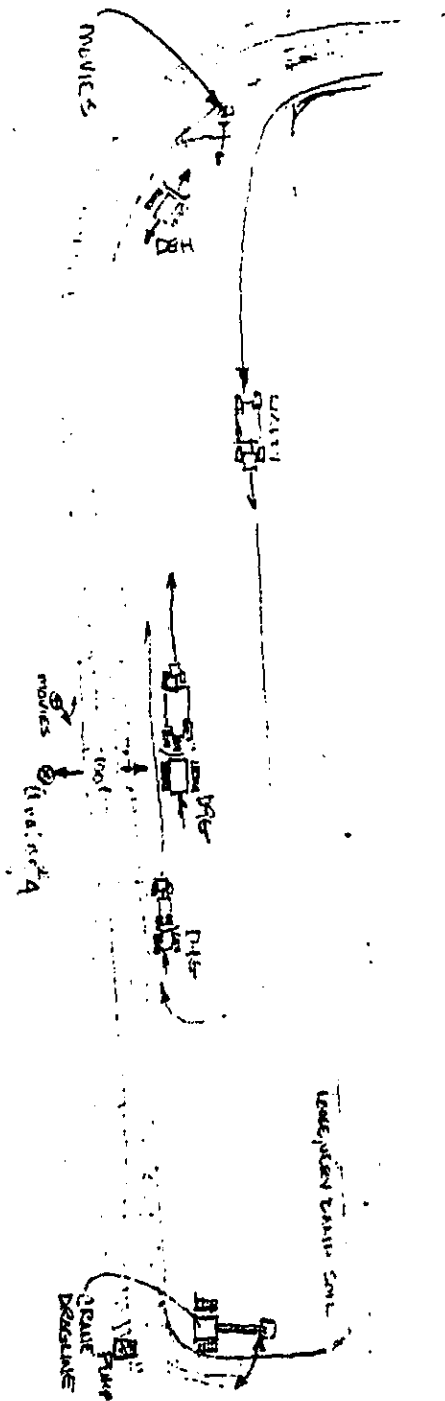
② *Training* + 3

Scraper speeds: 10 mph loaded  
30 mph empty

DIAGRAM 1-1SD  
BORROW EXCAVATION

- 2 Cat D9G Dozer
- 1 Cat DBH Dozer
- 2 Cat Scrapers

DIAGRAM 1-1SA, B, C, D REPRESENT  
A CLOSED LOOP SYSTEM; SAME  
SPREADS IN EACH.



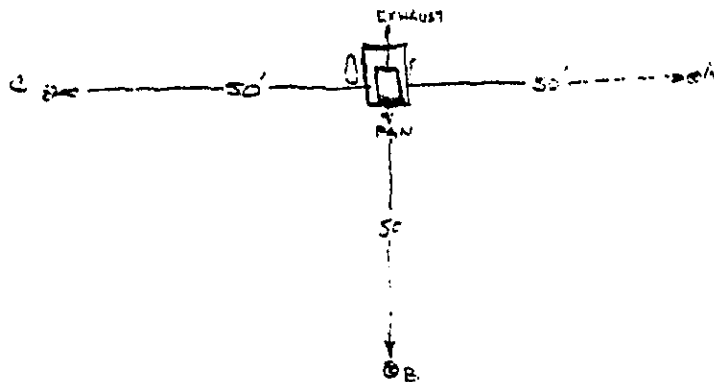
SCRAPER LOADING TIMES:  
(TIME WHEN SCRAPER IS BEING  
PUSHED BY DOZER.)

1:05  
1:15  
1:30  
AVG = 1:18

DIAGRAM 1-15E

Well pump  
4-cylinder diesel  
@ constant RPM

(See Diagram 1-15D for pump location).



L<sub>max</sub>:

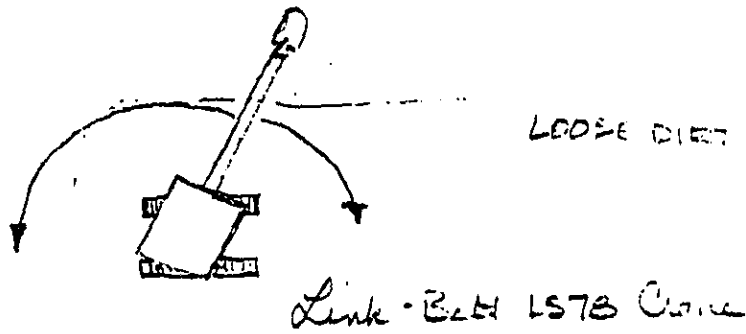
A = 63 dB

B = 65

C = 6A

Note: pump audible during analog #4 (see diagram 1-15D)

DIAGRAM 1-16D  
Dredging



⊗ Analog #23

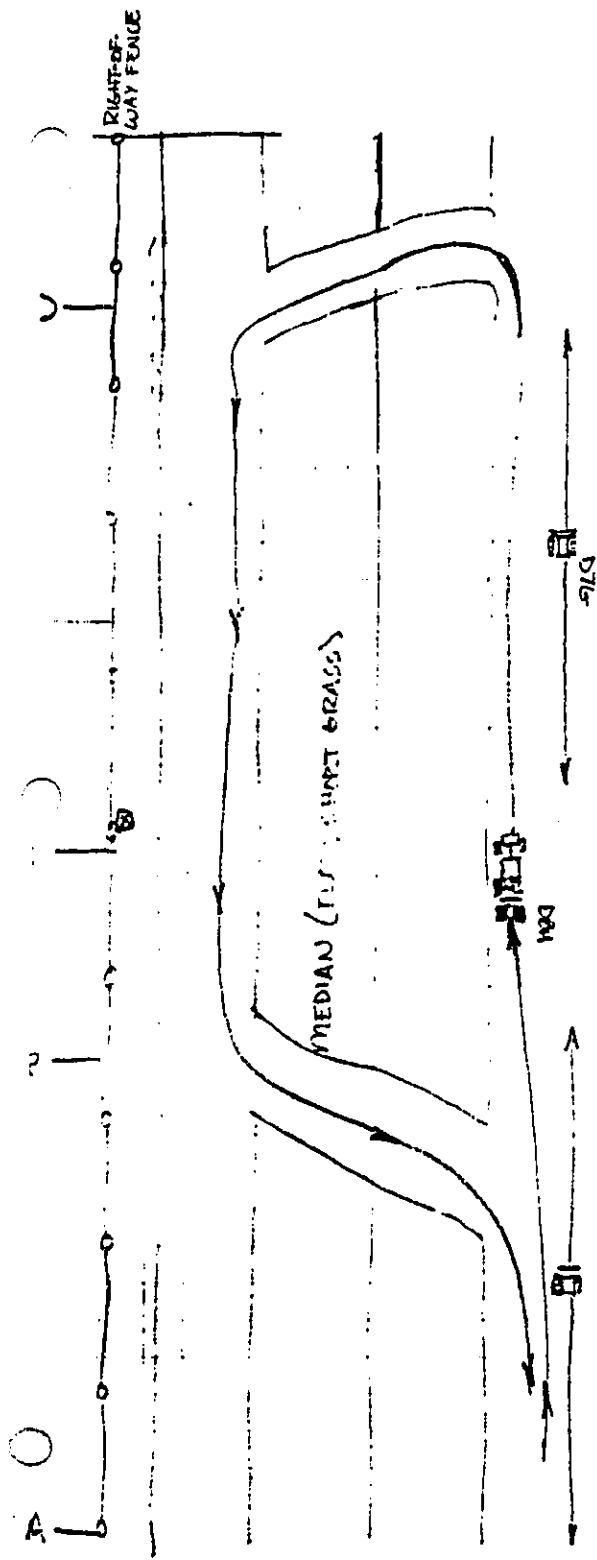


DIAGRAM 1-17A; FILL OP.

- 1 Cat 631B4C Scraper
- 2 Cat D8A Dozer
- 1 Cat D7G Dozer



Vertical equipment as found on Diagram 1-17A

Motor Analysis:

| SCRAPER: | 1    | 2    | 3    | 4    |
|----------|------|------|------|------|
| A to C = | 3:20 | 2:35 | 3:25 | 2:40 |
| C to D = | 1:50 | 1:30 | 1:50 | 1:20 |
| D to A = | 1:15 | 1:25 | 1:25 | 1:30 |

DOZER PUSHER SCRAPERS:

|          |      |      |      |
|----------|------|------|------|
| A to C = | 3:20 | 2:35 | 3:05 |
| C to A = | 1:40 | 1:55 | 1:50 |

DOZER PUSHING:

|          |      |
|----------|------|
| A to C = | 2:20 |
| C to A = | 1:50 |

|          |      |
|----------|------|
| C to D = | 1:35 |
| D to C = | 1:25 |

SCRAPERS ROUND TRIP TIME FROM BORROW PIT TO FILL AREA =

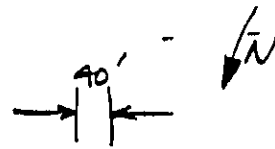
18:30

21:15

23:30

DIAGRAM 1-17C  
BORROW EXCAVATION (SAME 1-15C)

NOTE: DIAGRAM 17A & C  
ARE CLOSE LOOP  
SYSTEM



Digital 155-1

LOOSE, VERY DAM  
LINT

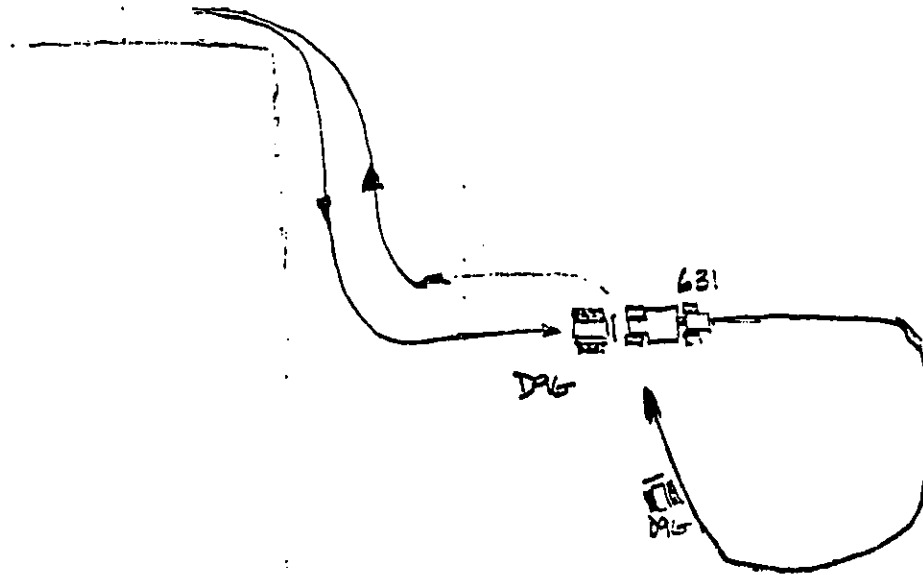




Diagram 1-29 A Borrow Site

→ 50' ←

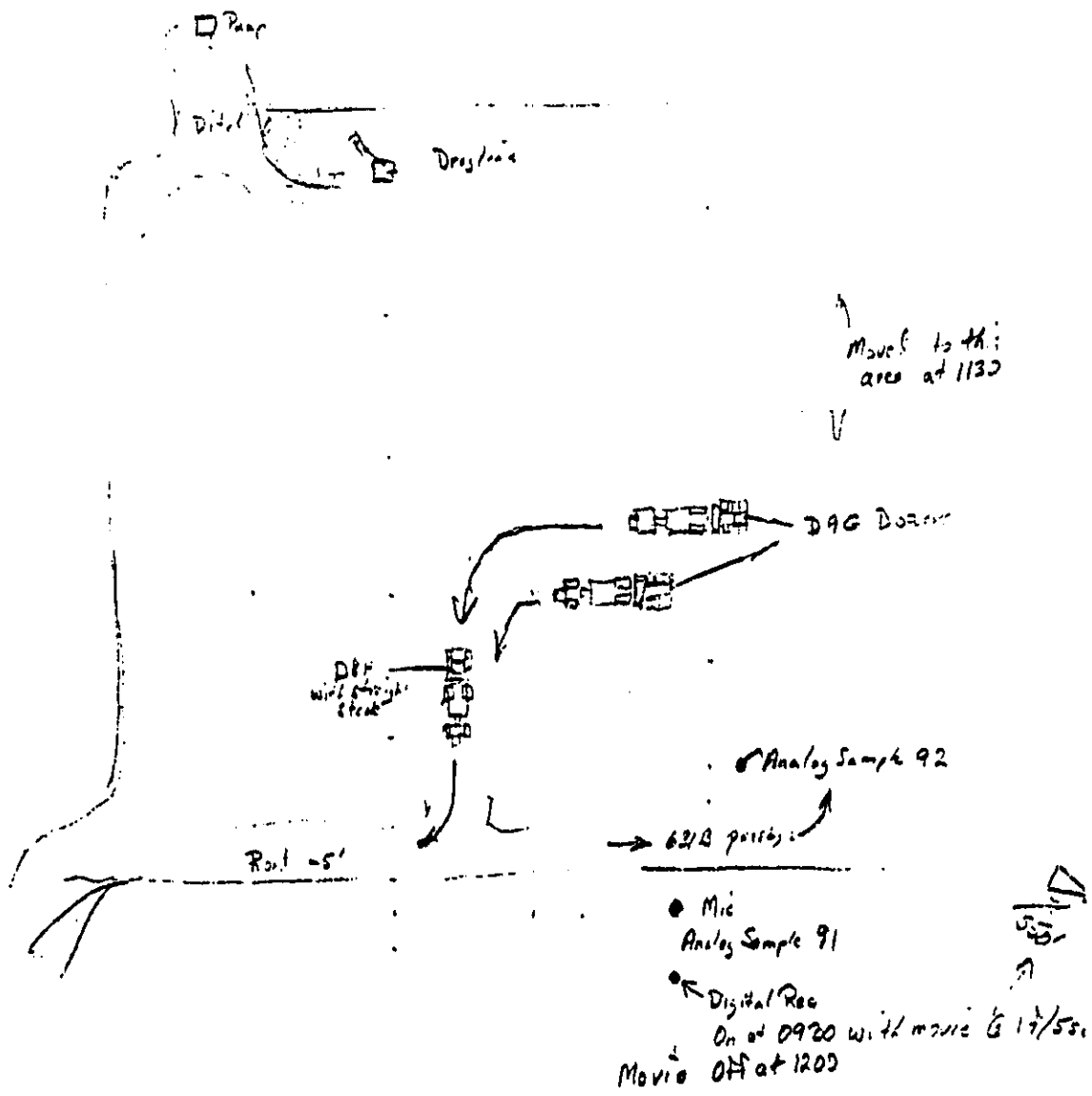
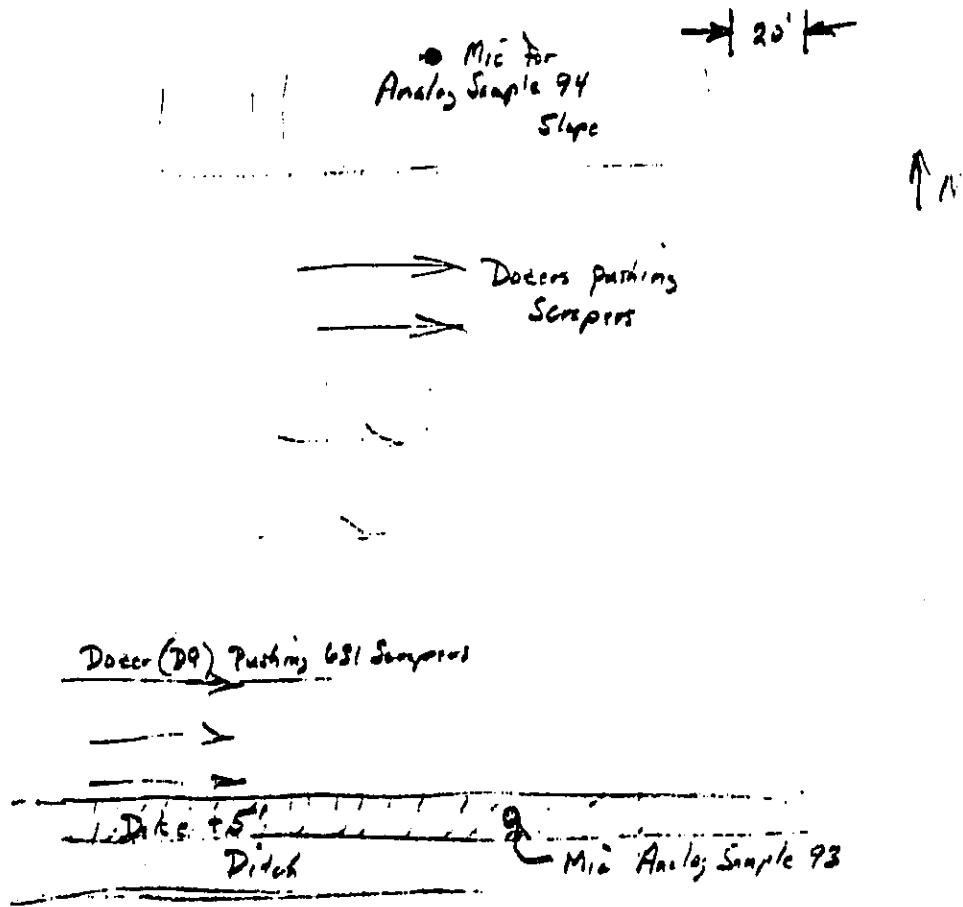


Diagram 1-29 B Borrow Pit



Sample 93 - Possibly of Dozers pushing scrapers at 50 to 130 ft.

Diagram 1-29C

→ 100 ft ←

Digital  
Recorder

Approx 500' from Digital to Activity in  
Afternoon

Seagulls  
Doves

Amalgam Sample 94

N ↓

Measurement Site Data

Highway: I-75

Date: Jan 1980

Site Location: Earthwork Site II - South of Marietta  
River near St. Rd 64.

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions:

Flat; Loose, wet soil.

Machinery Description:

- 2 Cat D9G Dozers with straight blades
- 1 Cat D6 Dozer with muffler
- 1 Cat 631B Scraper (single engine) with straight blade
- 1 Cat 637 Single Engine Scraper with muffler
- 1 Cat 637 Twin Engine Scraper with muffler

Miscellaneous Information:

Diagrams 1-17D & F represent closed loop system where dirt is removed from borrow pit and transported to fill area along highway right-of-way.



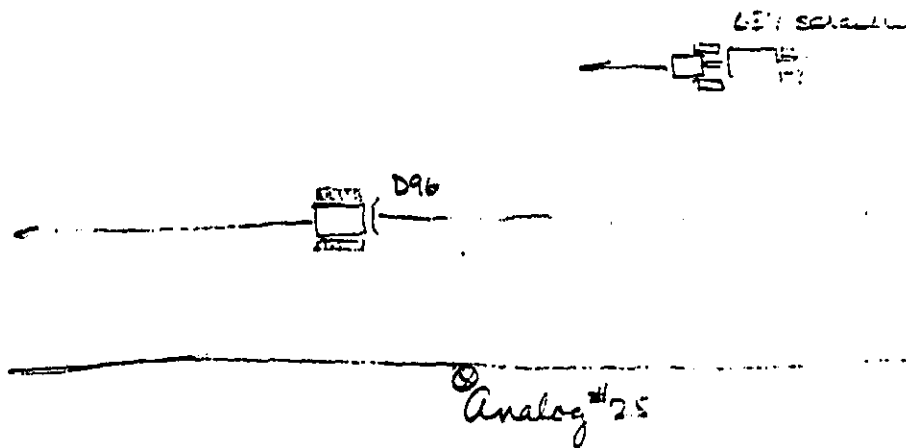






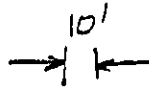


DIAGRAM 1-17B  
Full Operation  
(Paper Cont.)



- 1 Cat 631B with straight stack
- 1 Cat D96 Doye with straight stack
- 1 Cat 637 single engine scraper
- 1 Cat 637 twin engine scraper

DIAGRAM 1-17E



Co. 16 dozer  
Co. 9560C Loader

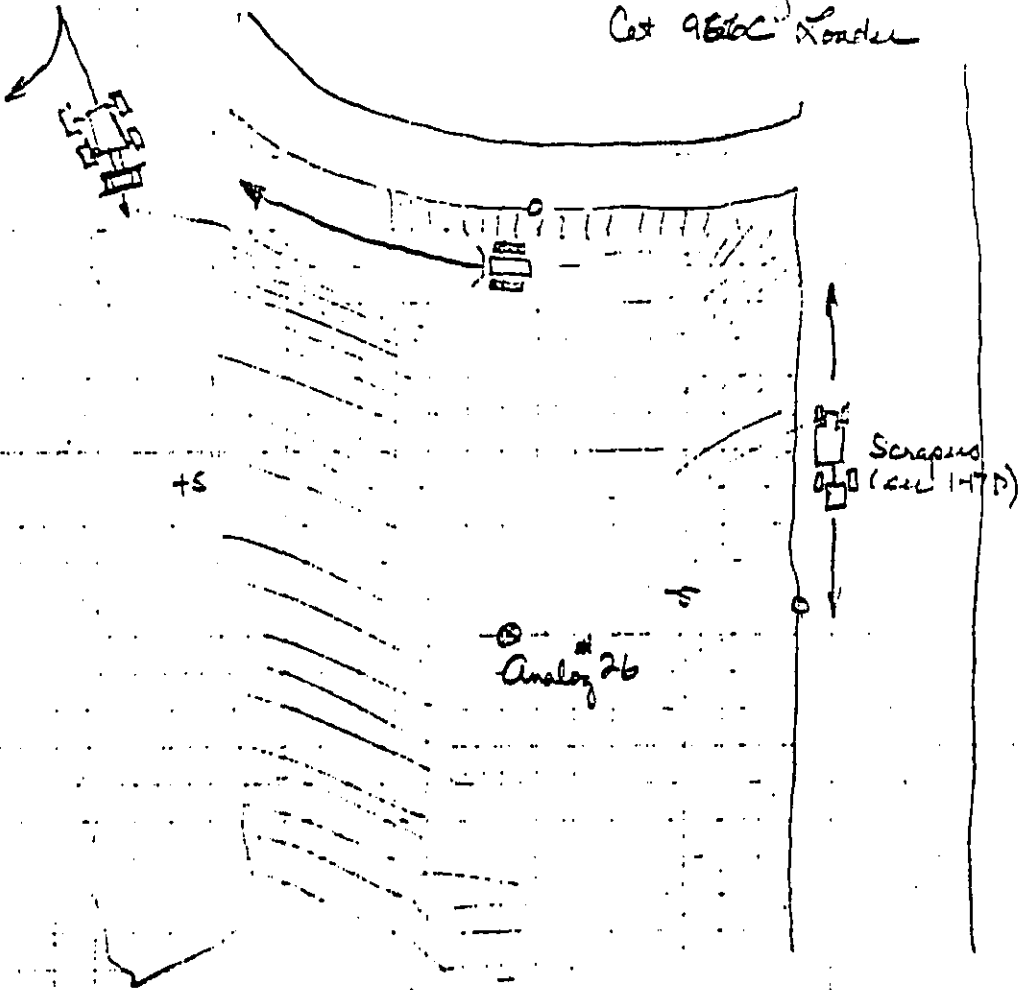
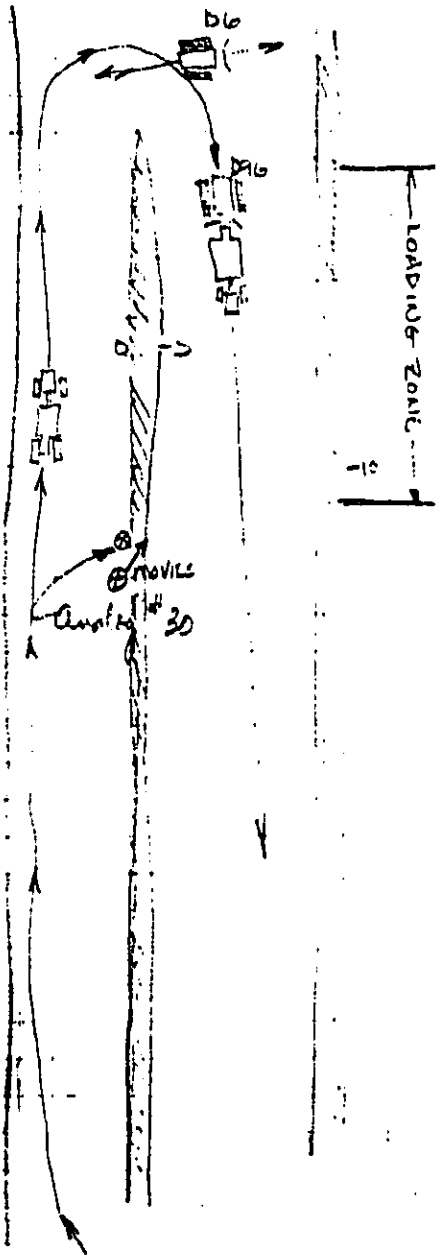
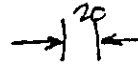


DIAGRAM 1-17F  
Borrow Excavation



- 1 Cat 650
- 1 Cat 600
- 1 Cat 550
- 1 Cat 500

NOTE: 17D: C AND  
CLOSED

Scraping  
:50  
:55  
1:10

Round Trip Time: 15:00

Measurement Site Data

Highway: I-275

Date: Jan 1980

Site Location: Earthwork Site III - Bridge  
Approach Ramp; St. Petersburg area

Type of Measurements:

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Community                | <input type="checkbox"/> Activity                    | <input type="checkbox"/> Propagation       |
| <input checked="" type="checkbox"/> Site Boundary | <input checked="" type="checkbox"/> Single Equipment | <input checked="" type="checkbox"/> Movies |

Soil/Terrain Conditions: Houses and trees line both  
sides of right-of-way. Work flat, compacted  
dirt with dump truck loads of earth situated  
at various points. Height of work increases  
as you look north (from top to bottom of  
Diagram 1-1BC).

Machinery Description:

- 1 Cat D7G Dozer with screen engine covers and muffler
- 1 Cat D7 Dozer with muffler
- 1 Cat 12F Grader with muffler
- 1 Cat 14E Grader with straight stack
- 1 Cat 613 Water truck
- Mack & Ford Single Chassis Dump Trucks
- 1 Dynapac Vibratory Roller
- 1 Dynapac Vibratory Roller

Miscellaneous Information:

1 1/2 rolls of movies were taken at very slow frame  
rate in order to provide truck count.



ACTIVITY NOISE MEASUREMENTS

HIGHWAY: I-75

DATE: Jan. 1980

SITE LOCATION: Earthwork Site III

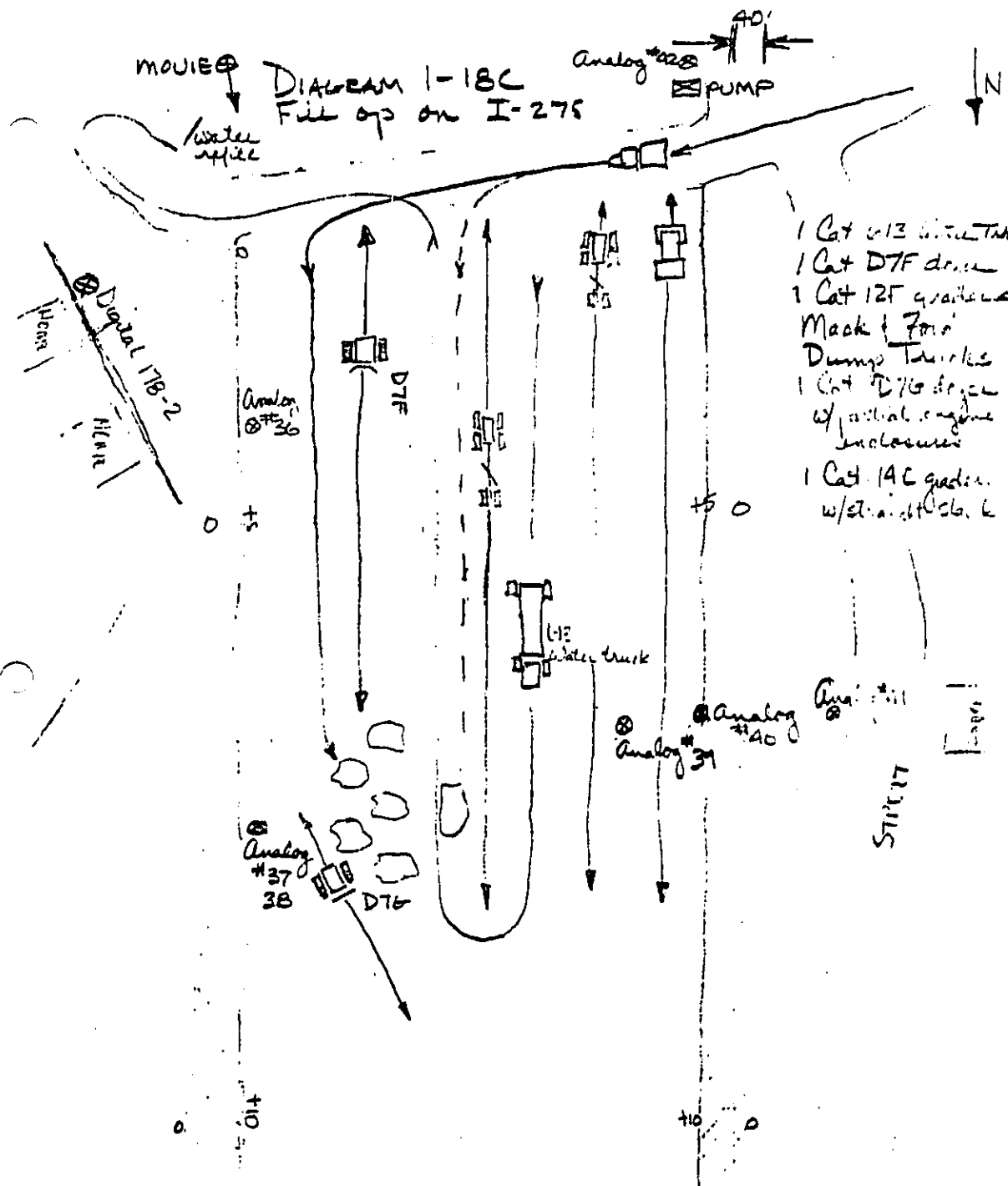
| Sample | Location | Date | Dur. | L <sub>eq</sub> | L <sub>99</sub> | L <sub>90</sub> | L <sub>50</sub> | L <sub>10</sub> | L <sub>1</sub> |
|--------|----------|------|------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|
| 47-36  | EW-12    | 1-18 | :08  | 72.6            | 65              | 68              | 72              | 76              | 79             |
| -38    | EW-13    |      | :08  | 73.7            | 64              | 68              | 72              | 77              | 80             |
| -39    | -        |      |      | N/G             |                 |                 |                 |                 |                |
| -40    | EW-14    |      | :12  | 71.0            | 64              | 67              | 70              | 74              | 76             |
| -41    | EW-16    |      | :10  | 66.3            | 63              | 64              | 66              | 68              | 70             |
| -42    | EW-17    |      | :02  | 83.2            | 82              | 83              | 83              | 84              | 84             |
|        |          |      |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |
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|        |          |      |      |                 |                 |                 |                 |                 |                |

22









NOTE: Analog #'s off by one compared to tape

NOTE: TOTAL CLOCKED ELAPSED  
TIME OF MOVIE = 1<sup>ST</sup> ROLL UNIVERSAL 35'  
2<sup>ND</sup> ROLL = ~34 minutes

Measurement Site Data

Highway: I-75

Date: Jan 1982

Site Location: Earthwork Site IV - Bridge  
Approach Ramp @ St. Rd. 64; Borrow Pit

Type of Measurements:

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Community                | <input checked="" type="checkbox"/> Activity | <input type="checkbox"/> Propagation       |
| <input checked="" type="checkbox"/> Site Boundary | <input type="checkbox"/> Single Equipment    | <input checked="" type="checkbox"/> Movies |

Soil/Terrain Conditions: Flat open terrain; Fill area  
is elevated, with height increasing from south  
to north. Borrow pit work area is about  
10 feet below original ground level.

Machinery Description:

- 1 Cat D6D Dozer with muffler (fill area)
- 2 Cat 631 C Scrapers
- 2 Cat 631 D Scrapers
- 2 Cat 627 B Twin Engine Scrapers
- 1 Cat D9H Dozer with muffler } (borrow pit)
- 1 Cat DBH Dozer with muffler }

Miscellaneous Information: See attached page

#### DESCRIPTION OF ACTIVITIES

As shown in the attached Summary Diagram, dirt was excavated from borrow pit by scrapers, which hauled the dirt approximately one mile north up the right-of-way to the bridge approach ramp fill area. Measurements were taken on two separate days such that some of the operations had changed somewhat.

Following is an interpretation of these operations:

- a. Borrow pit activities (Diagram 1-24A) remained the same for both measurement periods.
- b. At the approach ramp fill area, measurements made on 1/21 were in Area #1 as shown on Summary Diagram, while measurements made on 1/24 were in Area #2.
- c. Regarding the activity on 1/21, only the 631C and 631D scrapers were evident at this fill area (a total of four scrapers). The two 627B scrapers were entering/leaving the borrow pit, but were dumping at another site.
- d. Regarding the activity on 1/24, all six scrapers were dumping at the approach ramp fill area. Note that long-term 178-1 shown on Diagram 1-24B was started on 1/24 and stopped on 1/25. The activities depicted in that diagram relate to the configuration apparent on 1/24. On 1/25, the fill operation had moved 600 feet north of the microphone position and closer to the east boundary. Therefore, data taken on 1/25 will not be included in the  $L_{eq}$  value for the site.

~~was dumping at the pit~~

~~100%~~

### SCRAPER TRIP TIME ANALYSIS

Summary trip times as measured at Borrow Pit shown in Diagram 1-24A:

|                       | <u>Time in<br/>Borrow Pit</u> | <u>Time on<br/>Haul Road</u> | <u>Total Round<br/>Trip Time</u> |
|-----------------------|-------------------------------|------------------------------|----------------------------------|
| <u>631 D Scraper*</u> |                               |                              |                                  |
| Sample 1              | 2:45                          | 9:45                         | 12:30                            |
| 2                     | 3:45                          | 11:30                        | 15:15                            |
| 3                     | 3:45                          | 13:20                        | 17:05                            |
| 4                     | 2:15                          | 11:05                        | 14:20                            |
| 5                     | 4:20                          | 9:45                         | 14:05                            |
| <u>627B Scraper*</u>  |                               |                              |                                  |
| Sample 1              | 2:10                          | 11:50                        | 14:00                            |
| 2                     | 2:15                          | 10:15                        | 12:30                            |
| 3                     | 2:40                          | 10:30                        | 13:10                            |
| 4                     | 3:05                          | 11:00                        | 14:05                            |

\*All scrapers were travelling same distance during these analyses.

SUMMARY DIAGRAM  
(NOT TO SCALE)

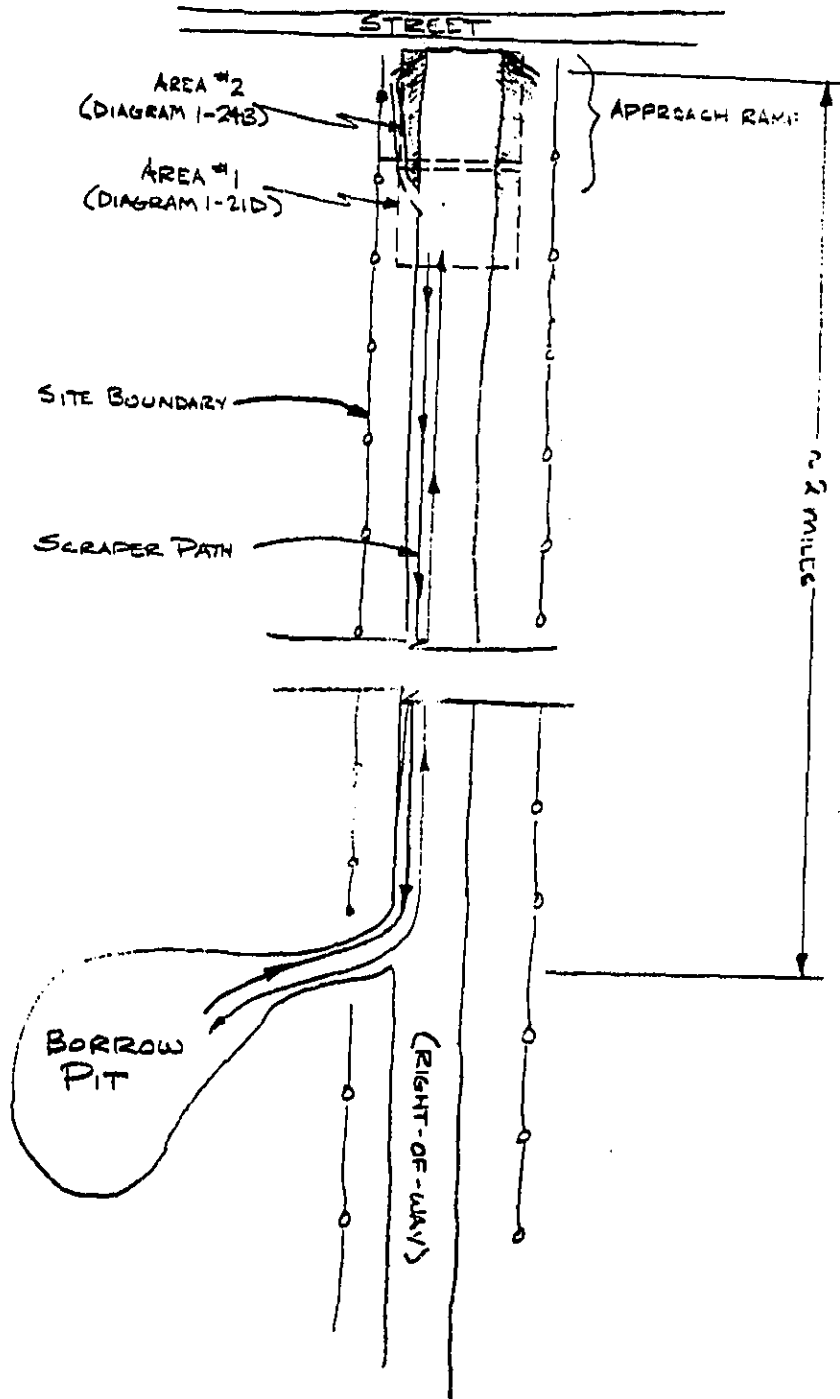












DIAGRAM 1-21D  
Full Operation  
w/ movies

MOVIES

- 1 Cat. D6D dozer
- 2 Cat 631D SCRAPER
- 2 Cat 631C SCRAPER

NOTE: SOIL IS LOOSE, ONLY  
SAWD THAT IS EASILY  
DUMPED BY SCRAPERS

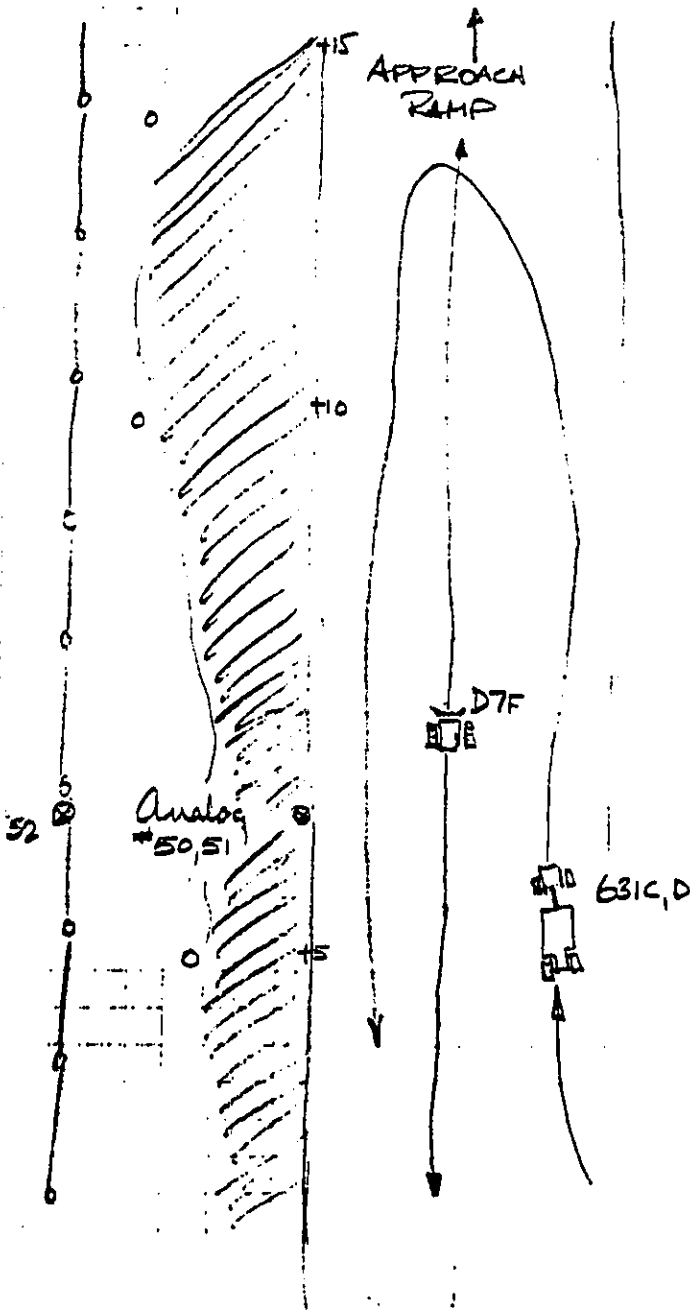
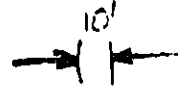


DIAGRAM 1-21 E  
High-Speed Scraper Passlys  
(Same scrapers as in 1-21 D)



2 Cat 631 C  
2 Cat 631 D

Analogy 53<sup>⊗</sup>

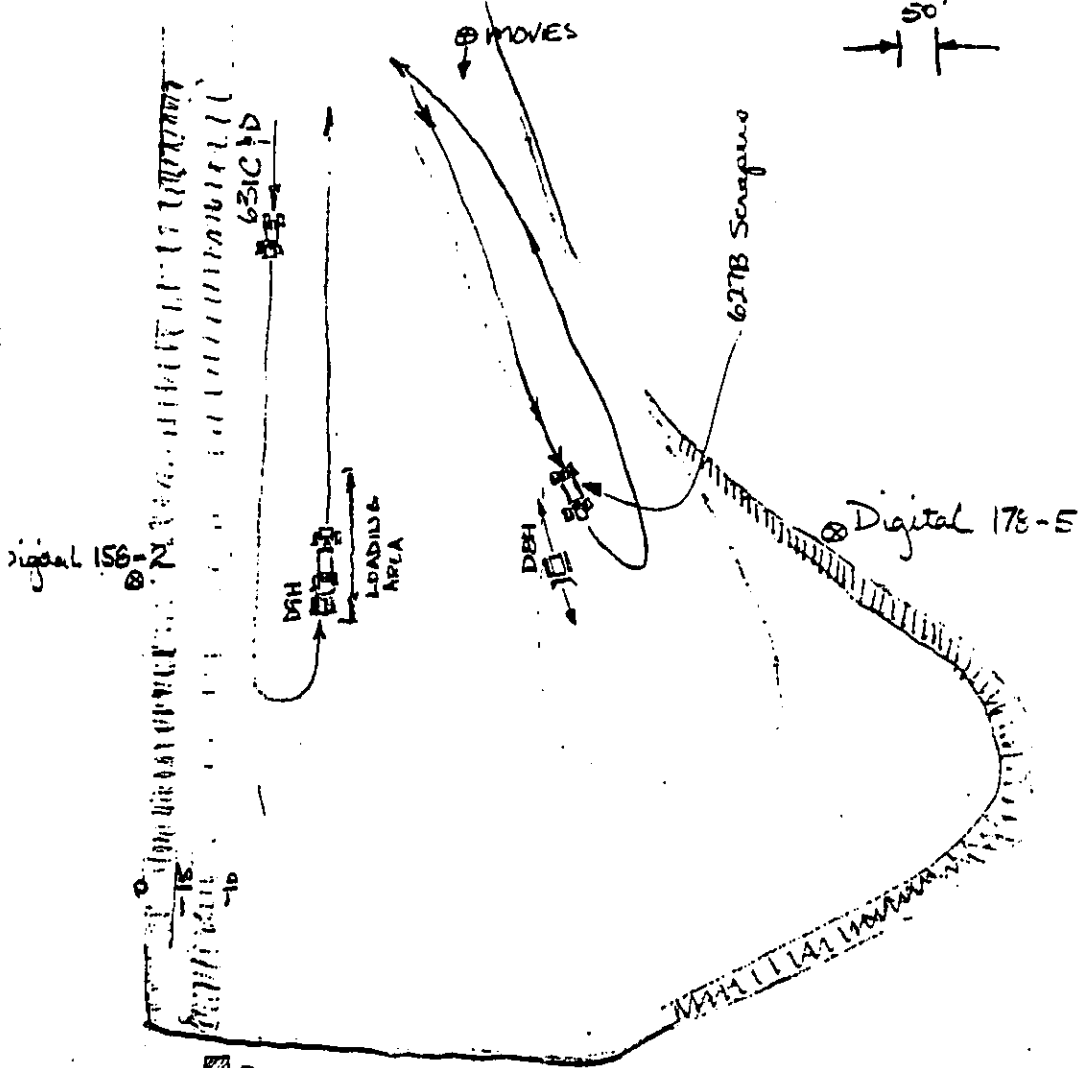


\* DISTANCE FROM WALK.  
TO SCRAPER VARIES  
FOR EACH PASS; SEE  
TAPE ALLOCATION

\* 6 passes in 22 min.

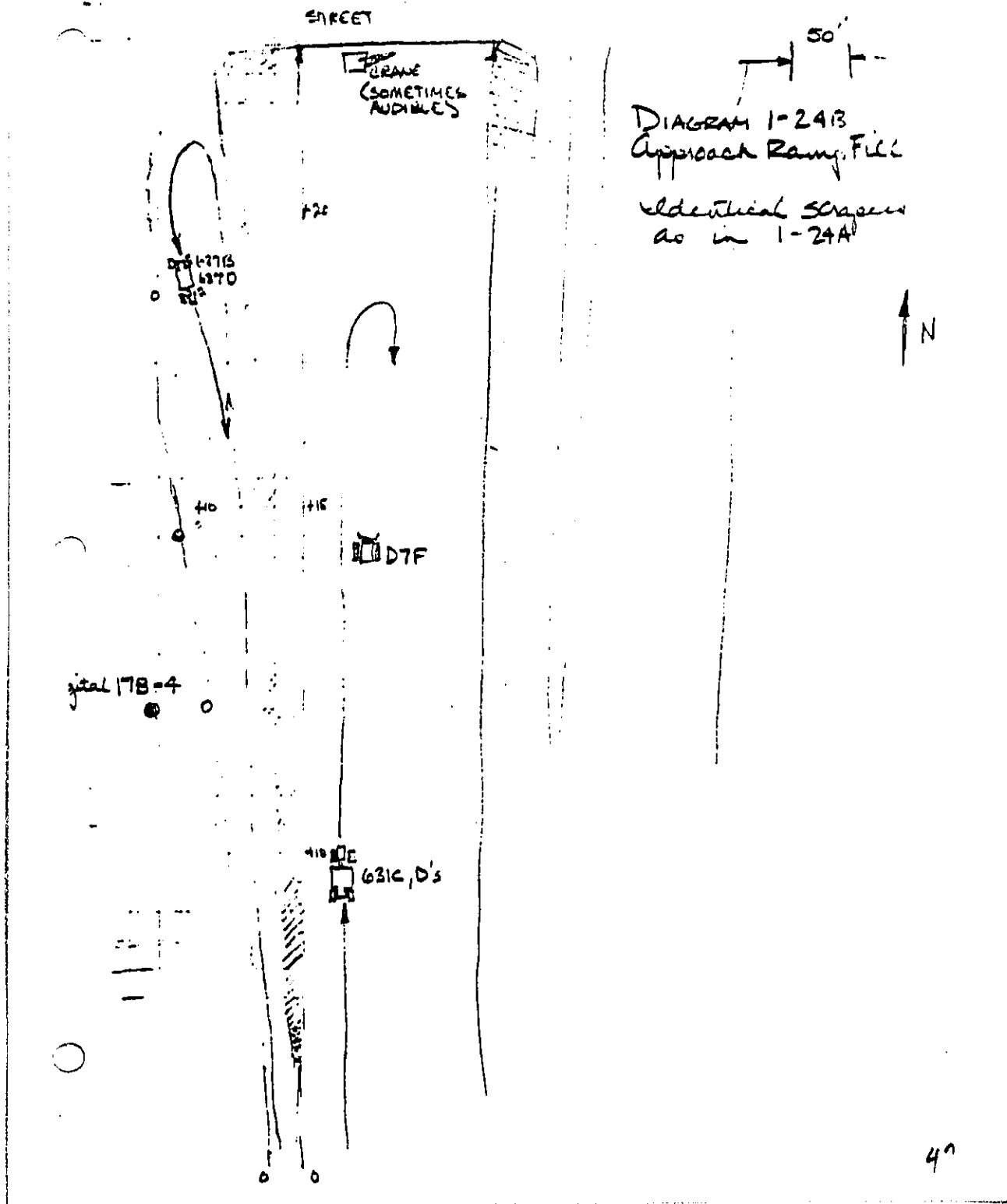
DIAGRAM 1-24A  
Borrow Excavation

50'



☒ PUMP  
(NOT AUDIBLE)

1/6



Measurement Site Data

Highway: I-75

Date: Jan 1980

Site Location: Earthwork Site V - Removal of  
Stockpiled Debris

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Flat, open area at stockpile  
loading site. Wooded area with heavy  
groundcover at unloading site.

Machinery Description:

- 1 Cat 966C Front End Loader with straight stock
- 1 Cat 950 Front End Loader with muffler
- 2 Cat 631B Scrapers with straight stock
- 1 Cat D7F Dozer w/ Straight Stock

Miscellaneous Information:

Diagrams I-15G, H and J are closed loop system involving loading, transporting and unloading/spreading of stockpiled debris.





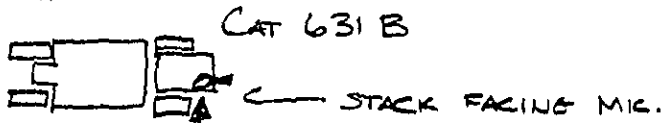






DIAGRAM 1-15H  
SCRAPER IMI'S & PASSBYS

(HAUL ROAD)  
FLAT, COMPACTED DIRT



(SHOULDER)  
LOOSE DIRT  
GENTLE SLOPE

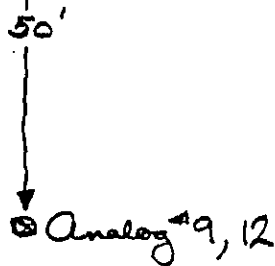
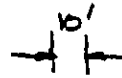
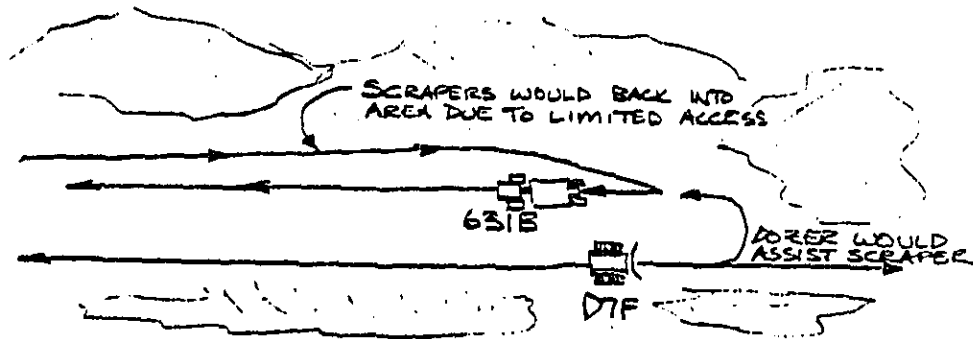


DIAGRAM 1-153  
SCRAPERS DUMPING  
DEBRIS IN WOODED AREA



AREA SURROUNDED BY TREES & GROUND COVER



Analogy #13  
(IMI INCLUDED  
IN THIS SAMPLE)

Cat. D7F Dozer w/straight stock  
Cat 631B Scraper

Measurement Site Data

Highway: I-75

Date: Jan 1980

Site Location: Earthwork VI - Approach Ramp  
Embankment Shaping

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Steep embankment; loosely  
compacted soil in work area

Machinery Description:

1 Cat. D6D Dozer with muffler

Miscellaneous Information:

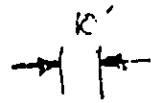




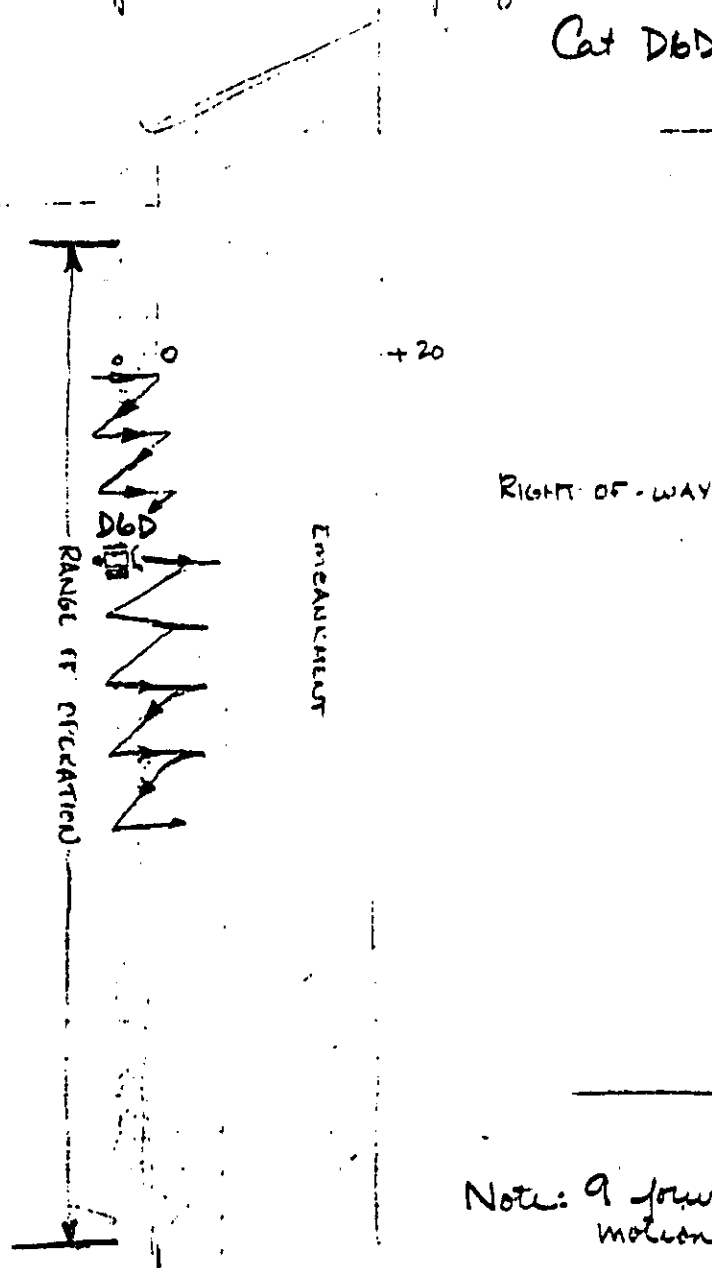




DIAGRAM 1-21C  
Approach Ramp Embankment Shaping



Cat D6D dozer



Analogy #48, 49

Note: 9 forward grading  
motion per 100-foot

Measurement Site Data

Highway: T-75

Date: Jan 1980

Site Location: Earthwork Site III - Finishing  
Grading Along Roadway Shoulder

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Microphone located on dirt  
embankment. Grading was occurring in loose  
dirt shoulder next to concrete roadbed.

Machinery Description:

1 Cat 12F Grader w/muffler

1 Cat 950 Loader

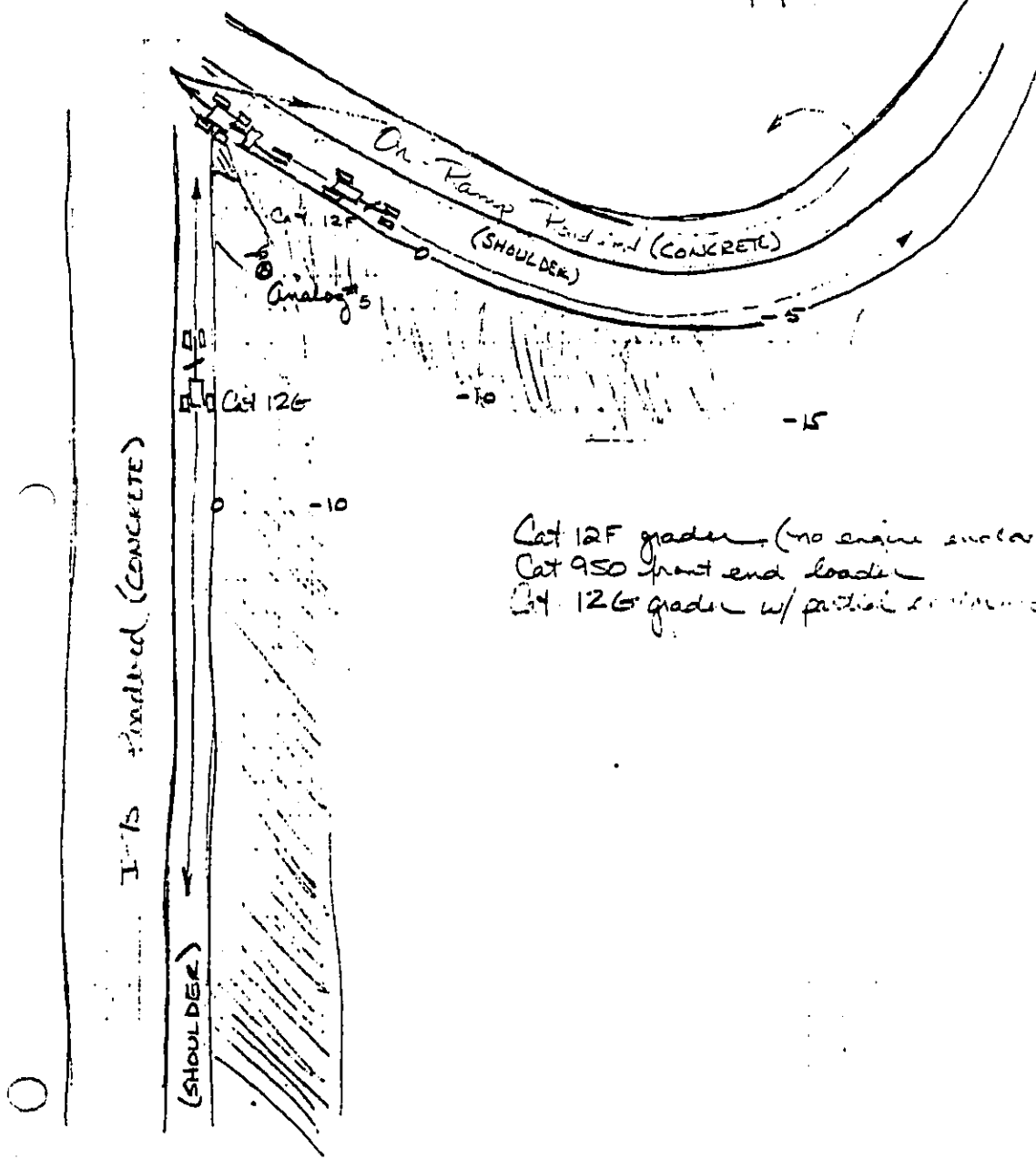
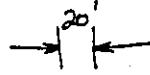
1 Cat 12G Grader w/ muffler and partial  
engine enclosure.

Miscellaneous Information:





DIAGRAM 1-15F  
 Finish Grading on On-Ramp



Cat 12F grader (no engine enclosure)  
 Cat 950 front end loader  
 Cat 126 grader w/ partial enclosure

Measurement Site Data

Highway: I-75

Date: Jan 1980

Site Location: Earthwork Site VIII - Finish  
Grading of Roadway Subbase

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Flat, compacted dirt

Machinery Description:

1 Autograde 65B Grader

1 Cat 613B Scraper with Elevator

Note: Grader operated almost continuously at a high, constant RPM.

Miscellaneous Information:

Grader worked very slowly, fine grading the subbase. Scraper would also pass slowly, picking up the windrow of dirt left by the grader.  
~~Scraper passes west of microphone and not part of subbase~~



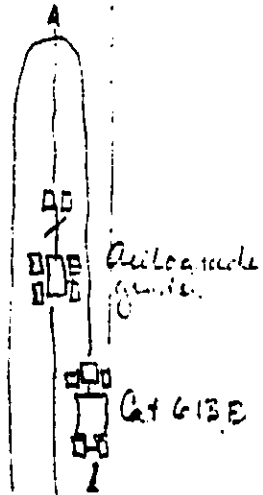
DIAGRAM 1-22C  
Finish grading



Equipment  
(part of subbase  
grading activity)



Analogy to



MEDIA







Measurement Site Data

Highway: I-75

Date: Jan. 1987

Site Location: Earthwork Site IX - Borrow  
Excavation

Type of Measurements:

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Community     | <input checked="" type="checkbox"/> Activity         | <input type="checkbox"/> Propagation       |
| <input type="checkbox"/> Site Boundary | <input checked="" type="checkbox"/> Single Equipment | <input checked="" type="checkbox"/> Movies |

Soil/Terrain Conditions: Borrow Pit area cleared of trees, etc.  
Uneven terrain within Borrow Pit. Large  
drainage ditch between microphone and  
scraper loading area.

Machinery Description:

- 1 Cat D9G dozer with no muffler
- 1 Cat 631B Scraper
- 1 Cat 631C Scraper
- 2 Cat 631D Scrapers

Miscellaneous Information:

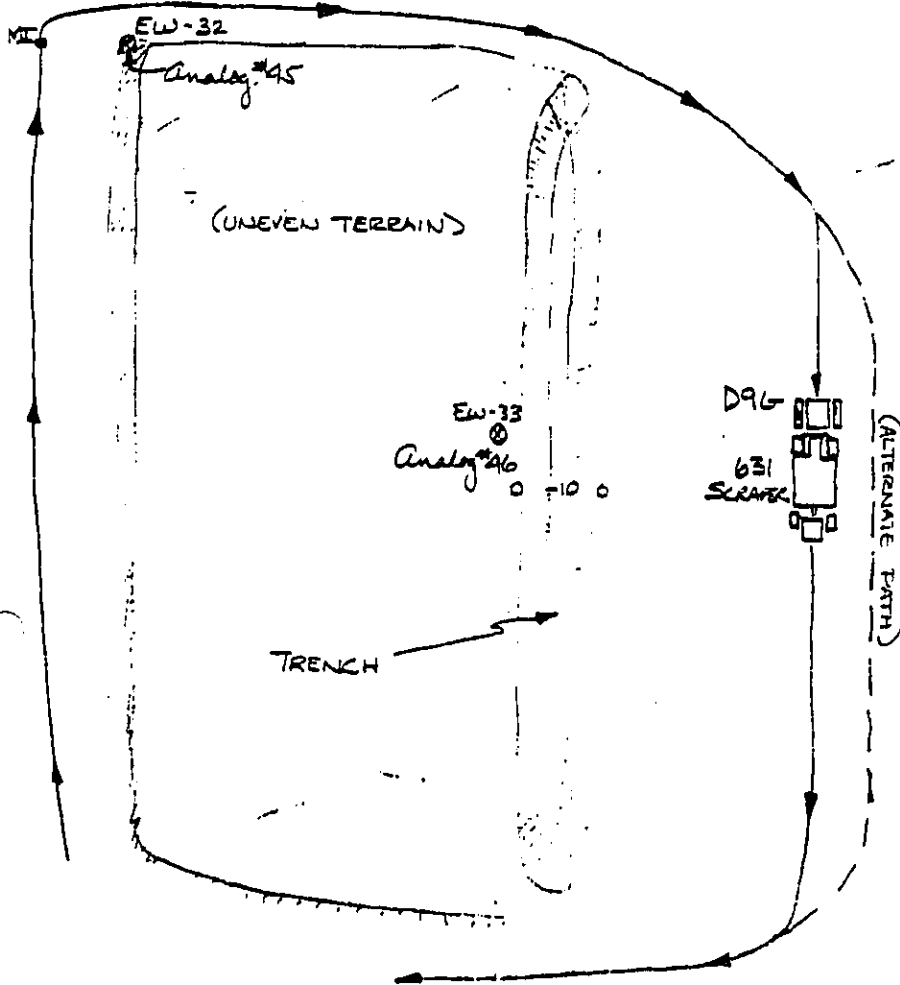
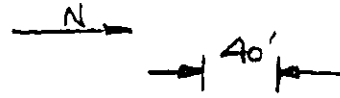
Dozer was pushing scrapers during loading  
cycles.







DIAGRAM 1-21A  
BORROW EXCAVATION



MOVIES

Measurement Site Data

Highway: I-75

Date: Jan. 1980

Site Location: Mobilization - Stockpiling Gravel  
for Batch Plant

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Flat, compacted dirt between  
microphone and stockpile. Stockpile  
height approximately 8-10 feet.

Machinery Description:

1 Cat 950 Front End Loader

Mack Tractor-Semitrailer Dump Trucks

Mack Single-Chassis Dump Trucks

Miscellaneous Information:

Note: Trucks measured at this site were forbidden  
by the owner to bang their tailgates.

75





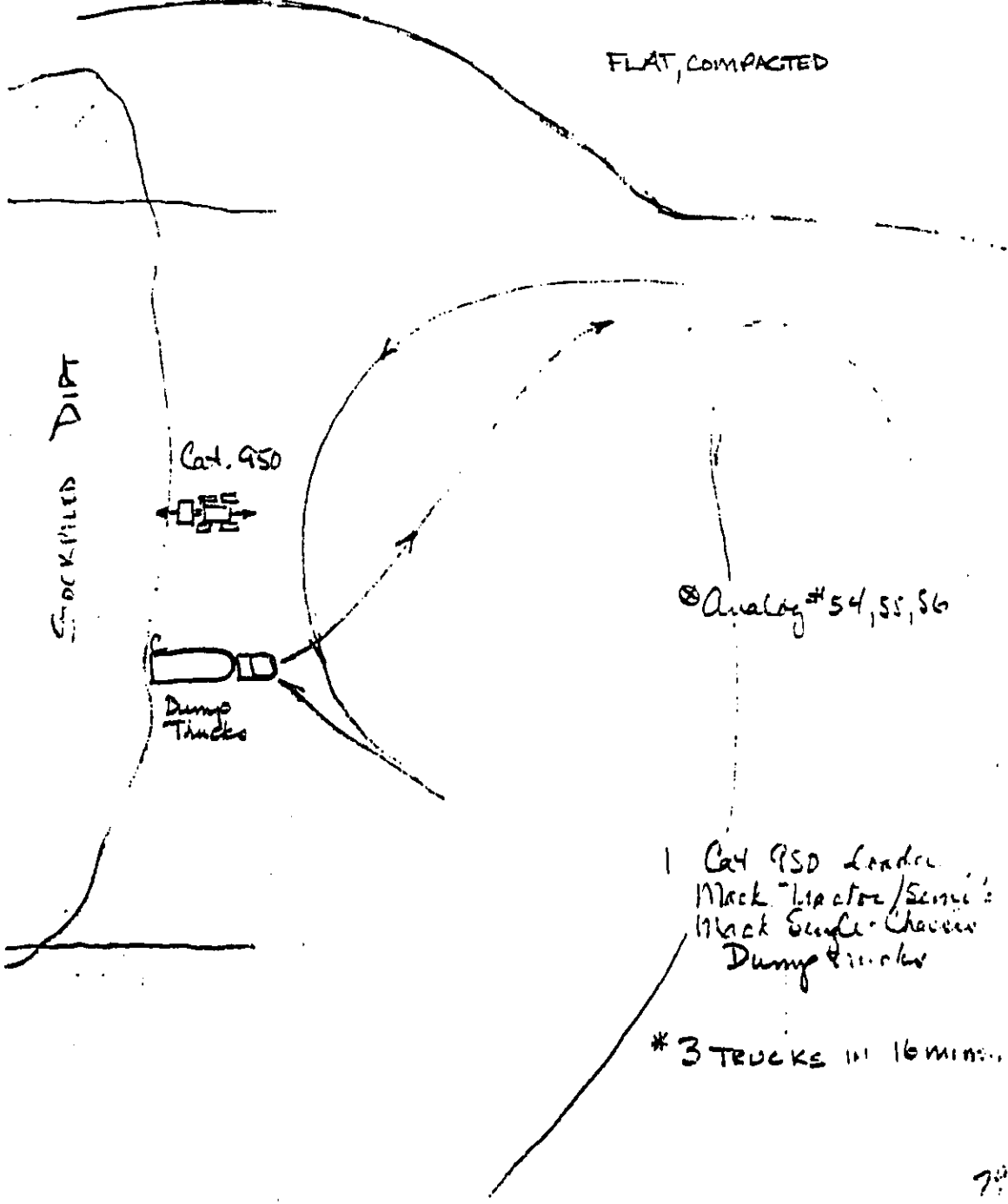




DIAGRAM 1-21F  
Stockpiling Dirt



FLAT, COMPACTED



STOCKPILED DIRT

Cat. 950



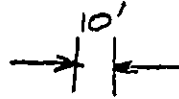
Dump Trucks

⊗ Analog #54, 55, 56

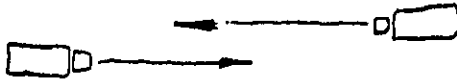
- 1 Cat 950 Loader
- 1 Mack Tractor/Semi
- 1 Mack Single-Chassis
- Dump Trucks

\* 3 TRUCKS IN 16 mins.

DIAGRAM 1-216  
Dump Truck Facility



Compacted Dirt



SHORT GRASS

⊕ Analy # 57

52



Measurement Site Data

Highway: I-75

Date: Jan 1980

Site Location: Clearing Site I; Front end loader  
stacking fallen trees - at St. Rd. 672

Type of Measurements:

- |  |  |                                      |
|--|--|--------------------------------------|
| <input type="checkbox"/> Community     | <input checked="" type="checkbox"/> Activity | <input type="checkbox"/> Propagation |
| <input type="checkbox"/> Site Boundary | <input type="checkbox"/> Single Equipment    | <input type="checkbox"/> Movies      |

Soil/Terrain Conditions: Flat area; numerous fallen  
trees around work area

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Machinery Description:

1 Terex 72-31B Front end loader with  
rake

Miscellaneous Information:

- Loader operated over several different paths during the course of the measurement.
- IMI of loader was taken on 1/24

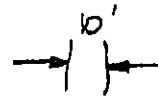




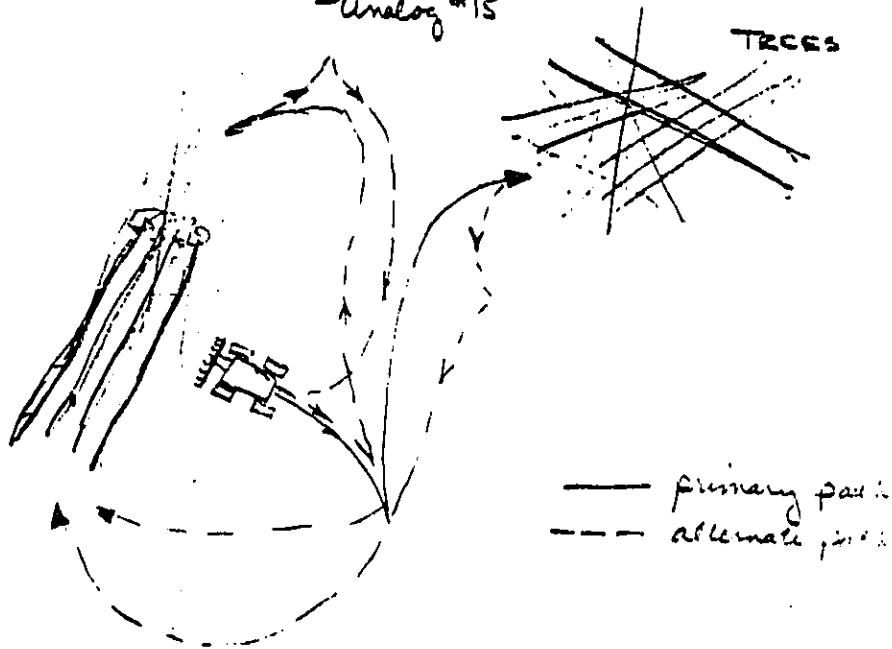
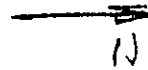




DIAGRAM 1-15K  
Clearing fallen trees



Terex 72-31B  
Front End loader w/ fork  
⊗ Analog #15



⊗ Analog #14

Measurement Site Data

Highway: I-75

Date: Jan. 1980

Site Location: Clearing Site II - near town of  
Riverview

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Flat; Heavily wooded and  
overgrown with ground cover. Wet soil

Machinery Description:

- 1 Cat D7G Dozer with muffler
- 1 Cat DBH Dozer with muffler
- 1 Terex 72-31B Front End loader w/ rake

Miscellaneous Information:

Cat D7G @ Position #1 for Samples 58 & 59; and  
@ Position #2 for Samples 62.







SINGLE EQUIPMENT/PROPAGATION NOISE MEASUREMENTS

HIGHWAY: I-75

DATE: Jan 1980

SITE LOCATION: Clearing Site II

| Sample             | Location | Date | Equipment     | L <sub>max</sub> @<br>25 ft. | L <sub>max</sub> @<br>50 ft. | L <sub>max</sub> @<br>100 ft. |
|--------------------|----------|------|---------------|------------------------------|------------------------------|-------------------------------|
| 59                 |          | 1-22 | D7G Dozer     |                              | 76                           |                               |
| 61                 |          |      | Trench Loader | 83                           |                              |                               |
| 63                 |          |      | DBH Dozer     |                              | 77                           |                               |
|                    |          |      |               |                              |                              |                               |
|                    |          |      |               |                              |                              |                               |
| (60) <sup>72</sup> |          |      | Cat D7G       | 82                           |                              |                               |
| 62                 |          |      | Cat DBH       |                              |                              | 74                            |
|                    |          |      | " "           |                              |                              | 75                            |
|                    |          |      | " "           |                              |                              | 76                            |
|                    |          |      |               |                              |                              |                               |
|                    |          |      |               |                              |                              |                               |
|                    |          |      |               |                              |                              |                               |
|                    |          |      |               |                              |                              |                               |
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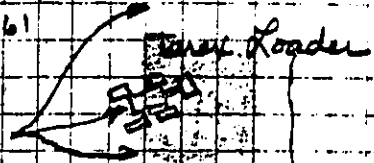
IMI's

SEL's

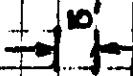


DIAGRAM 1-22A  
Clearing & Drilling  
w/ MOVIES

Angle #60, 61



- 1. Cut DTR down at initial enclosure
- 1. Temp 72-31B Loader



MOVIES

10'

MOVIES

ALB DAN

FALLEN TREES

Angle #62

225'

POSITION #2

MOVIES

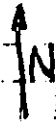
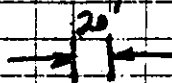
Angle #58, 59

CLEARING TREES

POSITION #1

DIAGRAM I-22B  
Clearing (See I-22A)

- 1 Cat D8H
- 1 Cat DTG
- 1 Felix Loader



PARTIALLY CLEARED AREA

Analogy 60

Analogy 62

RIGHT-OF-WAY

Analogy 63

Digital DTB-3

UNCLEARED AREA

(WEDGED; HEAVY GROUND COVER)

NOTE: Clearing op. is proceeding South

Measurement Site Data

Highway: I-75

Date: Jan 1980

Site Location: Clearing Site III; stacking & burning  
cleared material - at St. Rd. 672

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions:

Flat, cleared area

Machinery Description:

1 Cat 955L Track Loader

1 Terex 72-31B Front End Loader with  
rake (same machine as used at Clearing Site I).

Briggs & Stratton 3HP Gasoline Engine Fans

Miscellaneous Information:

Fans used to provide draft to planes



ACTIVITY NOISE MEASUREMENTS

HIGHWAY: I-75

DATE: Jan 1980

SITE LOCATION: Clearing Site III

| Sample | Location | Date | Dur. | L <sub>eq</sub> | L <sub>99</sub> | L <sub>90</sub> | L <sub>50</sub> | L <sub>10</sub> | L <sub>1</sub> |
|--------|----------|------|------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|
| 78     | CS-6     | 1-24 | :05  | 73.3            | 67              | 69              | 73              | 76              | 78             |
| 80     | CS-9     | ↓    | :05  | 75.4            | 65              | 68              | 75              | 78              | 82             |
| 81     | " "      | ↓    | :02  | 76.0            | 73              | 73              | 76              | 78              | 79             |
| 79     | CS-8     | 1-24 | :02  | 81.5            | 79              | 80              | 82              | 82              | 83             |
|        |          |      |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |
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|        |          |      |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |
|        |          |      |      |                 |                 |                 |                 |                 |                |

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SINGLE EQUIPMENT/PROPAGATION NOISE MEASUREMENTS

HIGHWAY: I-75

DATE: Jan 1980

SITE LOCATION: Clearing Site III

IMI's

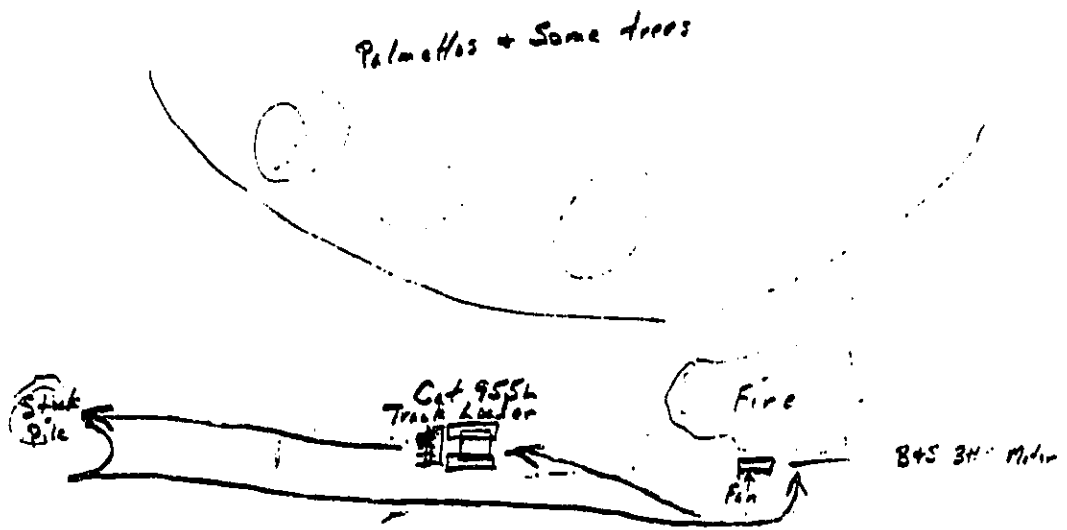
SEL's

| Sample | Location | Date | Equipment    | L <sub>max</sub> @<br>ft. | L <sub>max</sub> @<br>50 ft. | L <sub>max</sub> @<br>625 ft. |
|--------|----------|------|--------------|---------------------------|------------------------------|-------------------------------|
| 77     | CS-6     | 1-24 | Cat 955L     |                           | 79                           |                               |
| 82     | CS-11    | ↓    | Terex Loader |                           | 80                           |                               |
|        |          |      |              |                           |                              |                               |
|        |          |      |              |                           |                              |                               |
|        |          |      |              |                           |                              |                               |
| 78     |          |      | Terex Loader |                           |                              | 79                            |
| 79     |          |      | Fan          |                           | 83                           |                               |
| 80     |          |      | Terex Loader |                           |                              | 78                            |
| 81     |          |      | 2 Fans       |                           |                              | 79 @ 90 FT.                   |
|        |          |      |              |                           |                              |                               |
|        |          |      |              |                           |                              |                               |
|        |          |      |              |                           |                              |                               |
|        |          |      |              |                           |                              |                               |
|        |          |      |              |                           |                              |                               |
|        |          |      |              |                           |                              |                               |
|        |          |      |              |                           |                              |                               |
|        |          |      |              |                           |                              |                               |
|        |          |      |              |                           |                              |                               |

69

Diagram 1-24C

→ 20' ←



cleared

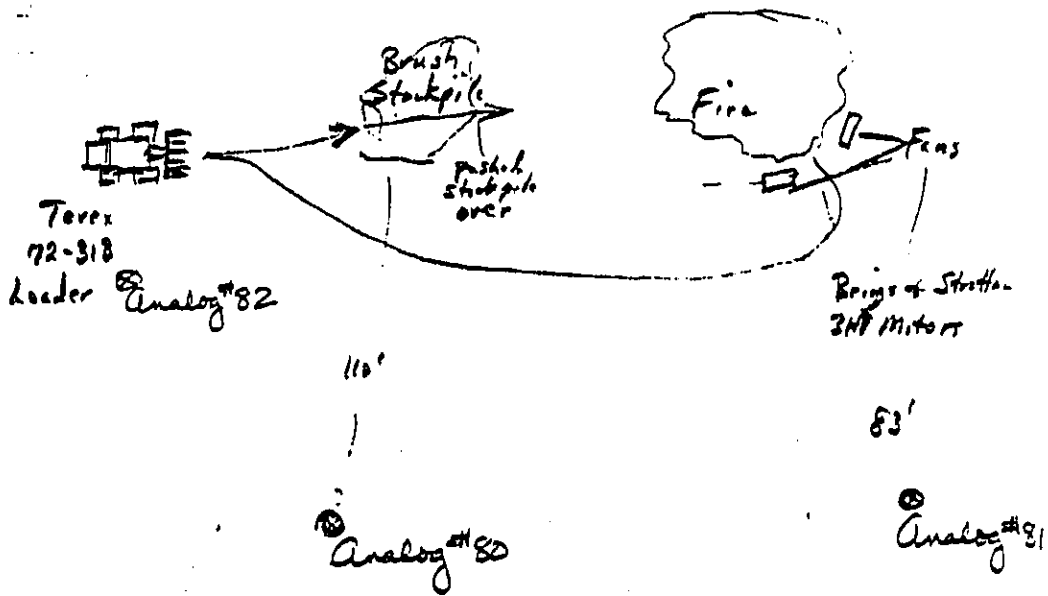
⊗ Analog #77

⊗ Analog #79 Stock Pile

⊗ Analog #78

Diagram 1-24 D

→ 20' ←





Measurement Site Data

Highway: I-75

Date: Jan. 1980

Site Location: Bridge Site I - Pile Driving

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Machinery Description:

*Crane with compressor & pile driver*

Miscellaneous Information:

*Pile driver was located on top of approach ramp fill, approximately 15 feet above microphone position.*

150

ACTIVITY NOISE MEASUREMENTS

HIGHWAY: I-75

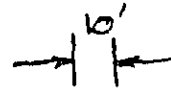
DATE: Jan. 1980

SITE LOCATION: Bridge Site 1

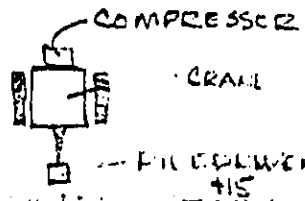
| Sample | Location | Date | Dur. | $L_{eq}$ | $L_{99}$ | $L_{90}$ | $L_{50}$ | $L_{10}$ | $L_1$ |
|--------|----------|------|------|----------|----------|----------|----------|----------|-------|
| 47-35  | BS-1     | 1-18 | :05  | 85.4     | 68       | 71       | 80       | 90       | 93    |
|        |          |      |      | 85.2     | 80       | 82       | 85       | 87       | 89    |
|        |          |      |      |          |          |          |          |          |       |
|        |          |      |      |          |          |          |          |          |       |
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FAST T.C.  
SLOW T.C.

DIAGRAM 1-18B  
DRIVING CONCRETE PILE



(BRIDGE APPROACH  
RAMP)



EMBANKMENT

COMPACTED DIRT  
FLAT

HAUL ROAD (2 SCRAPER PASSES INITIAL SAMPLE)

\*Analog #35

\* 80 impacts per minute

\* Approximately 15 minutes per pile

Measurement Site Data

Highway: I-75

Date: Jan 1960

Site Location: Bridge Site II - Concrete Pour  
For Bridge Abutment

Type of Measurements:

- |  |  |                                      |
|--|--|--------------------------------------|
| <input type="checkbox"/> Community     | <input checked="" type="checkbox"/> Activity | <input type="checkbox"/> Propagation |
| <input type="checkbox"/> Site Boundary | <input type="checkbox"/> Single Equipment    | <input type="checkbox"/> Movies      |

Soil/Terrain Conditions: Ground consisted of dry, compacted  
fill which represents the approach ramp.  
Sleep embankment directly behind mixer  
phone position.

Machinery Description:

American A250 Crane with concrete bucket  
IH Paystar 500 Concrete Trucks w/diesel engines  
Concrete Vibrator with gasoline engine  
generator.

Miscellaneous Information:

DATA LOG SUMMARY

HIGHWAY: I-75

DATE: Jan. 1980

SITE LOCATION: Bridge Site II

| Sample | Location | Date | Time | Dur. | Site<br>Diag. | Comments                      | Reduced |
|--------|----------|------|------|------|---------------|-------------------------------|---------|
| 47-47  | B-2      | 1-21 |      |      | 1-21B         | Bridge Abutment Concrete Pour |         |
|        |          |      |      |      |               |                               |         |
|        |          |      |      |      |               |                               |         |
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491

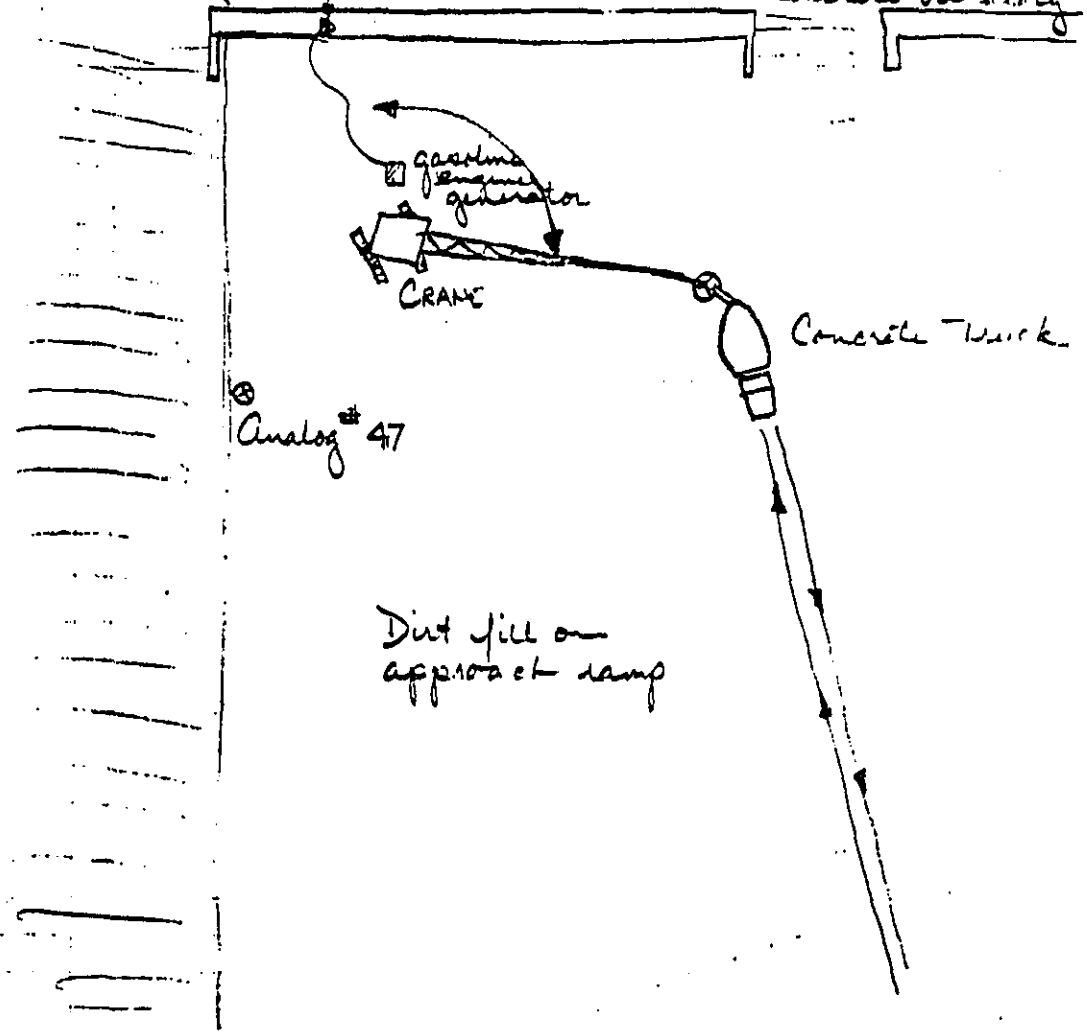


DIAGRAM 1-21B  
Bridge Substructure  
Concrete Pour



Framework for abutment  
Concrete vibrator

American 4250 Crane  
ITT Paystar 50T  
Concrete Trucks  
Concrete Vibratory



Measurement Site Data

Highway: I-75

Date: Jan. 1980

Site Location: Bridge Site III - Demolition of  
Bridge/Roadway Joint For Eventual Repair

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Bridge deck and roadway were  
completely finished. Therefore, surface between  
microphone and work area was flat concrete.  
3-foot high parapets along each side of  
bridge

Machinery Description:

- 1 Concrete Saw with gasoline engine
- 1 Spro 7do 175/80 Compressor with side enclosure
- 2 Portable Pneumatic Jackhammers
- 1 Fiat Allis H-B 745 (remained idle during sample)

Miscellaneous Information: Joints were first cut in concrete using  
the saw (Diagram 1-22E). Jackhammers were then used to  
break out concrete (Diagram 1-25B). Broken concrete was  
loaded into bucket on the front end loader. Loader remains  
idle during sample.

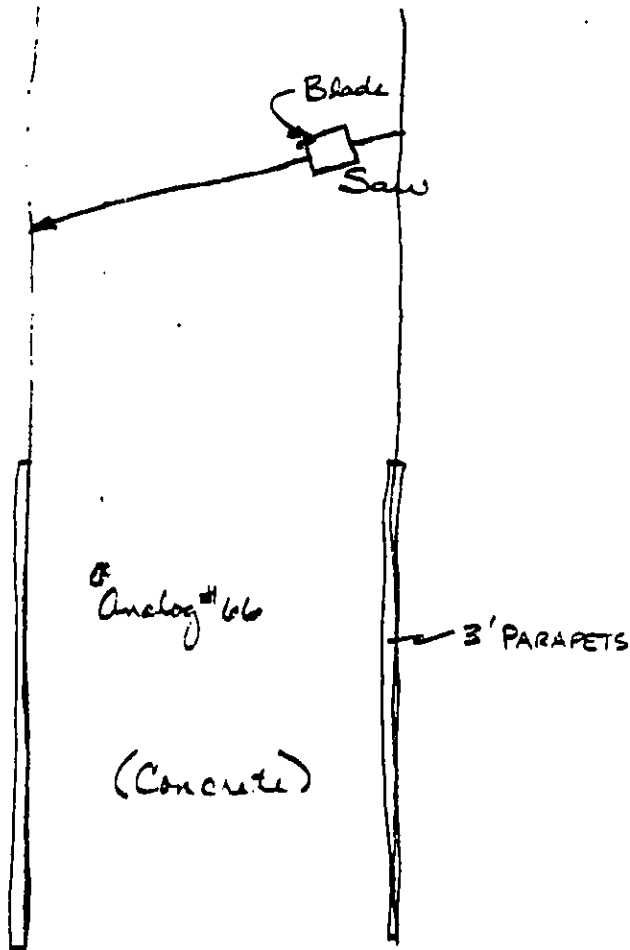






DIAGRAM 1-22E  
Concrete Saw

10'



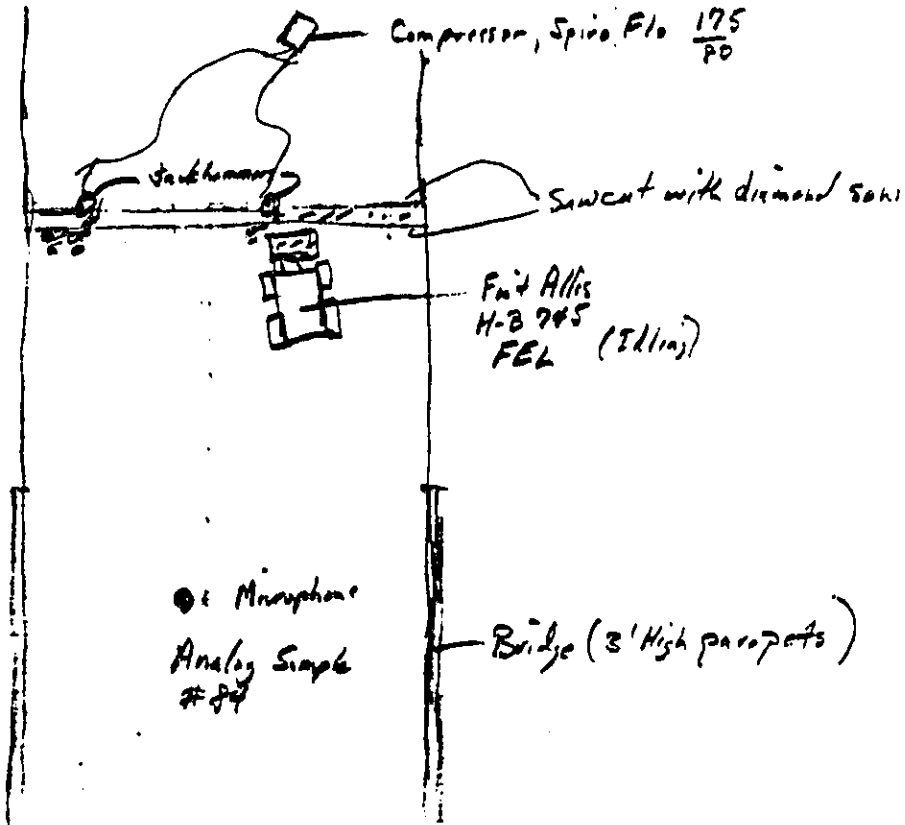
NOTES

1. Saw operates at a constant RPM
2. Saw cutting rate = 4 feet per minute

Diagram 1-25B Bridge Work

Jackhammers removing concrete

→ 10' ←



Measurement Site Data

Highway: I-75

Date: Jan. 1980

Site Location: Bridge Site IV - Substructure  
Excavation, Formwork, Concrete Pour

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Site bounded on north and south  
by approach ramp embankment. Terrain in  
working area was flat, consisting of compacted  
earth or pavement.

Machinery Description:

- 1 American 237 Crane w/ Headache Ball
- 1 American 6650 Crane w/ Pneumatic Pile Driver
- 1 Grace WC-59 Crane w/ Concrete Bucket
- 1 Crane (Make not known); worked intermittently on north approach ramp
- 1 Cat 235 Backhoe
- 1 Ford Single Chassis Dump Truck
- 1 IH Paystar 500 Concrete Truck
- 1 Homelite 300 GPM Pump
- 1 Portable Generator and Skid Saw

Miscellaneous Information:

SEE ATTACHED SUMMARY OF ACTIVITIES



ACTIVITY NOISE MEASUREMENTS

HIGHWAY: I-75

DATE: Jan 1982

SITE LOCATION: Bridge Site IV

| Sample    | Location | Date | Dur. | L <sub>eq</sub> | L <sub>99</sub> | L <sub>90</sub> | L <sub>50</sub> | L <sub>10</sub> | L <sub>1</sub> |
|-----------|----------|------|------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|
| 86A       |          | 1-28 | :17  | 75.6            | 66              | 68              | 72              | 79              | 85             |
| 86B       |          |      | :08  | 80.2            | 71              | 73              | 77              | 85              | 87             |
| 86C       |          |      | :05  | 74.2            | 70              | 71              | 73              | 76              | 81             |
| 86(TOTAL) |          |      | :26  | 77.5            | 66              | 68              | 73              | 82              | 86             |
| 87        |          |      | :09  | 71.4            | 67              | 69              | 71              | 73              | 76             |
| 88        |          |      | :02  | 74.9            | 72              | 73              | 74              | 77              | 80             |
| 89        |          |      | :12  | 81.9            | 71              | 74              | 77              | 86              | 89             |
| 90A       |          |      | :17  | 69.9            | -               | -               | -               | -               | -              |
| 90B       |          |      | :17  | 69.9            | 63              | 66              | 68              | 73              | 76             |
|           |          |      |      |                 |                 |                 |                 |                 |                |
|           |          |      |      |                 |                 |                 |                 |                 |                |
|           |          |      |      |                 |                 |                 |                 |                 |                |
|           |          |      |      |                 |                 |                 |                 |                 |                |
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|           |          |      |      |                 |                 |                 |                 |                 |                |
|           |          |      |      |                 |                 |                 |                 |                 |                |

11

SINGLE EQUIPMENT/PROPAGATION NOISE MEASUREMENTS

HIGHWAY: I-75

DATE: Jan 1980

SITE LOCATION: Bridge Site IV

| Sample        | Location | Date | Equipment  | L <sub>max</sub> @<br>ft. | L <sub>max</sub> @<br>50 ft. | L <sub>max</sub> @<br>ft. |
|---------------|----------|------|--|---------------------------|------------------------------|---------------------------|
| <del>86</del> |          |      | <del>CONCRETE SAW (20 FT.)<br/>w/ COMPRESSOR (100 FT.)</del> |                           |                              | <del>79</del>             |
| 86            |          |      | Grove Crane; Moving  |                           | 86                           |                           |
| 86            |          |      | Pile Driver  |                           |                              | 85 @ 165 FT.              |
| 87            |          |      | Cat 235 Backhoe  |                           |                              | 82 @ 160 FT.              |
| 88            |          |      | AMERICAN CRANE w/<br>BREAKER BALL                            |                           | 83                           |                           |
| 89            |          |      | Grove Crane; Lifting   |                           | 91                           |                           |
|               |          |      |  |                           |                              |                           |
|               |          |      |  |                           |                              |                           |
|               |          |      |  |                           |                              |                           |
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|               |          |      |  |                           |                              |                           |
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|               |          |      |  |                           |                              |                           |
|               |          |      |  |                           |                              |                           |
|               |          |      |  |                           |                              |                           |

L's

Not  
Parked



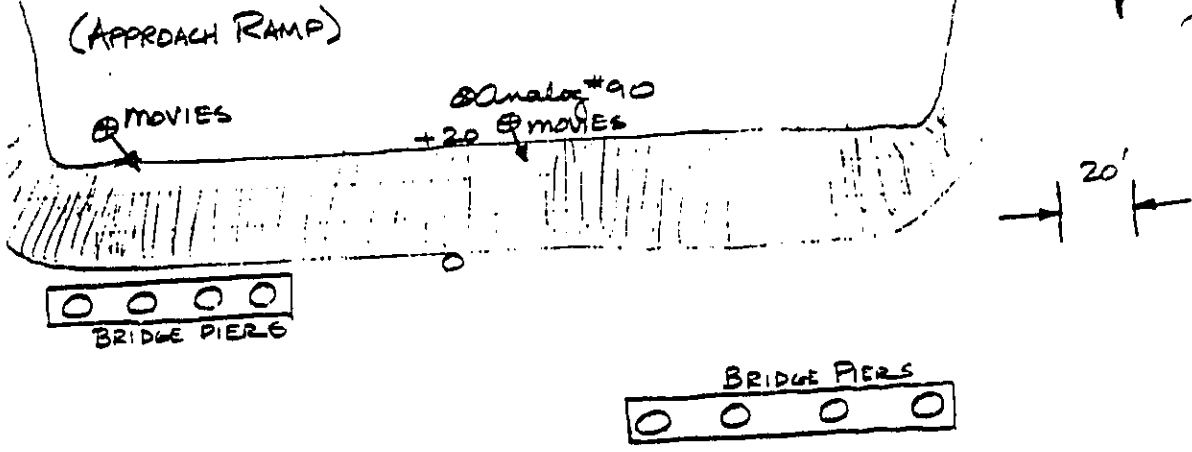
DIAGRAM 1-28B:

SUMMARY OF ACTIVITIES

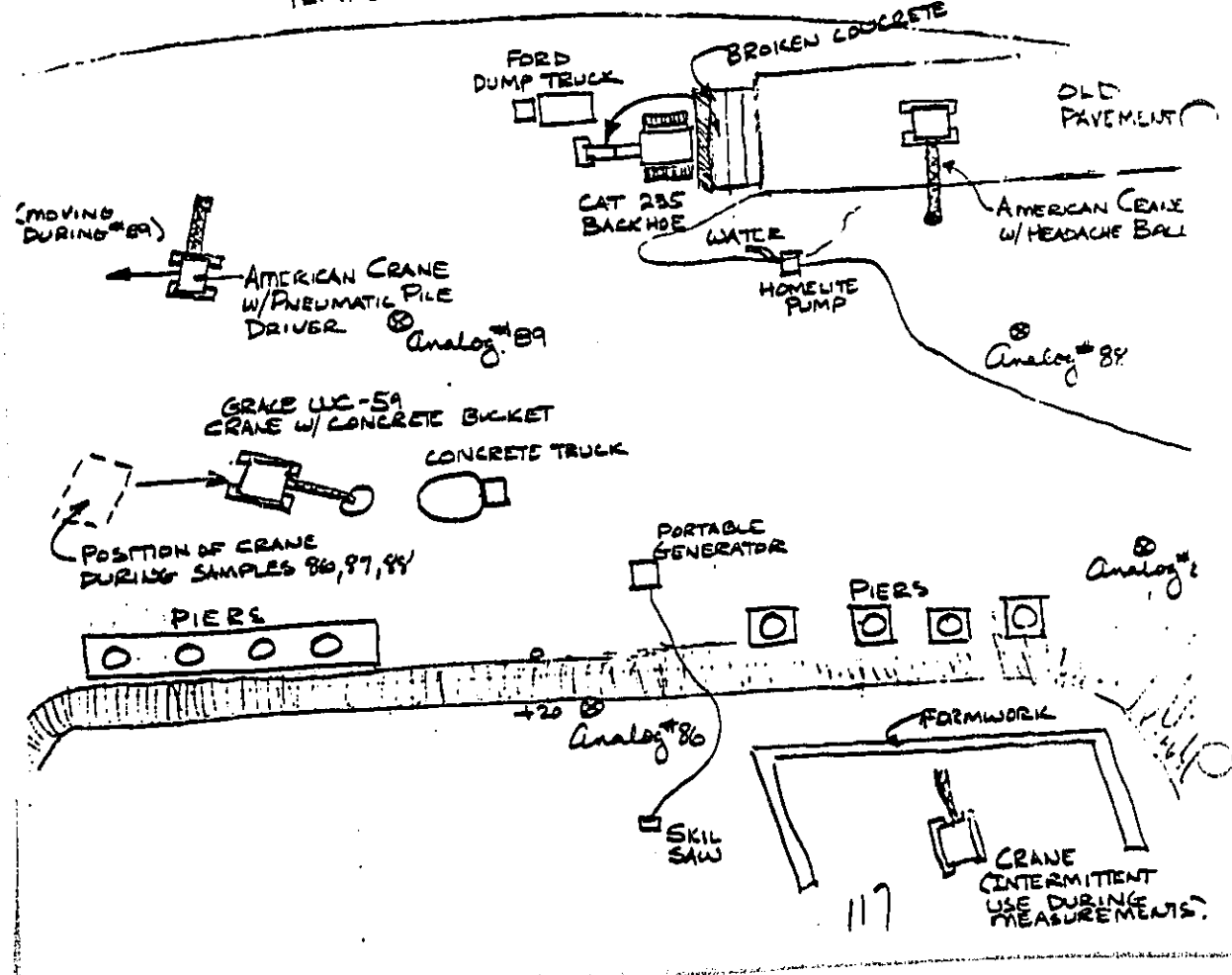
Following is a summary of activities depicted in Diagram 1-28B. In total, this operation represents the bridge substructure excavation and construction. Traffic on the surface street had been detoured to the temporary road. Traffic count on this street was low.

- a. A crane with a headache ball would intermittently break up the old pavement (See Sample #88).
- b. A trench had been dug at the end of the old pavement, exposing an old box culvert that had to be removed. The Cat. backhoe was excavating broken concrete and dirt and loading it into the dump truck.
- c. A crane with a pile driver was driving a series of concrete piles for bridge pier footings. Total time to drive one pile was 7 minutes, 15 seconds.
- d. A crane with a concrete bucket transported concrete from the truck to the top of the pier formwork during Samples #89, 90. During earlier samples, this crane was helping to repair an installation.
- e. A pump was dewatering in the area of old pavement and the trench.
- f. A Skil hand saw was used to cut wood for formwork on top of the north approach ramp. The saw received power from a portable generator located at the bottom of the approach ramp embankment.

DIAGRAM 1-28B  
BRIDGE SUBSTRUCTURE



TEMPORARY DETOUR



Measurement Site Data

Highway: I-75

Date: Jan 1980

Site Location: Bridge Site V - Concrete Saw  
on Bridge Abutment

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Flat, open area in vicinity  
of microphone. Compressor at grade with mic.  
Concrete Saw on top of approach ramp  
fill, 20 feet above mic.

Machinery Description:

- 1 Hand Held Concrete Saw
- 1 Goy D185QP Compressor with enclosure

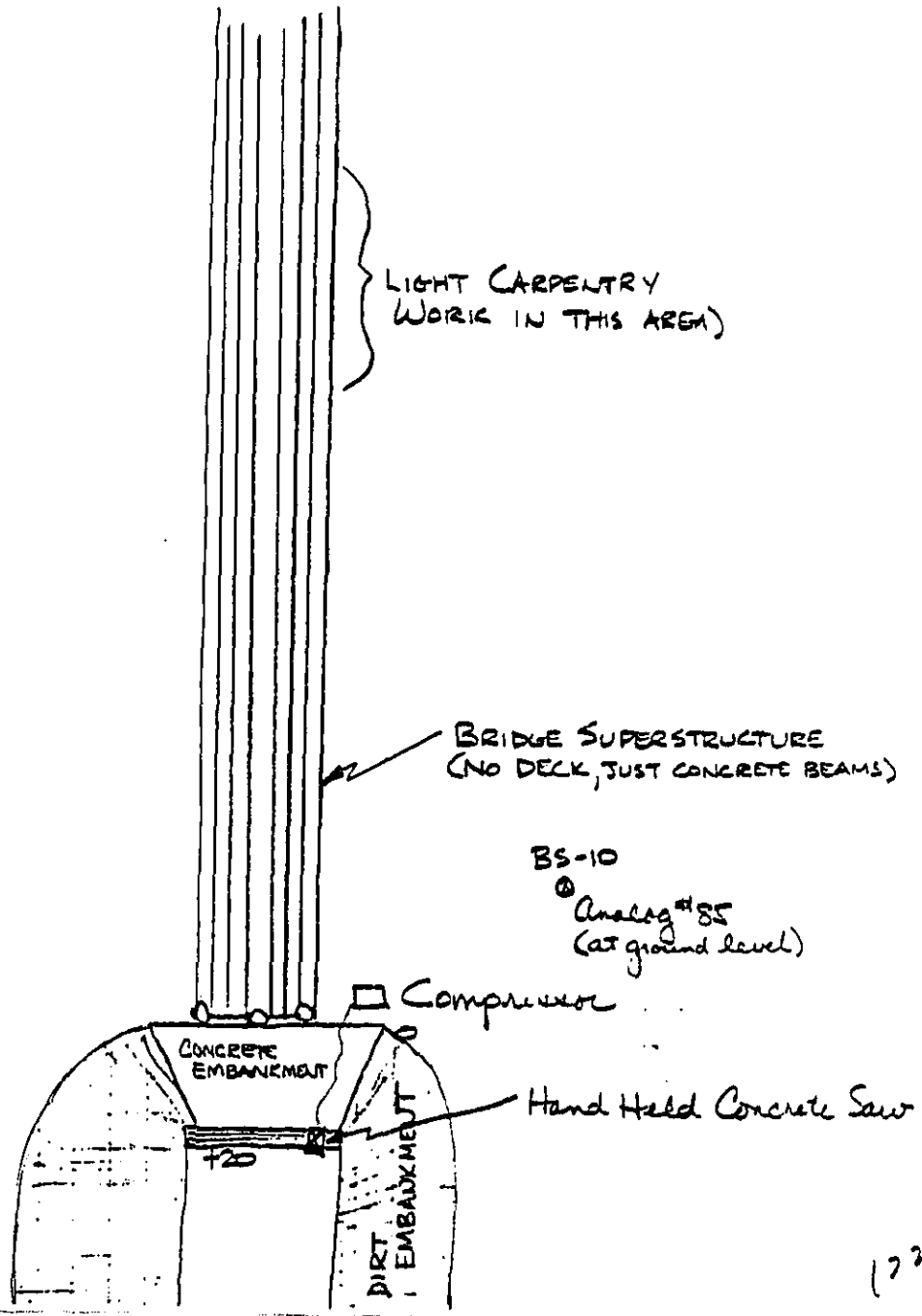
Miscellaneous Information:







DIAGRAM 1-28A  
Bridge Work



Measurement Site Data

Highway: I-75

Date: Jan 1980

Site Location: Concrete Paving and Batch Plant Operation

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Flat, open area; hard, compacted ground around batch plant.

Machinery Description:

Maxon Side Loading Spreader

Gomaco HW-165 Paver

Finishing Truss

Ford 9000 Side Dumping Concrete Trucks  
with diesel engines and concrete bed vibrators

Fiat-Allis 745 Front End Loader

Cat. 980C Front End Loader

Miscellaneous Information:

Diagrams 16A, B, C represent closed-loop system involving batch plant, transporting and laying of concrete.

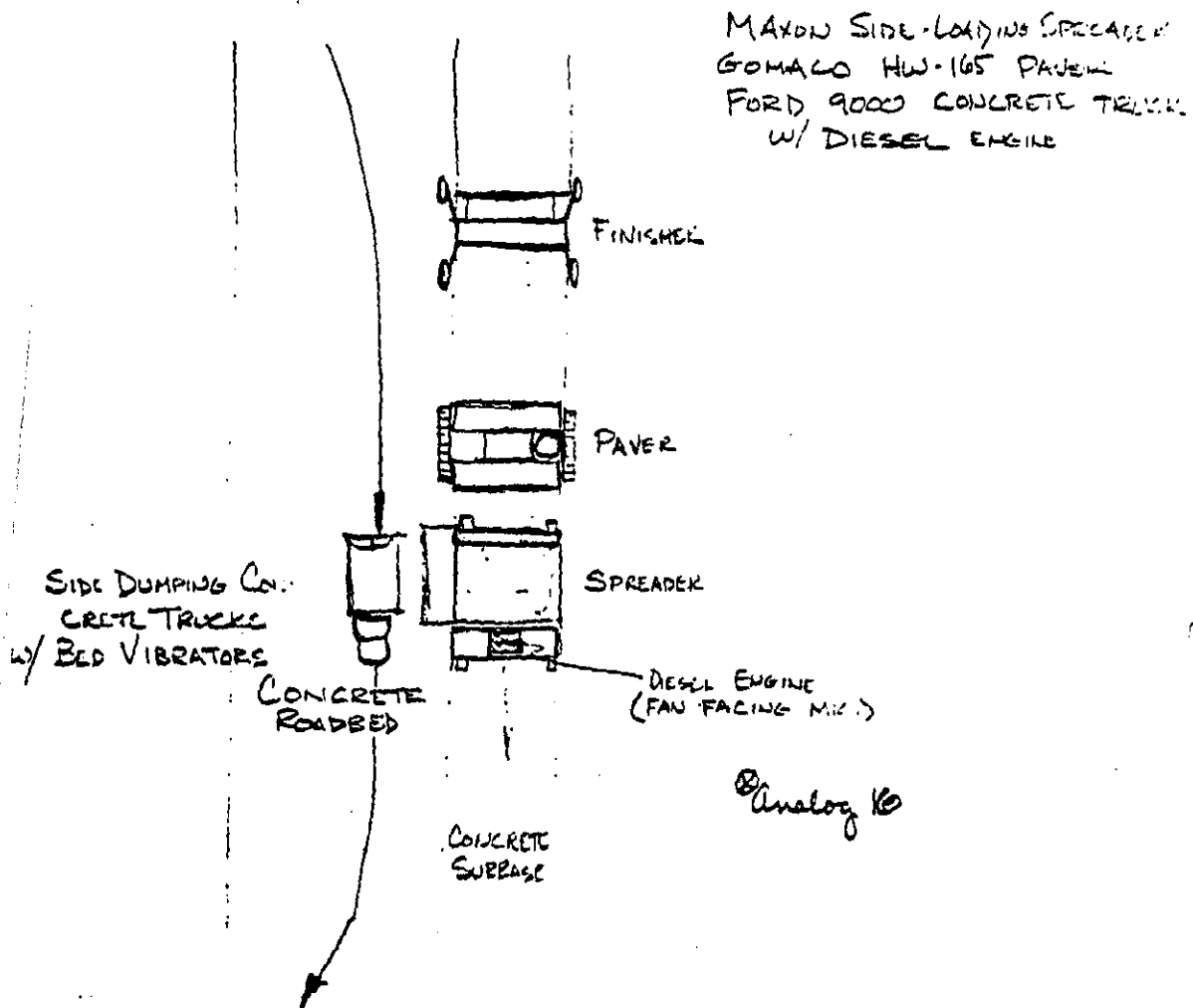
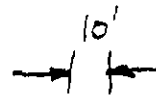








DIAGRAM 1-16A



MAXON SIDE-LOADING SPREADER  
GOMACO HW-165 PAVER  
FORD 9000 CONCRETE TRUCK  
W/ DIESEL ENGINE

SIDE DUMPING CONCRETE TRUCKS  
W/ BED VIBRATORS

FINISHER

PAVER

SPREADER

DIESEL ENGINE  
(FAN FACING MICH.)

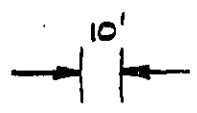
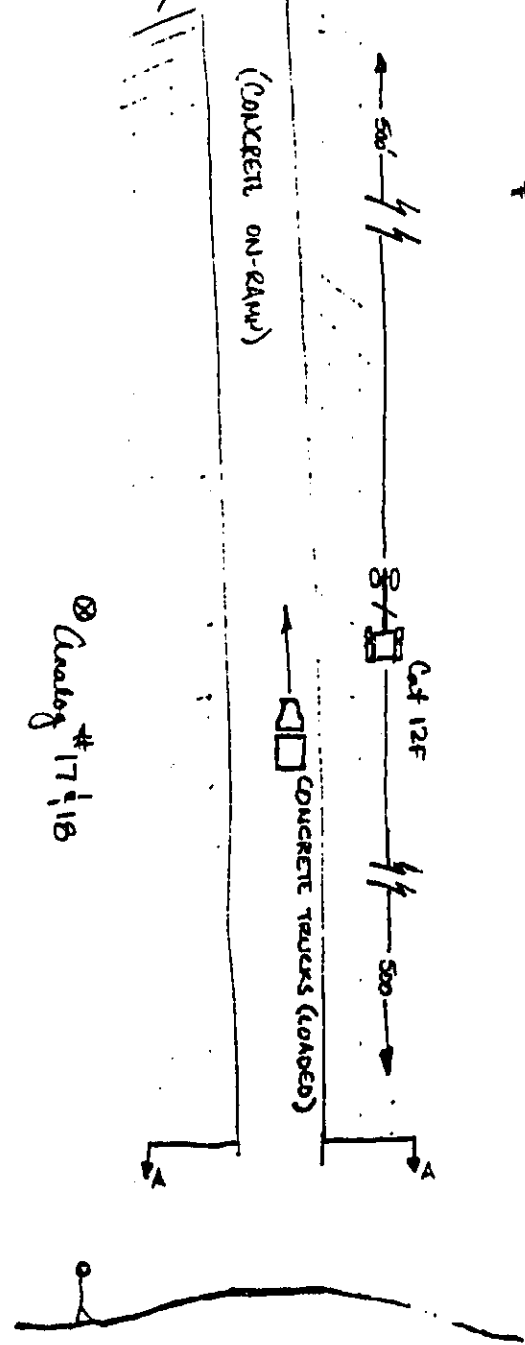
CONCRETE ROADBED

CONCRETE SUBBASE

Analog 10

- NOTES:
- 1. POURING RATE: 50 FEET PER 6.5 MINUTES
  - 2. CONCRETE TRUCKS: 5 TRUCKS IN 12 MINUTES
  - 3. TRUCK DUMPING TIME: 1 MIN. 30 SEC

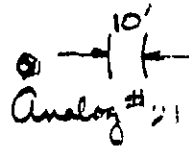
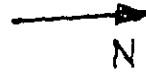
DIAGRAM 1-16B  
FINISH GRADING/ CONCRETE TRUCK PASSAYS



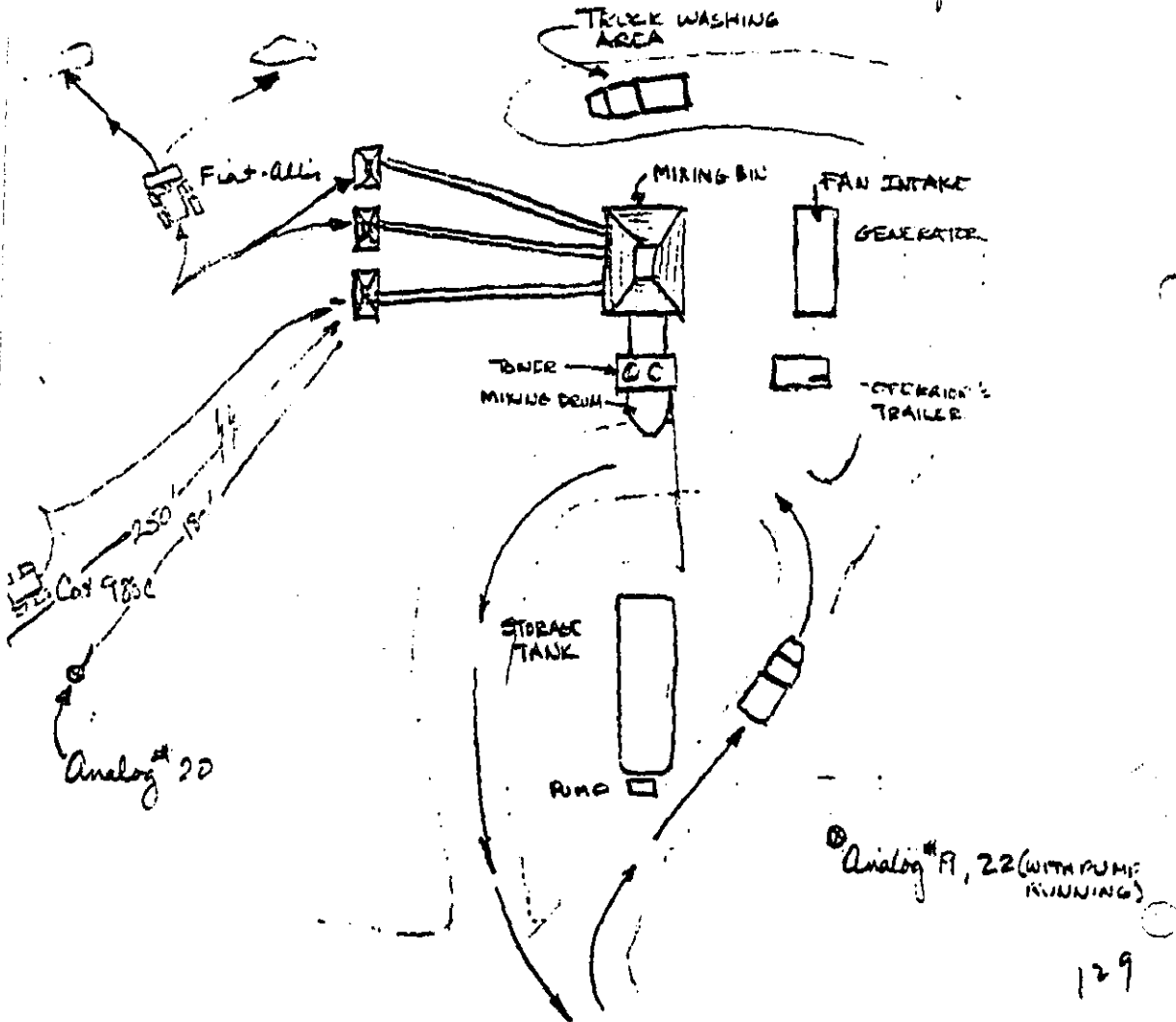
- \*17: CAT 12F GRADER
- \*18: FORD 9000 CONCRETE TRUCK

DIAGRAM 10-C  
CONCRETE BATCH PLANT

NOTE: 10A, B, C REPRESENT A CLOSED-LOOP SYSTEM;  
IDENTICAL CONCRETE TRUCKS IN EACH



Fiat-Elm. H-B 74' 1/2"  
Cat 980C  
Ford 9000 Concrete  
Transport Trucks



Measurement Site Data

Highway: I-75

Date: Jan. 1980

Site Location: Single Equipment - Cat 966C  
Front End Loader IMI's

Type of Measurements:

- |  |  |                                      |
|--|--|--------------------------------------|
| <input type="checkbox"/> Community     | <input type="checkbox"/> Activity                    | <input type="checkbox"/> Propagation |
| <input type="checkbox"/> Site Boundary | <input checked="" type="checkbox"/> Single Equipment | <input type="checkbox"/> Movies      |

Soil/Terrain Conditions: Flat. Large stockpile of dirt  
just beyond loader

Machinery Description:

Miscellaneous Information:

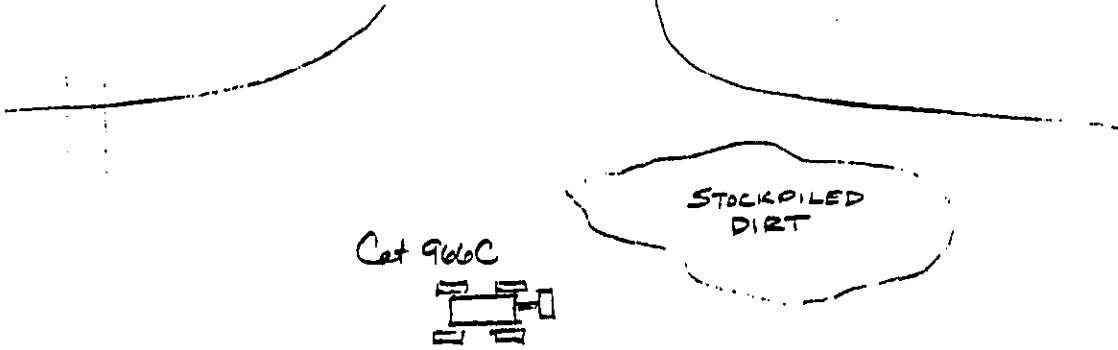






DIAGRAM 1-17E

10'



Analogy 27

Measurement Site Data

Highway: I-75

Date: Jan. 1980

Site Location: Single Equipment - Front End  
Loader Loading Stockpiled Mat'l.

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Flat terrain; stockpile approxi-  
imately 6-8 feet in height.

Machinery Description:

1 Cat 950 Front End Loader

Miscellaneous Information:

This is same 950 Loader that was measured  
at Earthwork Site II. See Sample 47-8  
for IMI values.

DATA LOG SUMMARY

HIGHWAY: I-75

DATE: Apr. 1980

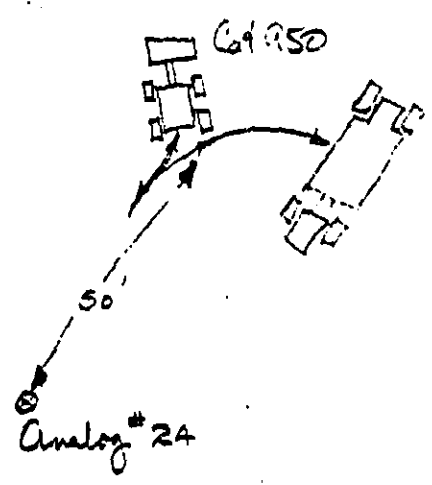
SITE LOCATION: Single Equip. - F.E. Loader

| Sample | Location | Date | Time | Dur. | Site<br>Diag. | Comments                        | Reduced |
|--------|----------|------|------|------|---------------|---------------------------------|---------|
| A7-24  | E-2      | 1-17 |      |      | 1-17B         | Cat. 950; Loading Op. of movies |         |
|        |          |      |      |      |               |                                 |         |
|        |          |      |      |      |               |                                 |         |
|        |          |      |      |      |               |                                 |         |
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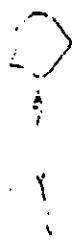
135



DIAGRAM 1-17B  
LOADER (w/ MOVIES)



↑  
⊕ movies



Measurement Site Data

Highway: I-75

Date: Jan 1980

Site Location: Single Equipment IMI Measurements  
on Miscellaneous Machinery

Type of Measurements:

- |  |  |                                      |
|--|--|--------------------------------------|
| <input type="checkbox"/> Community     | <input type="checkbox"/> Activity                    | <input type="checkbox"/> Propagation |
| <input type="checkbox"/> Site Boundary | <input checked="" type="checkbox"/> Single Equipment | <input type="checkbox"/> Movies      |

Soil/Terrain Conditions: Flat, compacted dirt.

Machinery Description:  
1 Cat 631B Scraper with straight stack.  
(Scraper appeared to be at least 10 years old)  
  
1 Cat 12G Grader with muffler

Miscellaneous Information:

DATA LOG SUMMARY

HIGHWAY: I-75

DATE: Jan 1980

SITE LOCATION: Single Equipment

| Sample | Location | Date | Time | Dur. | Site<br>Diag. | Comments      | Reduced |
|--------|----------|------|------|------|---------------|---------------|---------|
| 47-9   | E-3      | 1-15 |      |      | 1-15H         | Scraper IMI's |         |
| -10    | E-4      | 1-15 |      |      | 1-15I         | Grader IMI's  |         |
|        |          |      |      |      |               |               |         |
|        |          |      |      |      |               |               |         |
|        |          |      |      |      |               |               |         |
|        |          |      |      |      |               |               |         |
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139

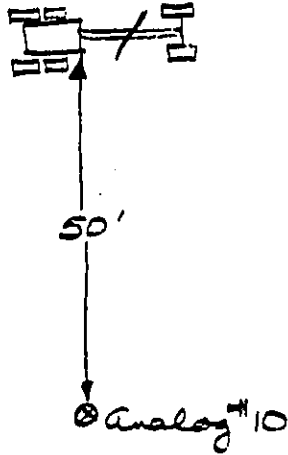




DIAGRAM 1-15I

(RIGHT-OF-WAY)  
FLAT, COMPACTED DIET

CAT 12G GRADER W/ MUFFLER



Measurement Site Data

Highway: I-75

Date: JAN 1980

Site Location: Single Equipment / Finish Grading

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

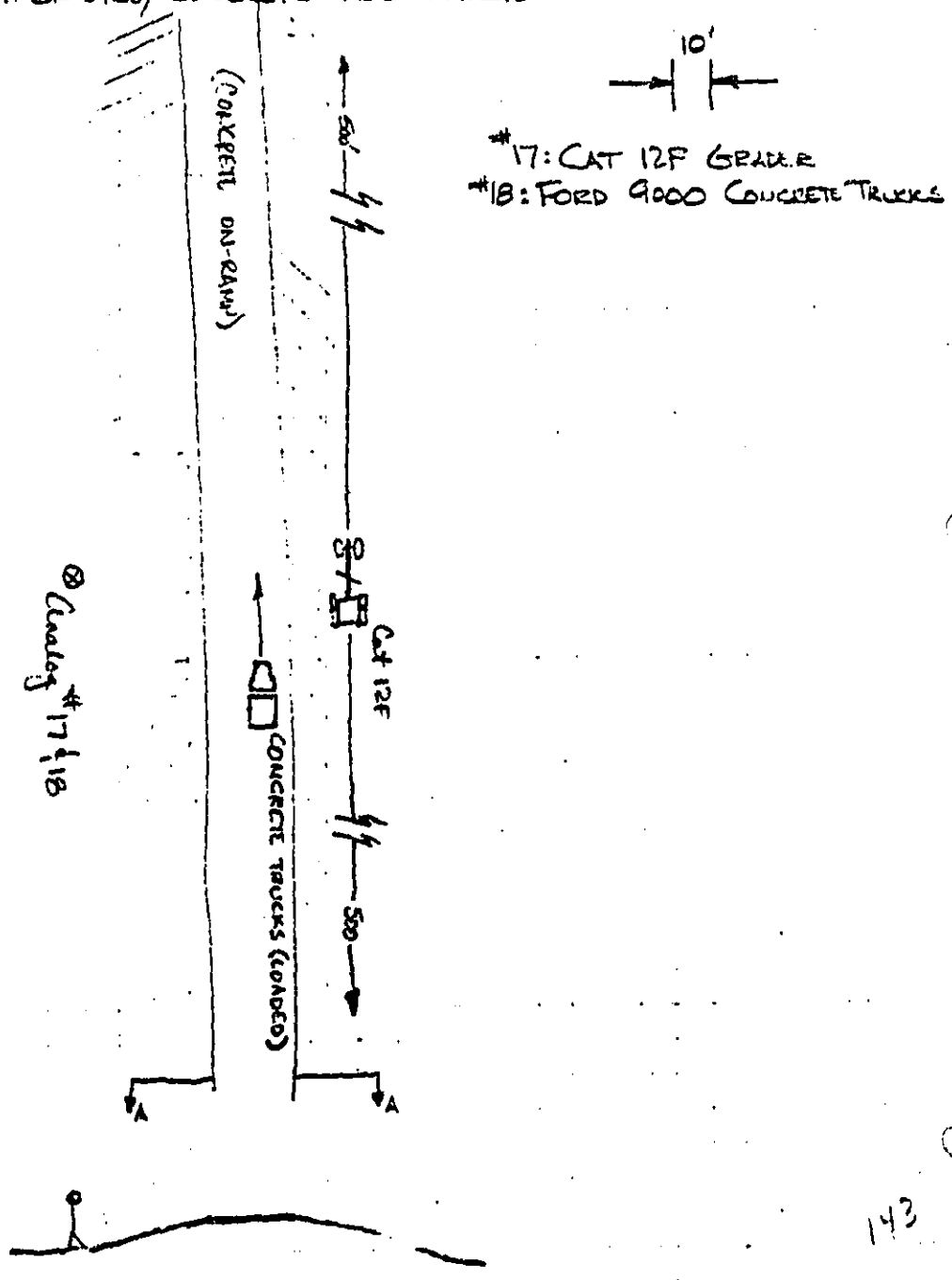
Machinery Description:

1 Cat 12F Grader

Miscellaneous Information:

147

DIAGRAM 1-16B  
FINISH GRADING/ CONCRETE TRUCK PASSBYS







Measurement Site Data

Highway: I-75

Date: Jan 1980

Site Location: Single Equipment - Crane with Dragline Bucket, Excavating Dirt

Type of Measurements:

- |  |   |                                      |
|--|---|--------------------------------------|
| <input type="checkbox"/> Community     | <input type="checkbox"/> Activity         | <input type="checkbox"/> Propagation |
| <input type="checkbox"/> Site Boundary | <input type="checkbox"/> Single Equipment | <input type="checkbox"/> Movies      |

Soil/Terrain Conditions: Flat, compacted dirt between microphone and crane. Crane working next to steep embankment which dropped off into deep borrow pit.

Machinery Description:

1 American 797 Crane with Dragline Bucket (Crane single exhaust with muffler).

Miscellaneous Information:







SINGLE EQUIPMENT/PROPAGATION NOISE MEASUREMENTS

HIGHWAY: I-75

DATE: Jan 1980

SITE LOCATION: Single Equipment

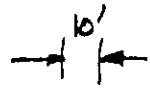
| Sample | Location | Date | Equipment          | L max @<br>ft. | L max @<br>50 ft. | L max @<br>ft. |
|--------|----------|------|--------------------|----------------|-------------------|----------------|
| 65     | E-6      |      | American 797 Crane |                | 73                |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |
|        |          |      |                    |                |                   |                |

Max Level of  
cycle operation

EL

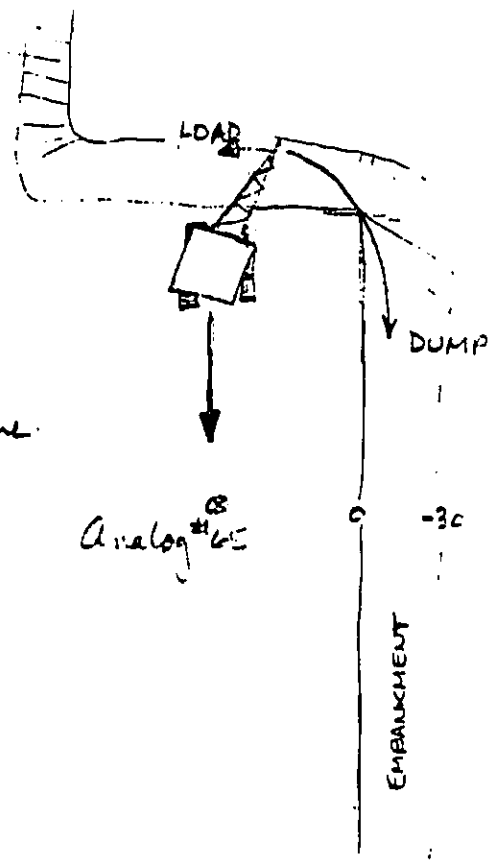
yr.

DIAGRAM 1-22D  
BORROW EXCAVATION



American 797  
Crane w/ dragline.

Analogy #65



Measurement Site Data

Highway: I-75

Date: Jan 1982

Site Location: Single Equipment - Dump Truck  
Pauline.

Type of Measurements:

Community

Activity

Propagation

Site Boundary

Single Equipment

Movies

Soil/Terrain Conditions: Measurements taken along completed  
but unopened section of I-75 which dump  
trucks were using a haul road.

Machinery Description:

Mack Single Chassis 10-Wheel Dump Trucks  
1 Mack Tractor-Semi Dump Trucks

Miscellaneous Information:

Vehicles were traveling at  
35-50 mph.



Roll #1  
 Photo Log - 35 mm

| Frame # | Location                    | Date | Time | View or Subject                    |
|---------|-----------------------------|------|------|------------------------------------|
| 1       | Earthwork Site I            | 1-15 |      | EW-3; Scraper Pavelys              |
| 2       | ↓                           |      |      | " " "                              |
| 3       |                             |      |      | EW-4; Looking S.E. @ Borrow Pit    |
| 4       | ↓                           |      |      | EW-4; Looking east @ Borrow Pit    |
| 5       | Earthwork Site VII          |      |      | EW-30; Cat 12G Grader              |
| 6       | ↓                           |      |      | EW-30; Cat 12F Grader              |
| 7       | ↓                           |      |      | EW-30; Cat 950 Loader              |
| 8       | Earthwork Site V            |      |      | EW-25; Debris loading op.          |
| 9       | Single Equipment            |      |      | E-4; Cat 12G Grader, IMI           |
| 10      | ↓                           |      |      | E-3; Cat 631B Scraper, IMI         |
| 11      | ↓                           |      |      | " " " " "                          |
| 12      | -                           |      |      | -                                  |
| 13      | Earthwork Site V            |      |      | EW-28; Cat D7F Dozer               |
| 14      | Cleaning Site I             |      |      | CS-7; Looking east                 |
| 15      | ↓                           |      |      | CS-7; Looking east at Terex Loader |
| 16      | Concrete Paving/Batch Plant | 1-16 |      | P-1; Looking west at Pavers        |
| 17      | ↓                           |      |      | P-1; Looking N.E.                  |
| 18      | ↓                           |      |      | P-1; Looking west                  |
| 19      | Single Equipment            |      |      | E-5; Finishing grading             |
| 20      | Concrete Paving/Batch Plant |      |      | P-2; Ford 9000 Concrete Trucks     |
| 21      | ↓                           |      |      | BP-1; Looking S.W.                 |

Roll #1  
 Photo Log - 35 mm

| Frame # | Location             | Date | Time | View or Subject                  |
|---------|----------------------|------|------|----------------------------------|
| 22      | Concrete Paving/B.P. | 1-16 |      | BP-2; Looking N.W.               |
| 23      | ↓                    | ↓    |      | BP-3; Looking S.E.               |
| 24      | -                    | ↓    |      | -                                |
| 25      | Earthwork Site I     | 1-17 |      | EW-7; Looking N.W.               |
| 26      | ↓                    |      |      | EW-7; Looking S.W.               |
| 27      | Single Equipment     |      |      | E-2; Cat 950 (movies)            |
| 28      | -                    |      |      | -                                |
| 29      | Earthwork Site I     |      |      | EW-7; Looking west of Borrow Pit |
| 30      | Earthwork Site II    |      |      | EW-9; Scraper Paving             |
| 31      |                      |      |      | EW-9; Cat. 996 Paving            |
| 32      |                      |      |      | EW-9; Cat 637 Scraper            |
| 33      |                      |      |      | EW-10; Looking north             |
| 34      | Single Equipment     |      |      | E-1; Cat 966C Loader             |
| 35      | Earthwork Site II    |      |      | EW-11; Cat 637, IMI              |
| 36      | ↓                    | ↓    |      | " " "                            |
|         |                      |      |      |                                  |
|         |                      |      |      |                                  |
|         |                      |      |      |                                  |
|         |                      |      |      |                                  |
|         |                      |      |      |                                  |
|         |                      |      |      |                                  |
|         |                      |      |      |                                  |

151

Roll #2  
 Photo Log - 35 mm

| Frame # | Location           | Date | Time | View or Subject                       |
|---------|--------------------|------|------|---------------------------------------|
| 1       | Earthwork Site III | 1-18 | 1315 | Mack Single Chassis Dump Truck        |
| 2       |                    |      |      | EW-12; Looking west                   |
| 3       |                    |      |      | EW-13; Cat D7G, IMI                   |
| 4       |                    |      |      | EW-15; Looking east @ roller          |
| 5       |                    |      |      | EW-14; Looking east                   |
| 6       | ↓                  | ↓    |      | EW-16; Looking east                   |
| 7       | -                  |      |      | -                                     |
| 8       | -                  |      |      | -                                     |
| 9       | Earthwork Site IX  | 1-21 | 1030 | EW-39; Scrape Pavement (Sample #44)   |
| 10      |                    |      |      | " " " "                               |
| 11      |                    |      |      | EW-32; Looking south                  |
| 12      |                    |      |      | " " "                                 |
| 13      |                    |      |      | South of EW-32, looking north         |
| 14      |                    |      |      | Camera location east of pit           |
| 15      | ↓                  |      |      | Camera location, looking east @ EW-33 |
| 16      | Bridge Site II     |      |      | South of B-2 looking north            |
| 17      | ↓                  |      |      | S.E. of B-2 looking north             |
| 18      | Earthwork Site VI  |      |      | South of EW-29 looking north          |
| 19      | Earthwork Site IV  |      |      | Looking S.E. @ EW-19                  |
| 20      | ↓                  |      |      | EW-19; looking @ DTF Door             |
| 21      | ↓                  | ↓    |      | EW-19; Looking N.E.                   |



Roll #2  
 Photo Log - 35 mm

| Frame # | Location            | Date | Time | View or Subject                  |
|---------|---------------------|------|------|----------------------------------|
| 22      | Mobilization        | 1-21 | 1610 | M-1; looking N.E. @ Dump Trucks  |
| 23      | ↓                   | ↓    |      | M-2; Dump Truck Pavulys          |
| 24      | ↓                   | ↓    |      | " " " "                          |
| 25      | Clearing Site II    | 1-22 | 1035 | CS-2; Cat D7G                    |
| 26      | ↓                   |      |      | CS-2; Looking north              |
| 27      | ↓                   |      |      | CS-3; Looking east at Terex      |
| 28      | ↓                   |      |      | CS-4; Cat DBT                    |
| 29      | Earthwork Site VIII |      |      | EW-31; Autograde Grader          |
| 30      | ↓                   |      |      | EW-31; Cat 613B Scraper          |
| 31      | Single Equipment    |      |      | Sample #47                       |
| 32      | ↓                   |      |      | " "                              |
| 33      | ↓                   |      |      | " "                              |
| 34      | Bridge Site III     |      |      | BS-3; Concrete Saw finishing cut |
| 35      | ↓                   |      |      | BS-3; Concrete Saw               |
| 36      | Single Equipment    |      |      | Dump Truck Pavulys (Sample 67)   |
|         |                     |      |      |                                  |
|         |                     |      |      |                                  |
|         |                     |      |      |                                  |
|         |                     |      |      |                                  |
|         |                     |      |      |                                  |

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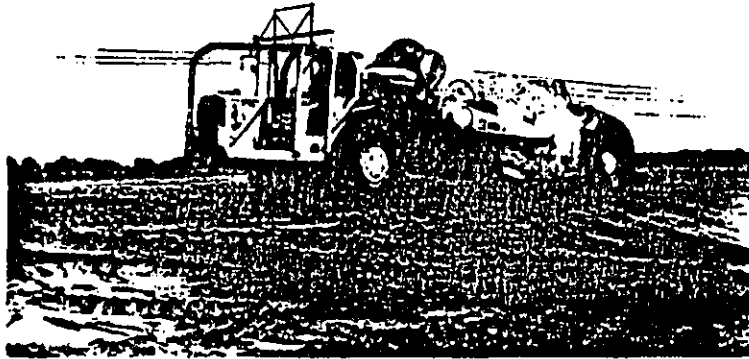
ROLL #3  
 Photo Log - 35 mm

| Frame # | Location          | Date | Time | View or Subject                           |
|---------|-------------------|------|------|---|
| 1       | -                 | 1-23 | 1430 | N/G                                       |
| 2       | Abatement Demo.   |      |      | Well Point Pump; without enclosure        |
| 3       |                   |      |      |   |
| 4       |                   |      |      |   |
| 5       |                   |      |      |   |
| 6       |                   |      |      |   |
| 7       |                   |      |      |   |
| 8       |                   |      |      | Well Point Pump; With enclosure           |
| 9       |                   |      |      |   |
| 10      |                   |      |      |   |
| 11      |                   |      |      |   |
| 12      |                   |      |      |   |
| 13      | Eachwork Site IV  | 1-24 |      | EW-23; Looking south into pit             |
| 14      |                   |      |      | EW-22; Looking east towards approach ramp |
| 15      | Clearing Site III |      |      | CS-8; Loader & fan at fire                |
| 16      |                   |      |      | 3-hp fan                                  |
| 17      |                   |      |      | " "                                       |
| 18      |                   |      |      | CS-9; Loader at fire                      |
| 19      |                   |      |      | CS-10; fan near fire                      |
| 20      |                   |      |      | CS-11; Terex Loader                       |
| 21      | Eachwork Site IV  |      |      | Movie Camera Section (Diagram 1-24A)      |

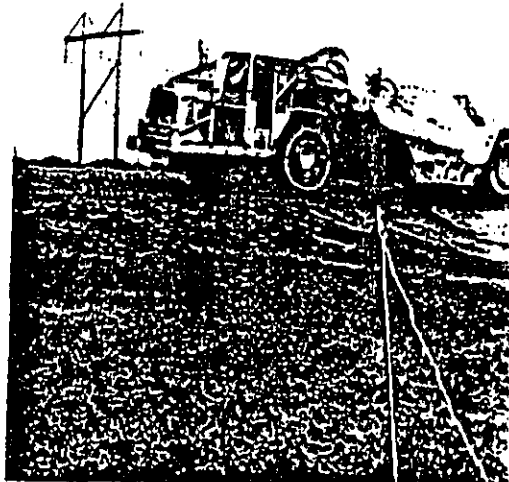




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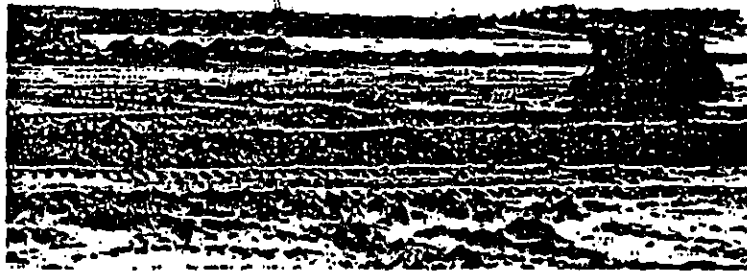
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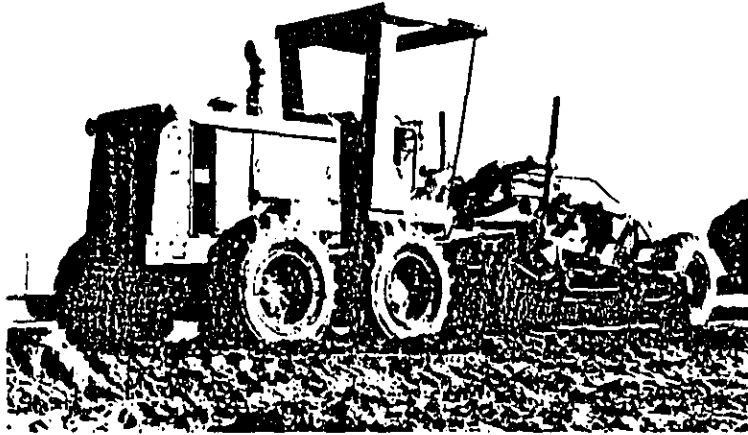
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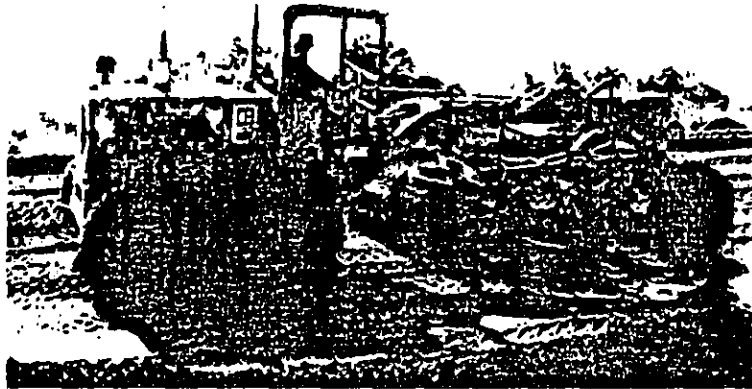
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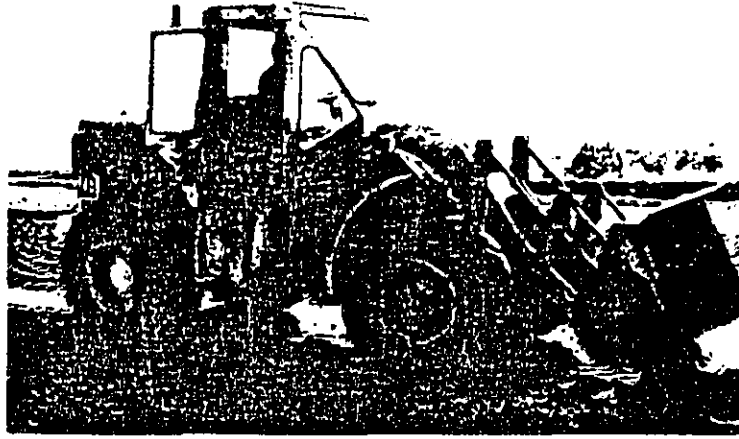


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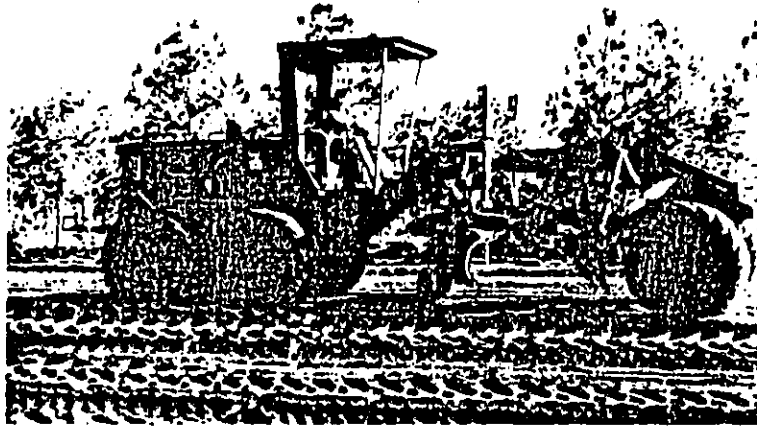
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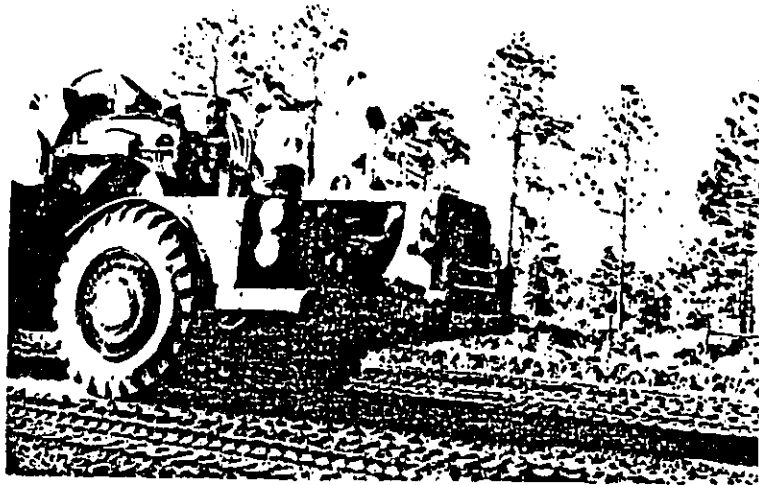
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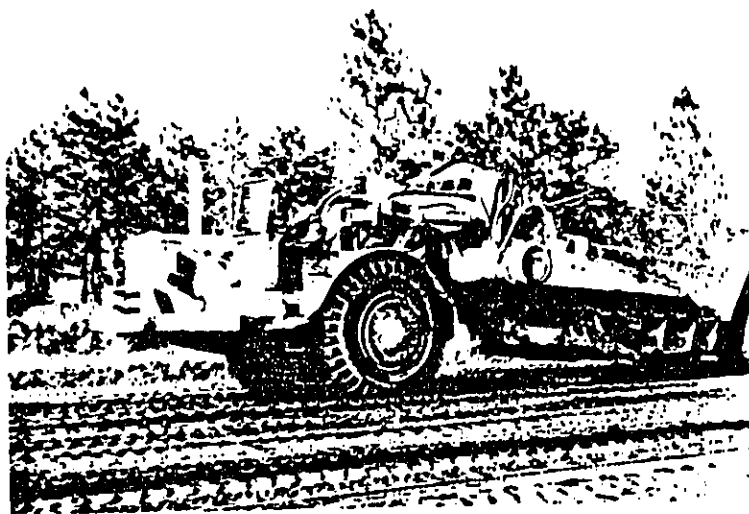




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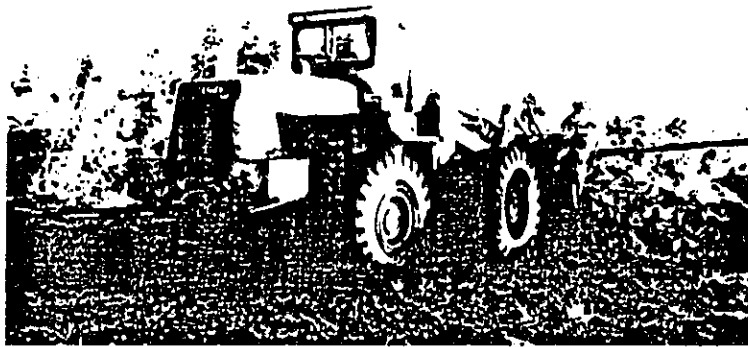
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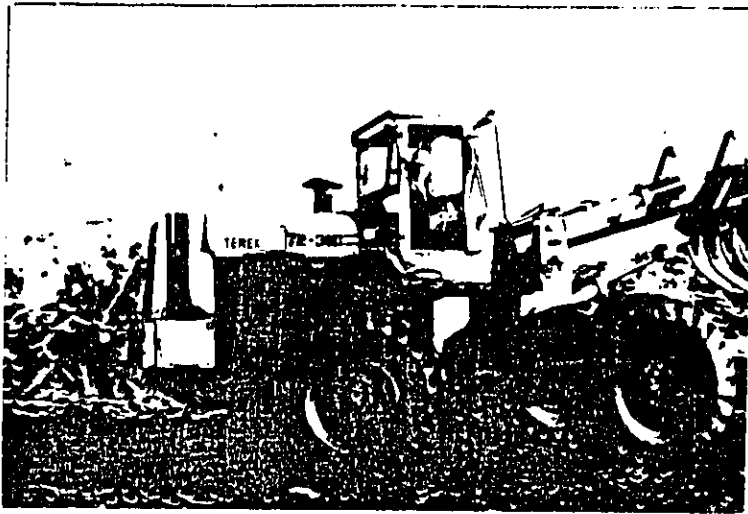
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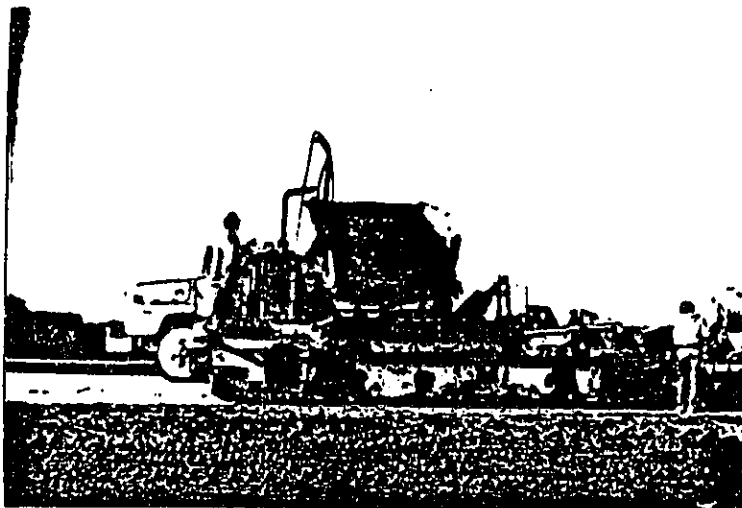
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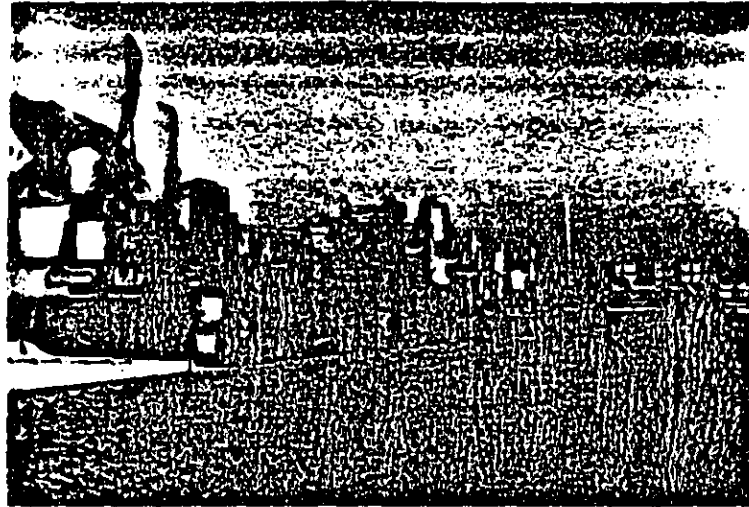
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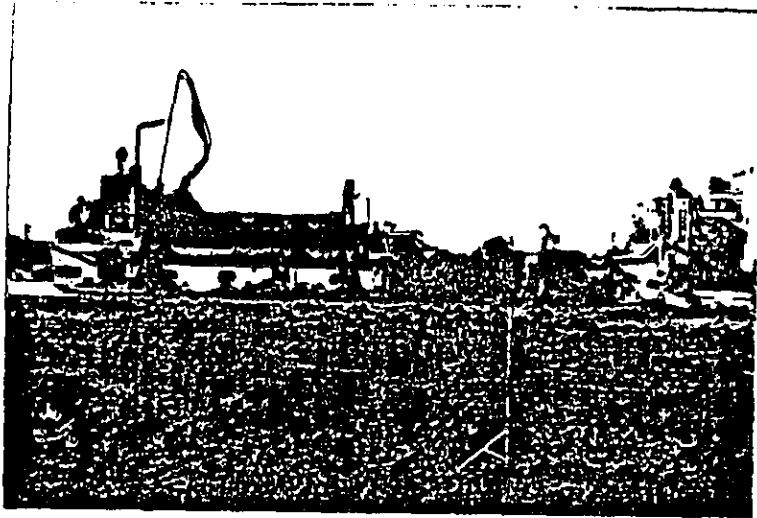
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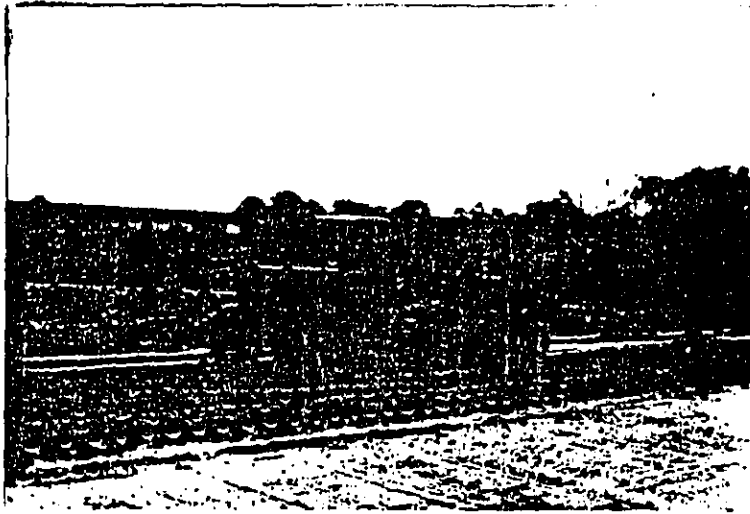
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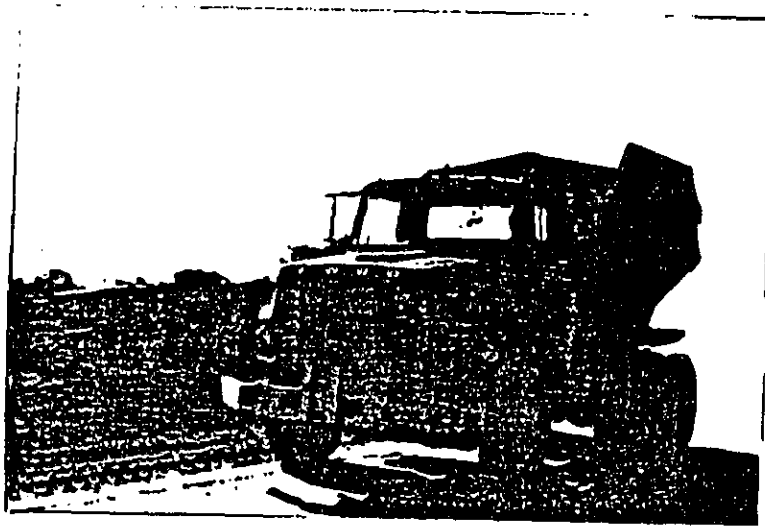
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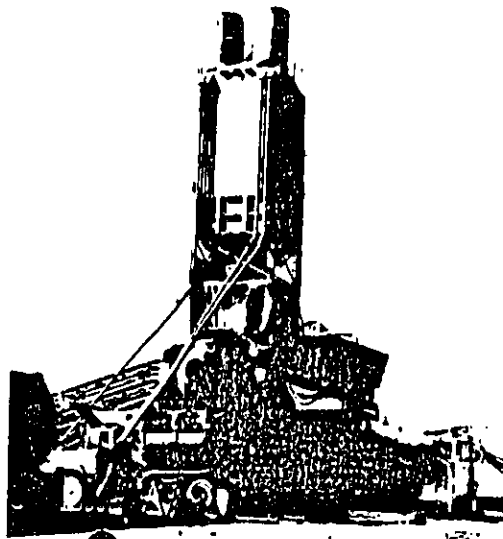
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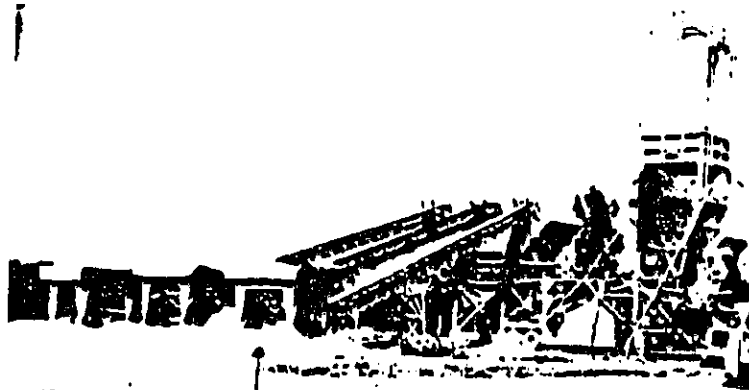
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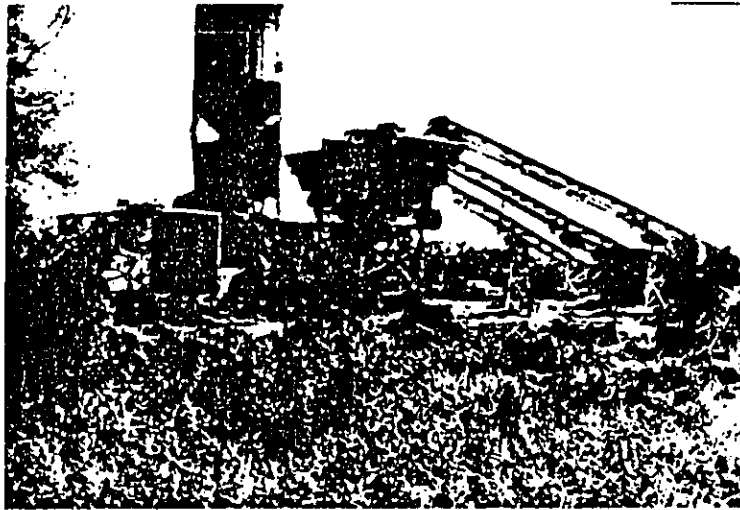
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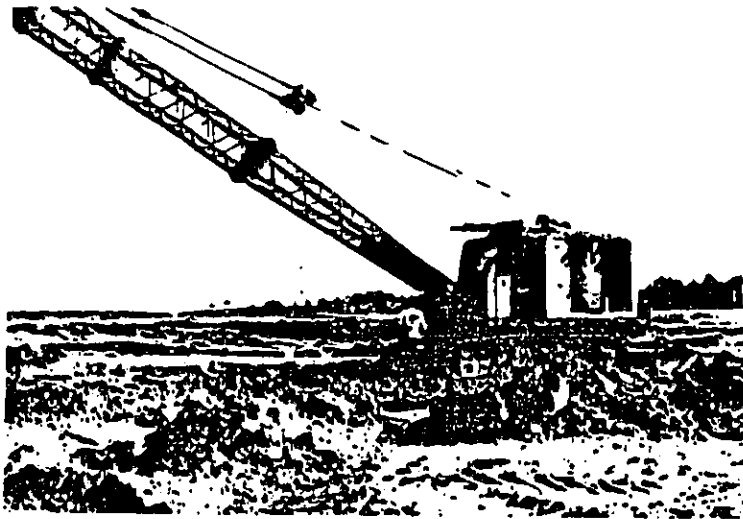
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#22



# 23



# 24

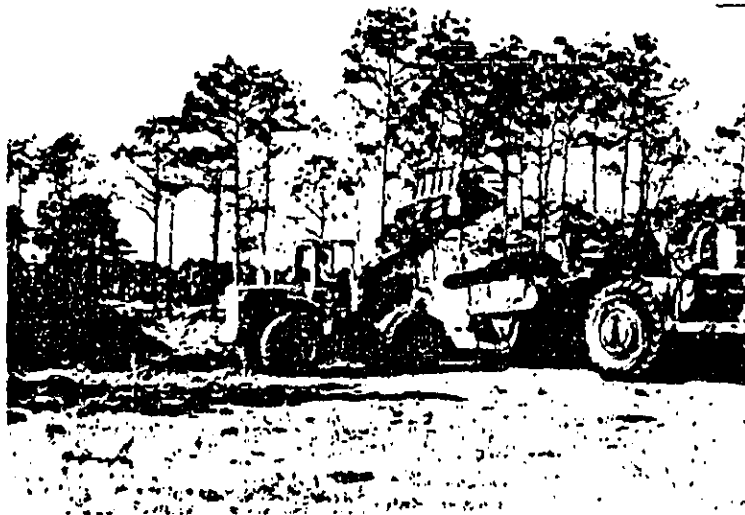




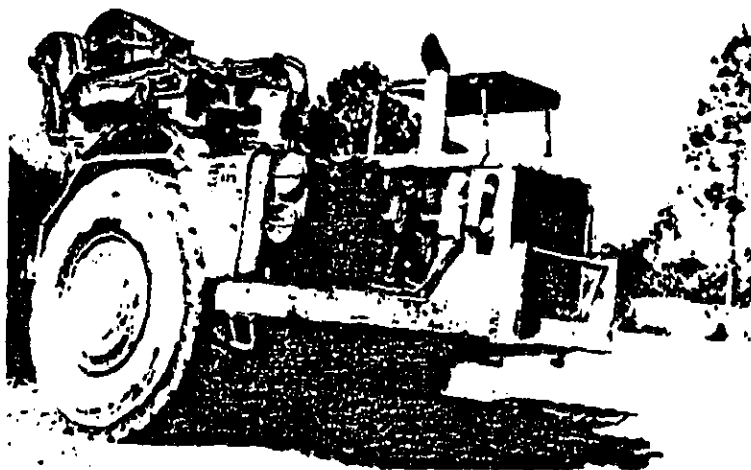
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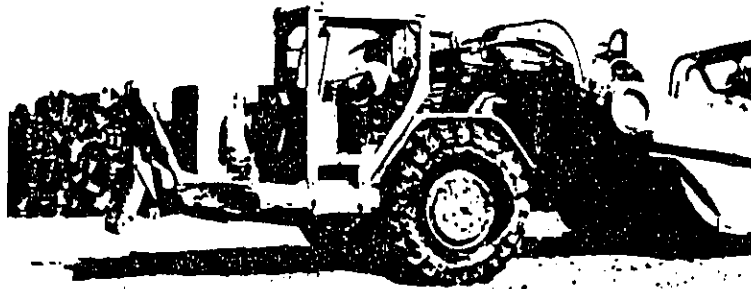
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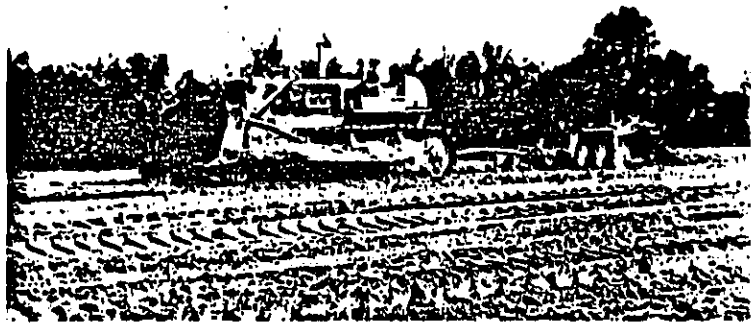
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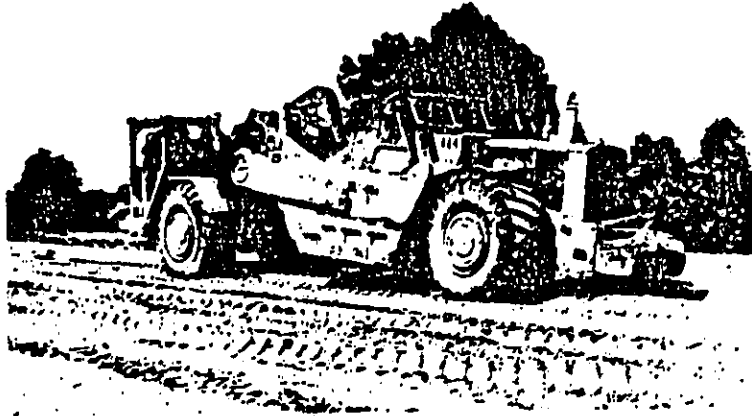
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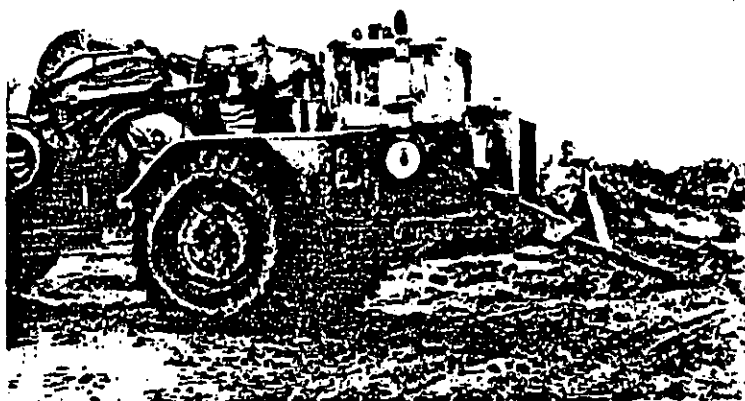
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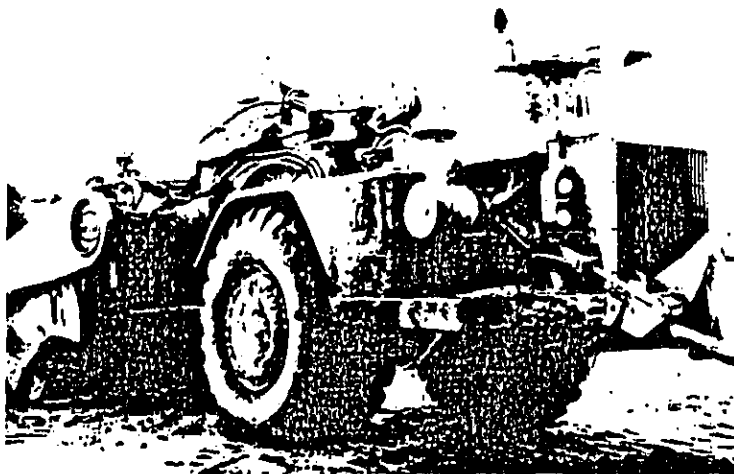


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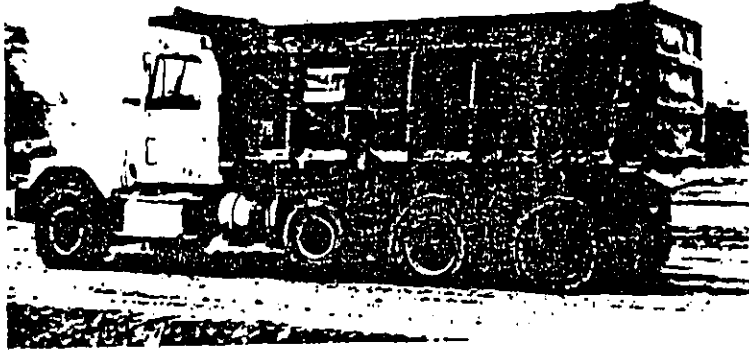
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117



# 310

ROLL #2

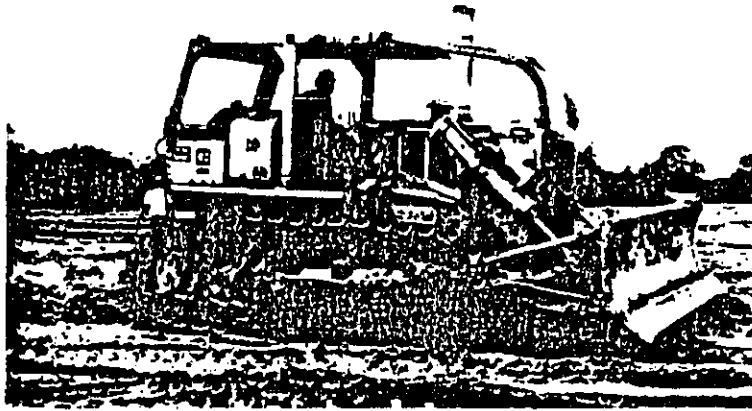


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#2





# 3



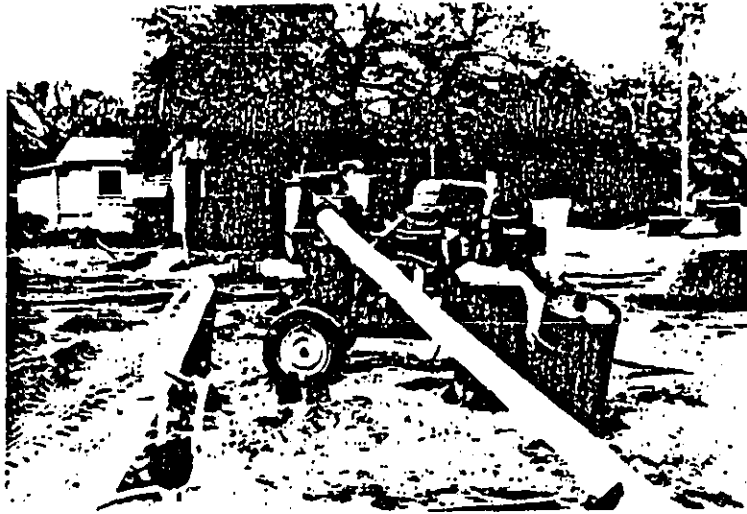
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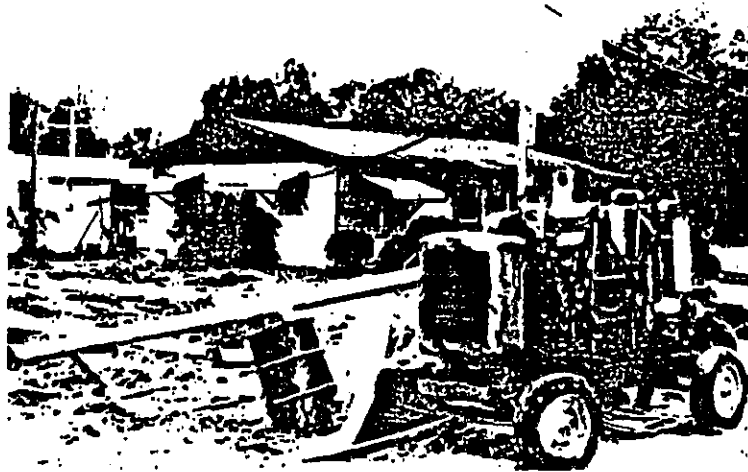
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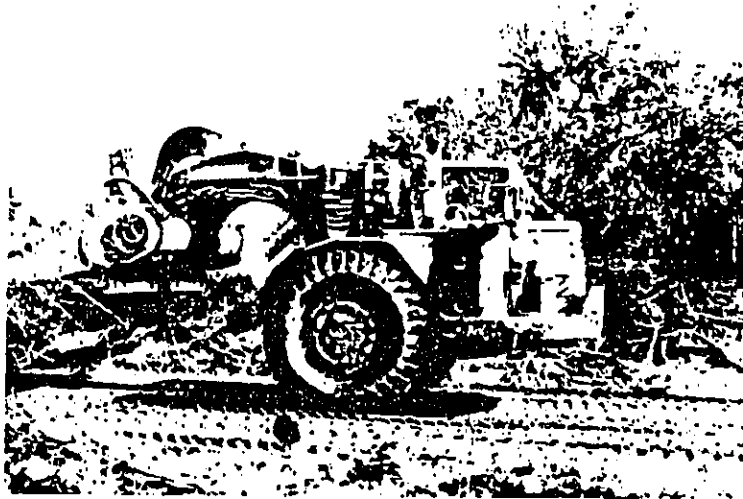
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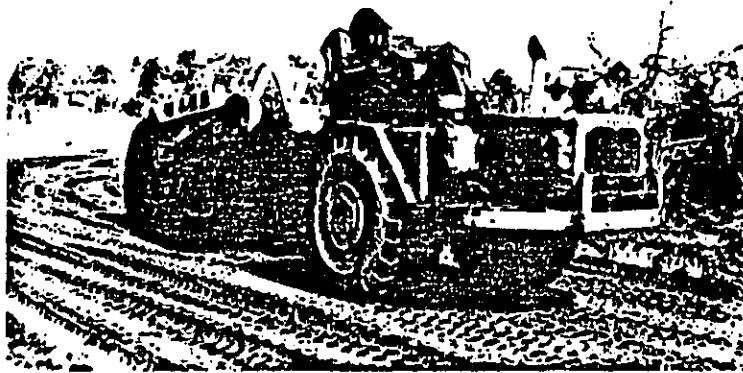
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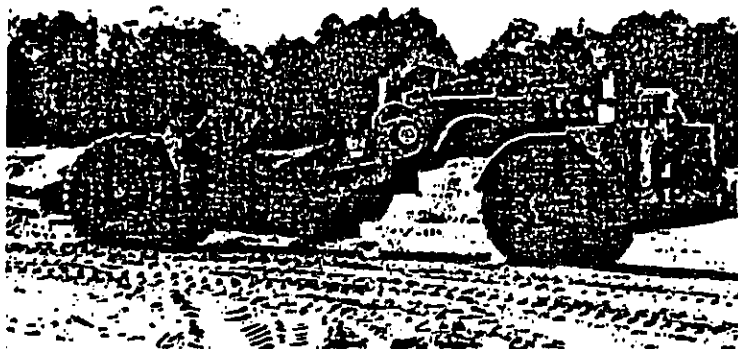


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113



# 11



# 12



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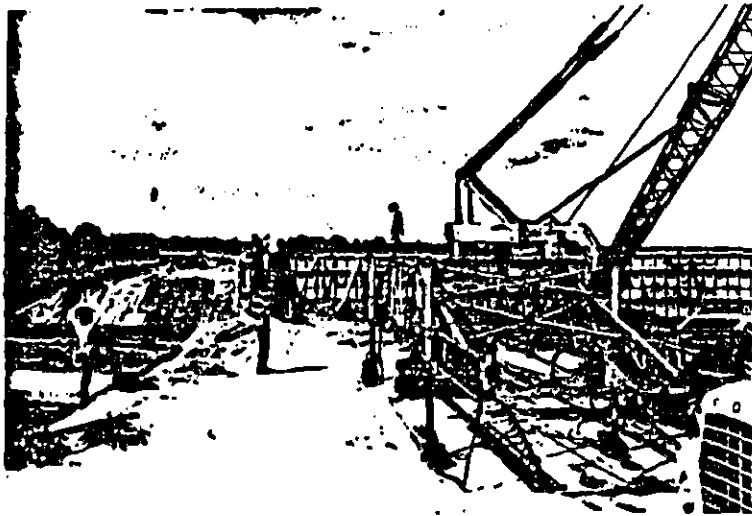


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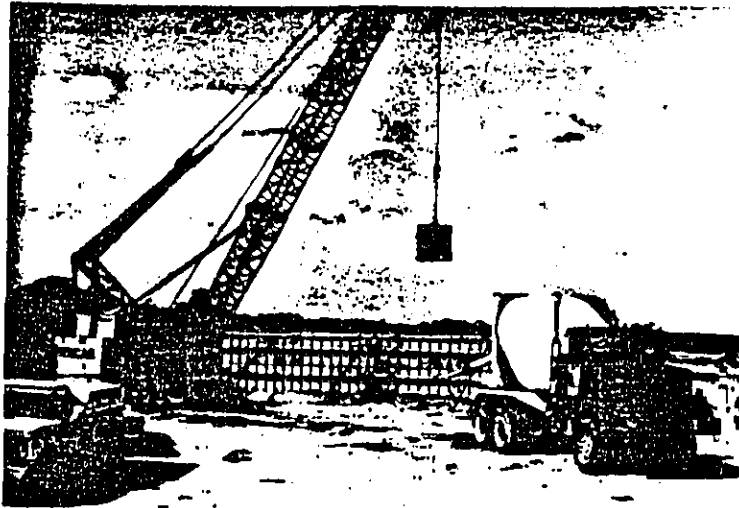
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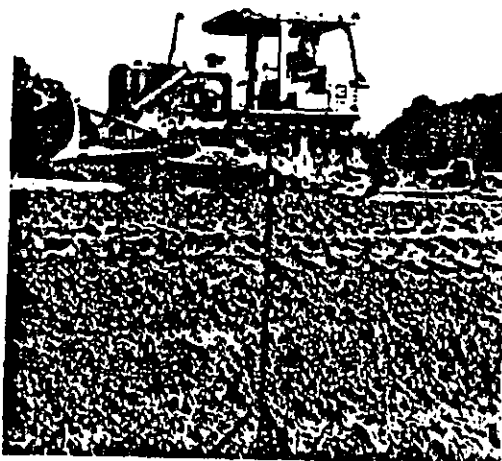
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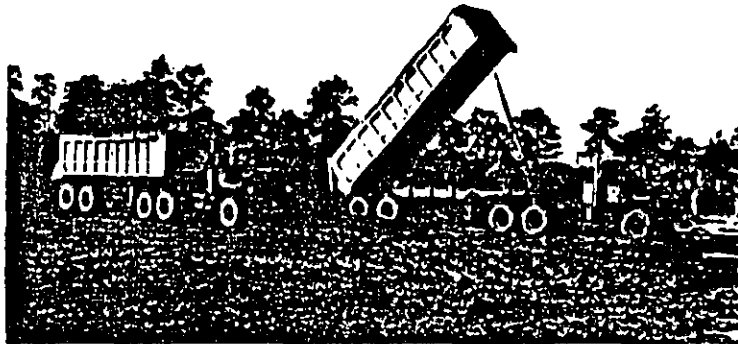


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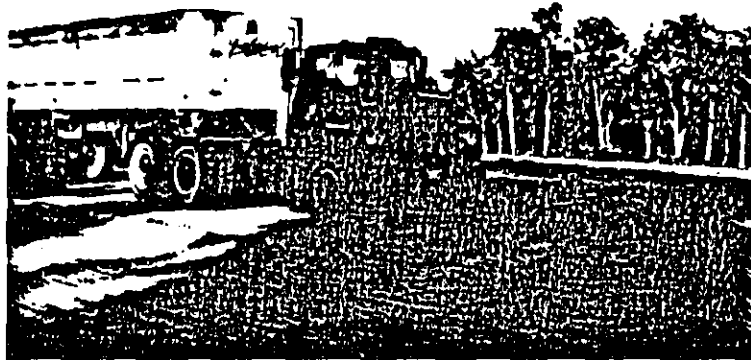
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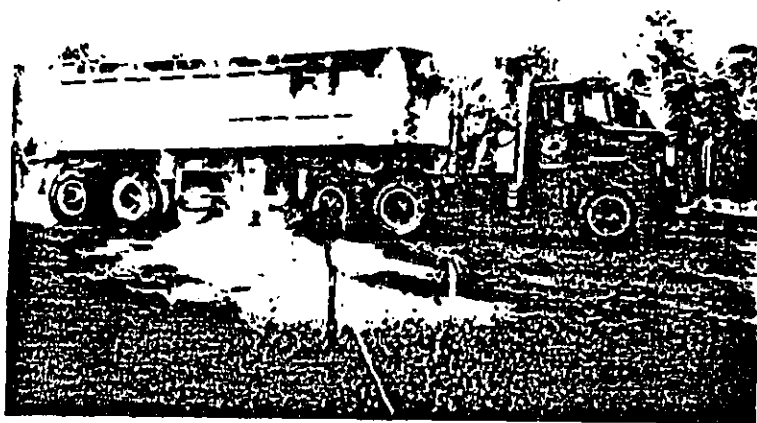
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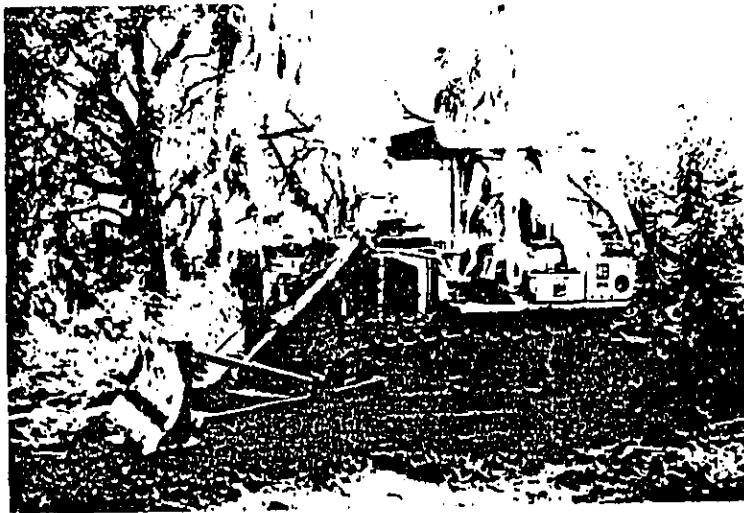
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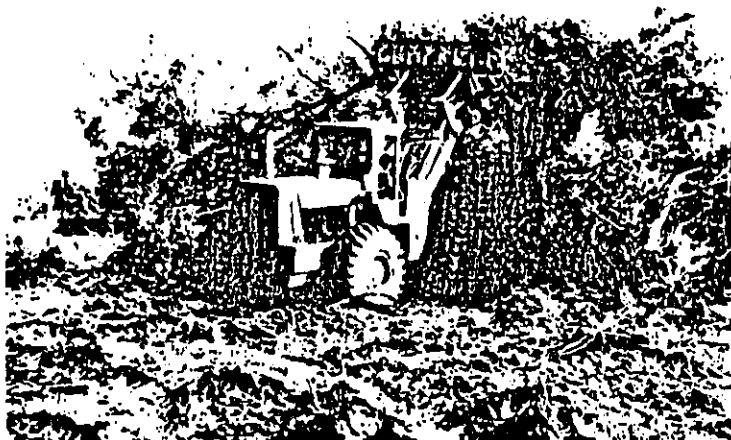
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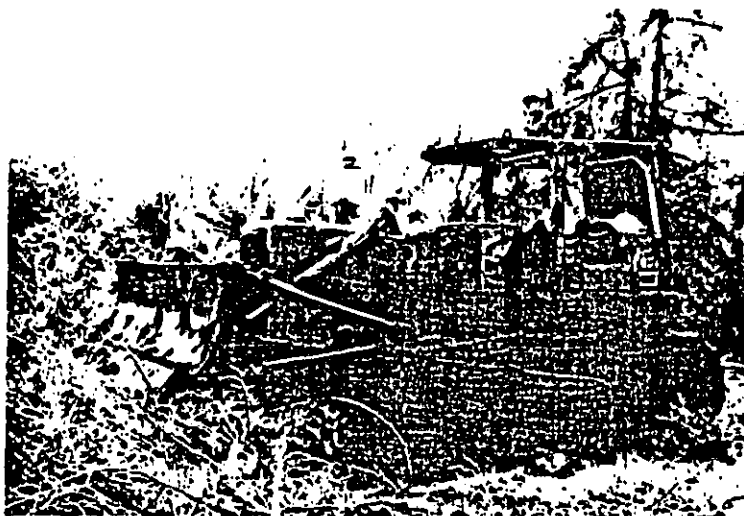
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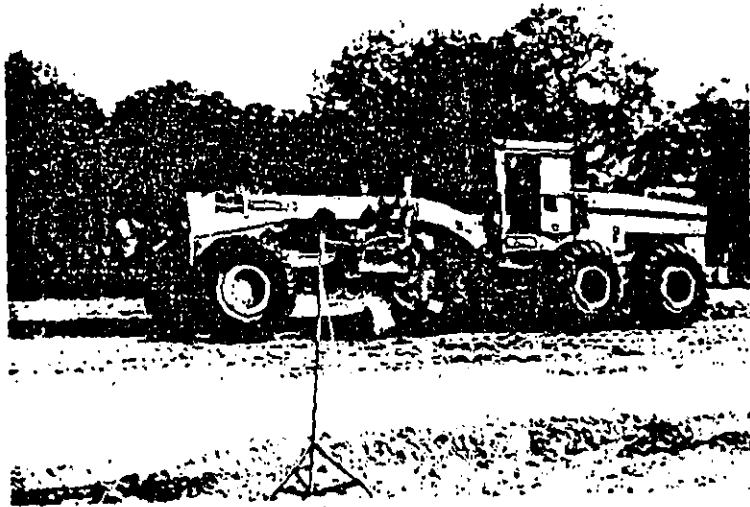
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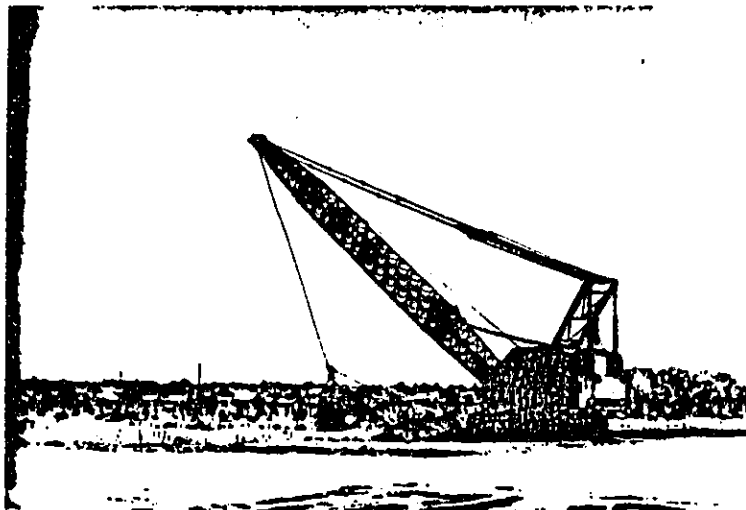
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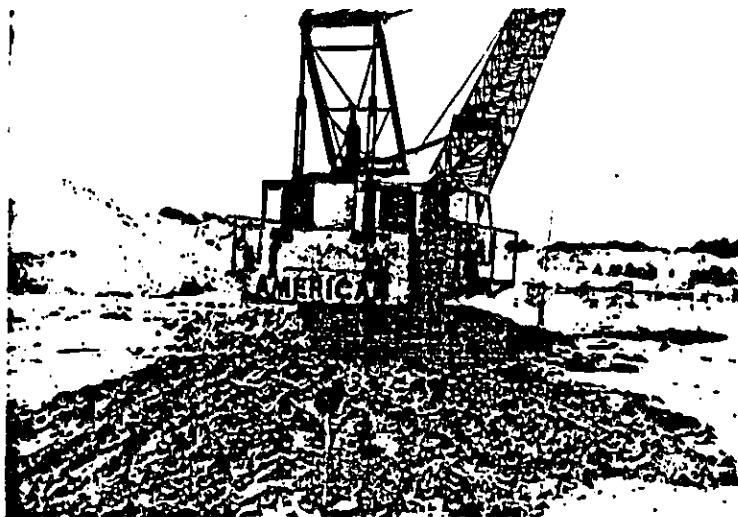
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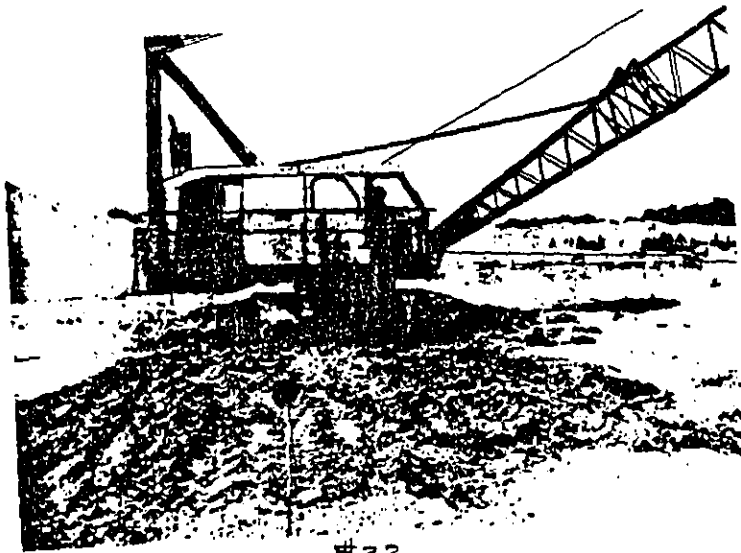
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# 31



# 32



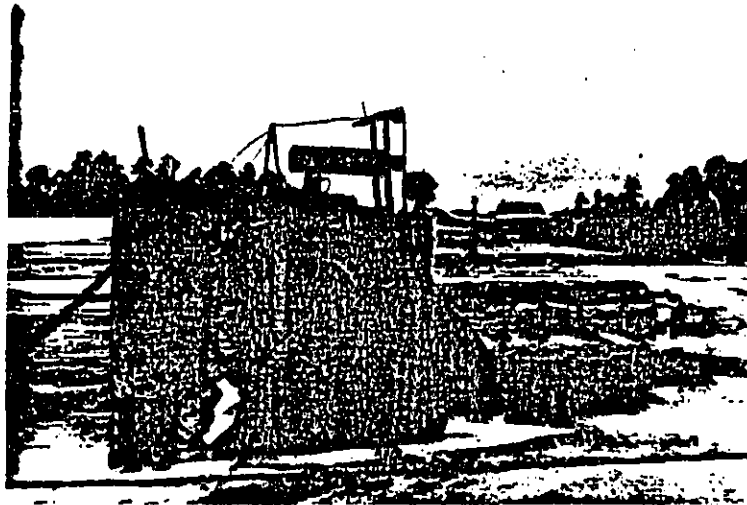
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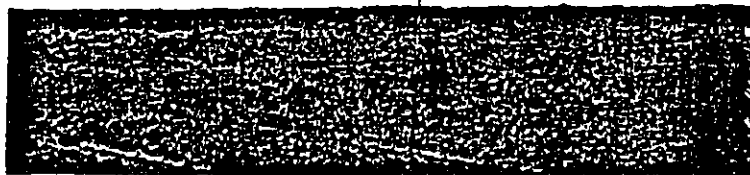
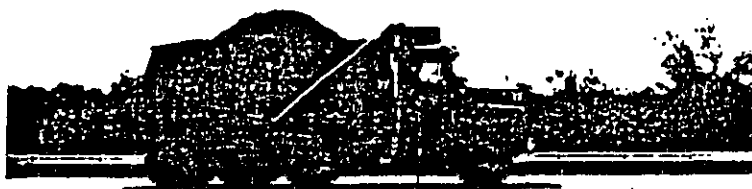
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# 35



# 36

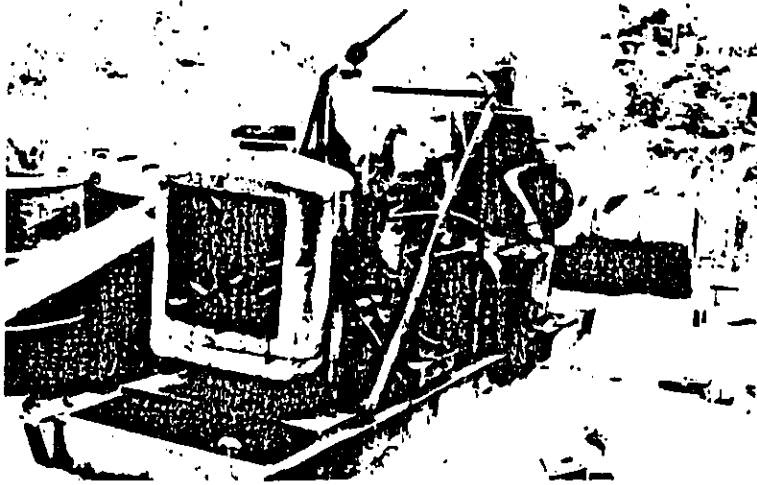
196

ROLL #1 E

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#2

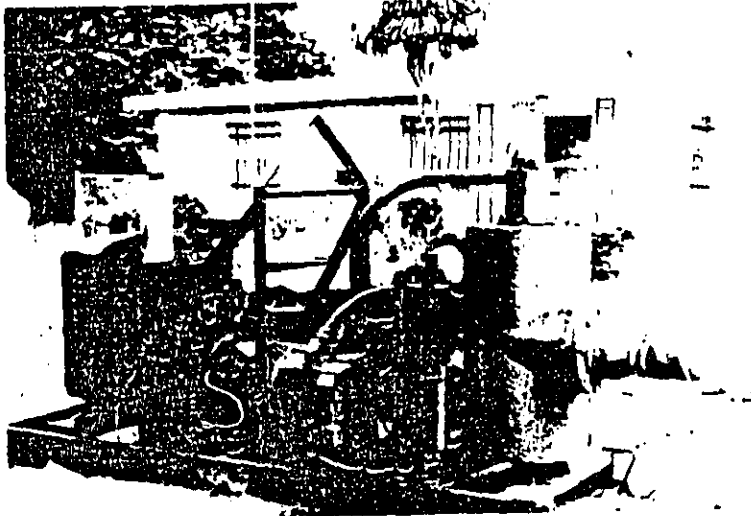


#1



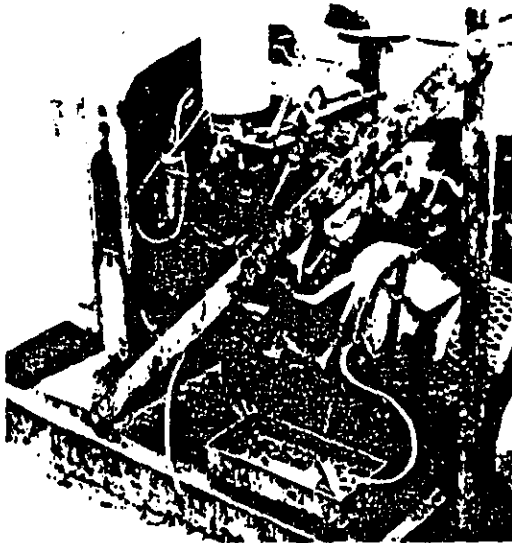
#2

101



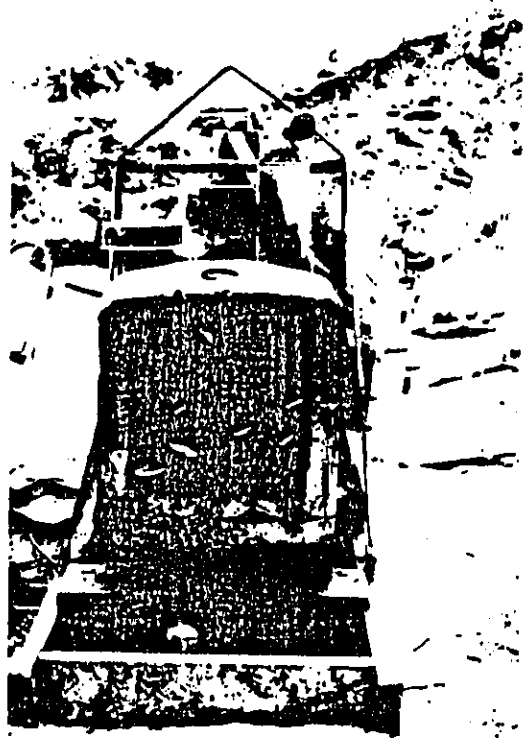
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#5

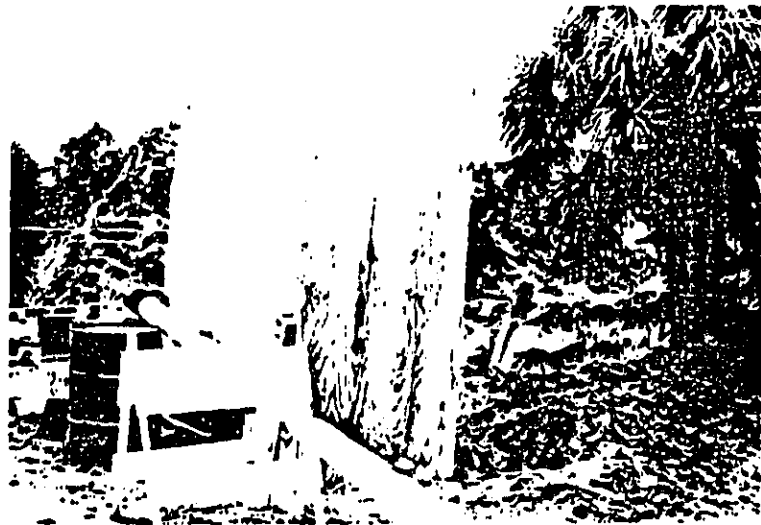


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199

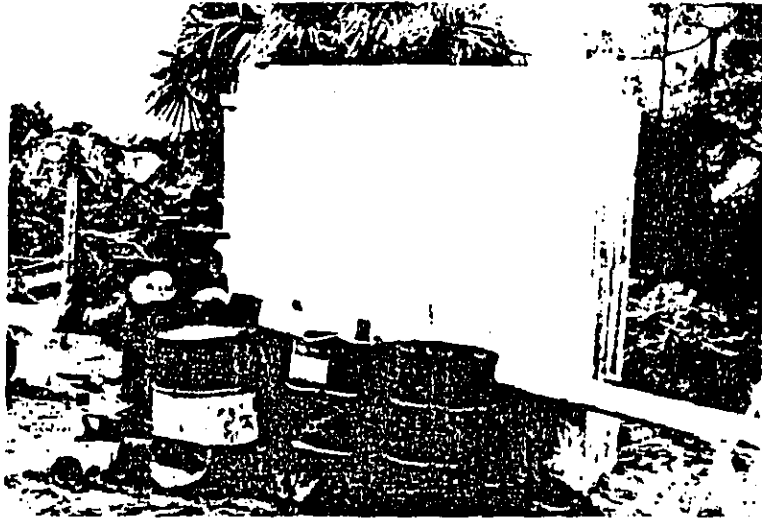


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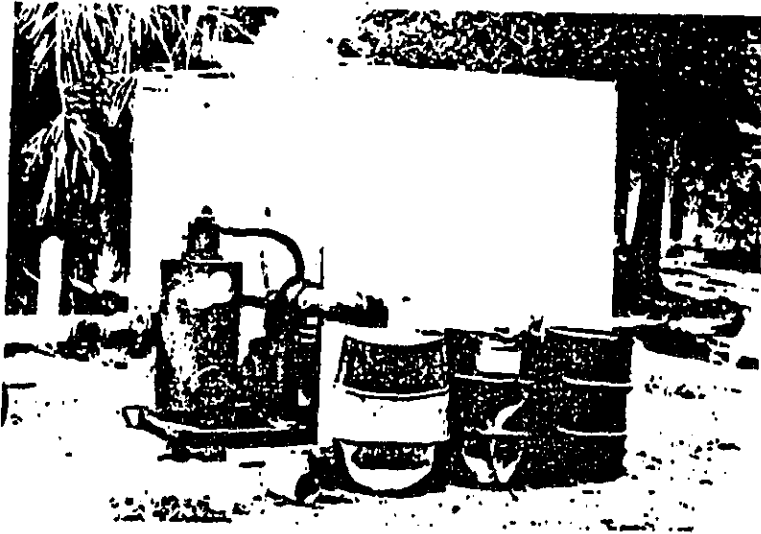


#8

200

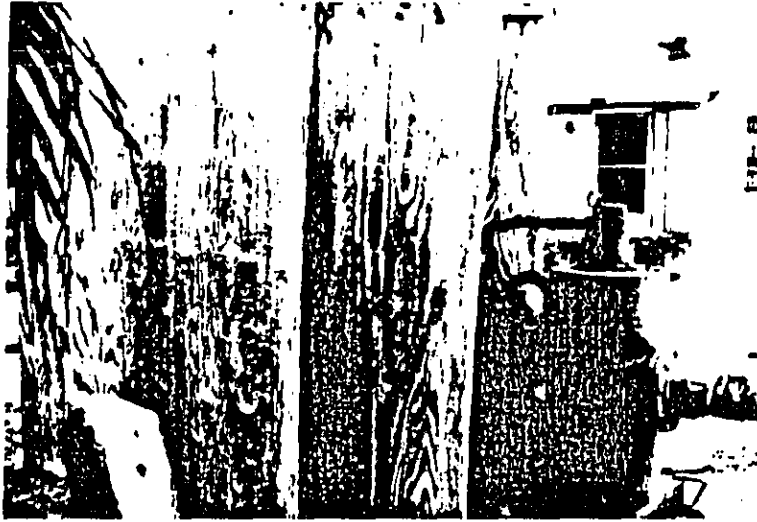


#9



#10

201



#11



#12

202



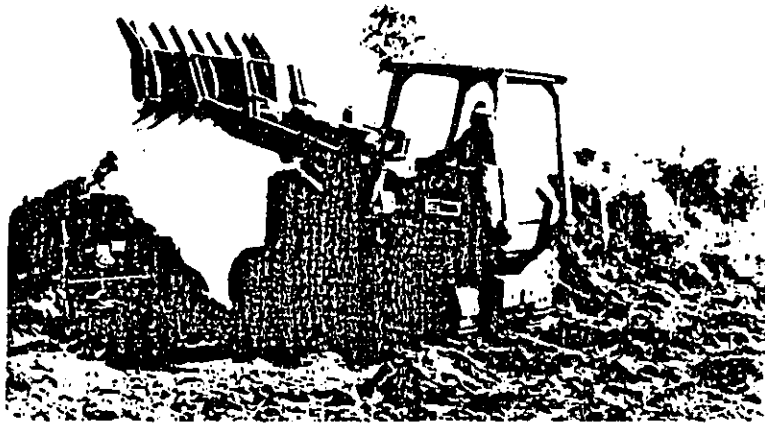
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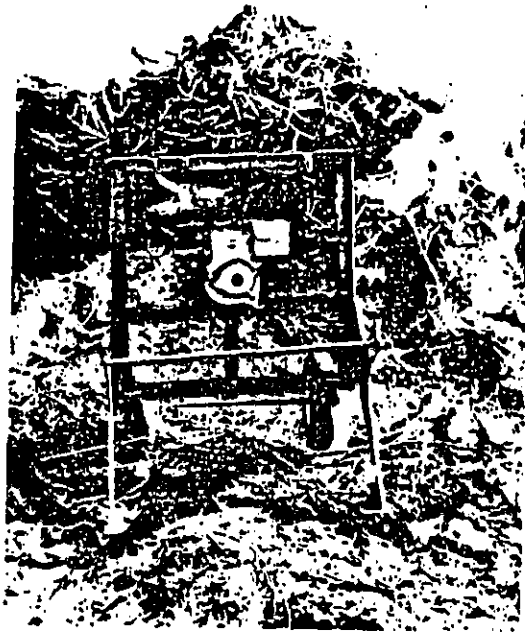
#14

208



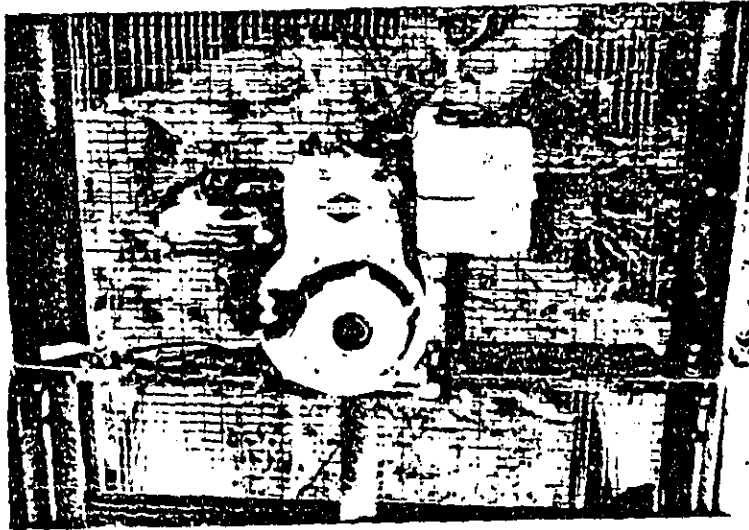


#15



#16

204



#17



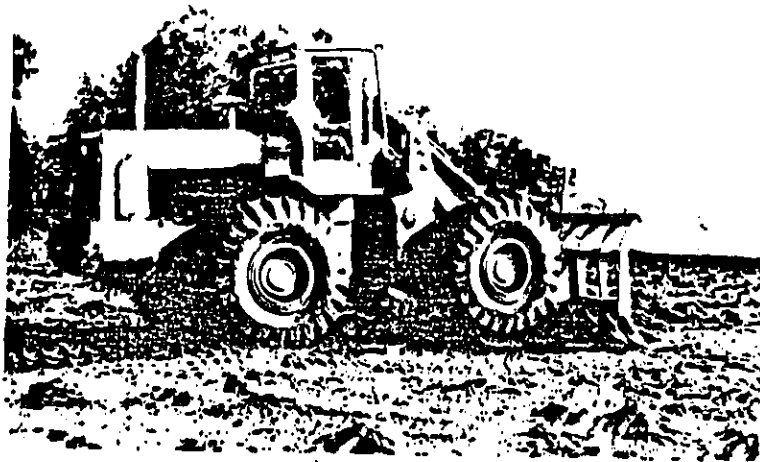
#18

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305

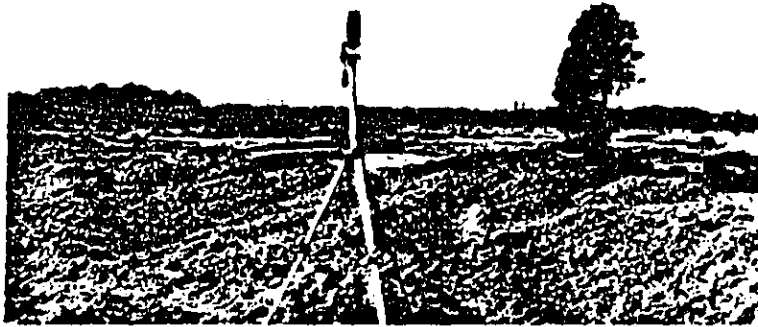


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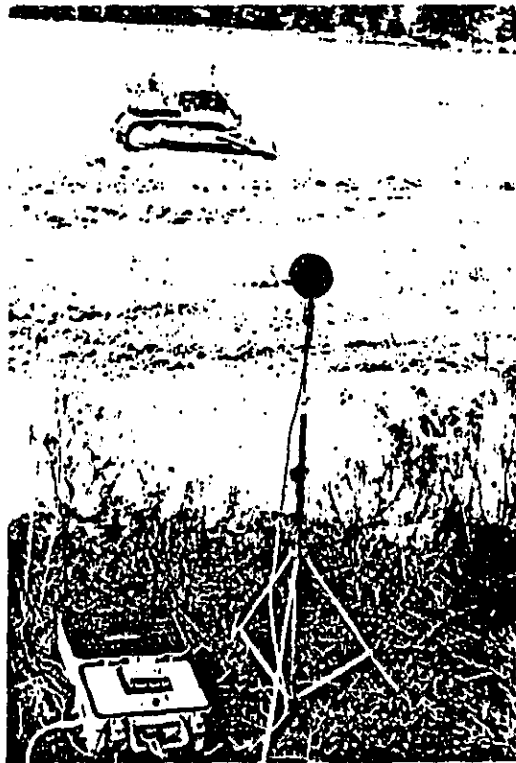


# 20

206



#21



#22

200

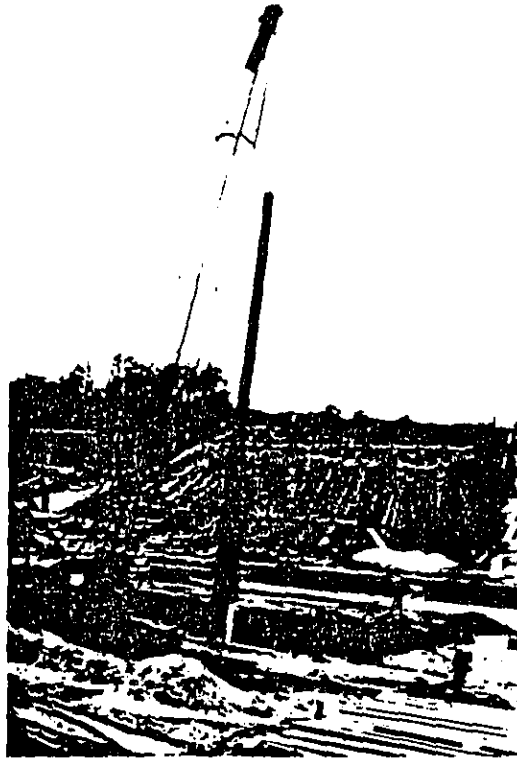


#23



#24

208

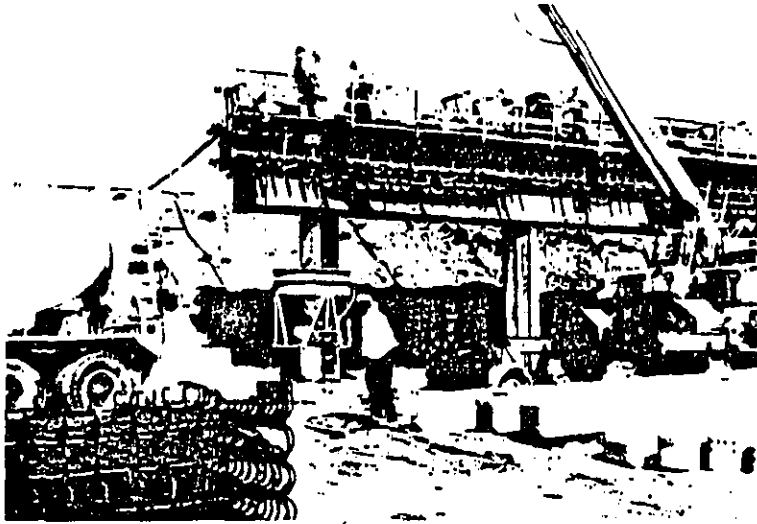


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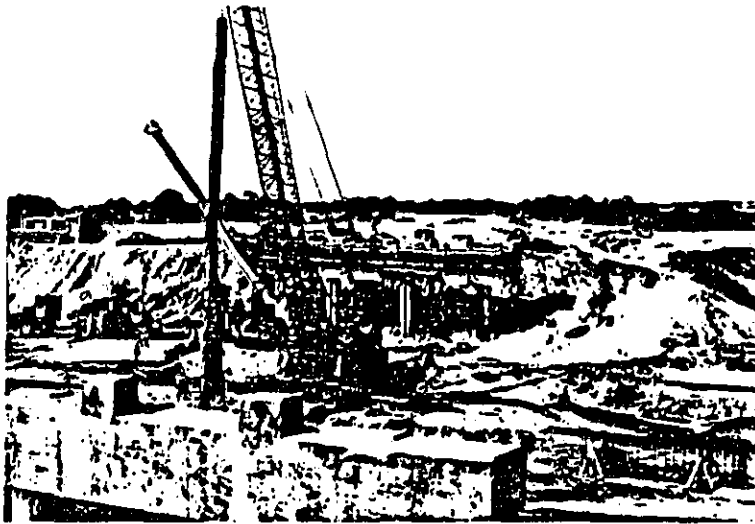


#26

209

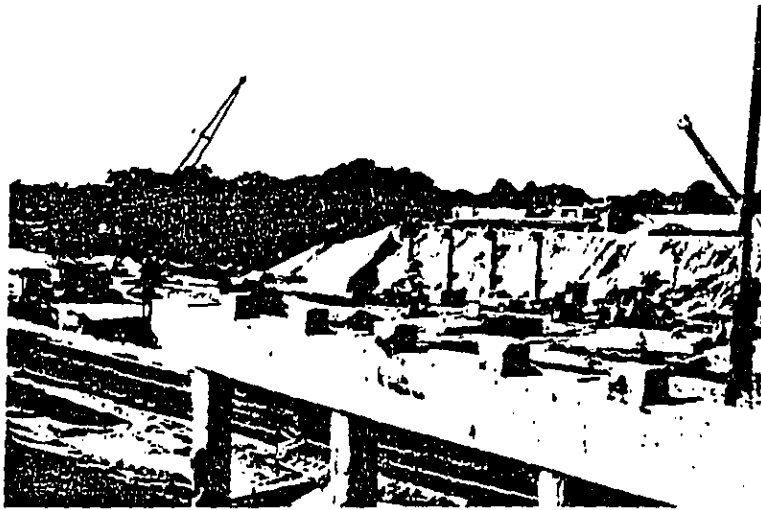


# 27

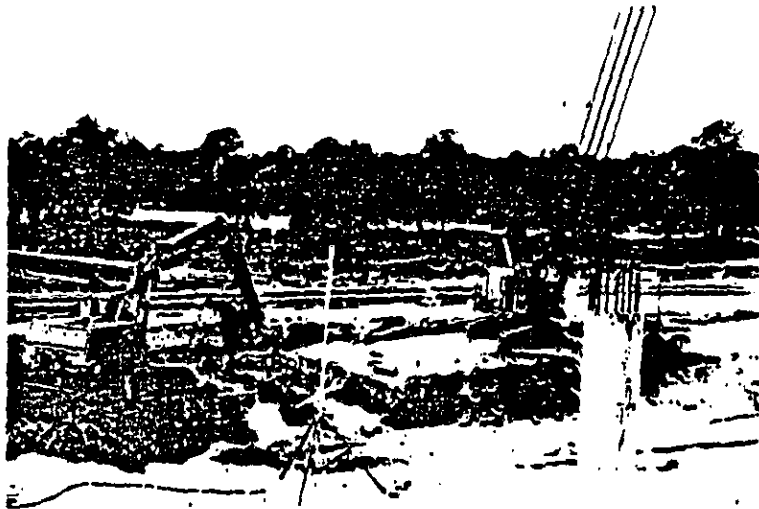


# 28

219



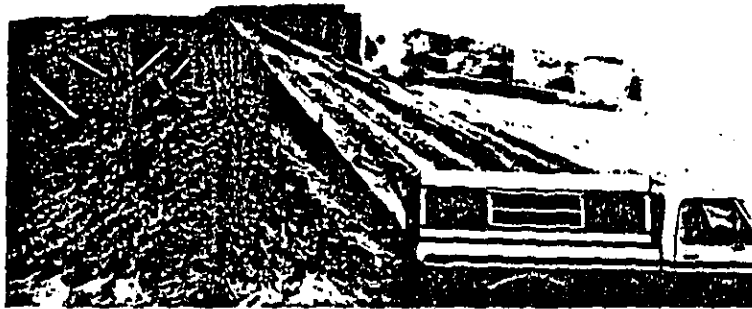
#29



#30

211



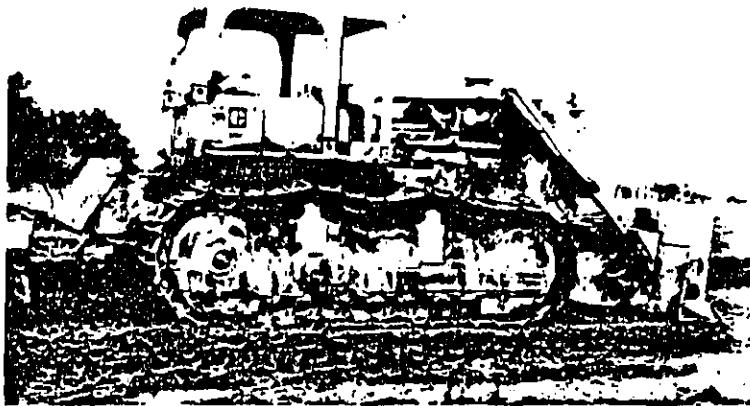


#31

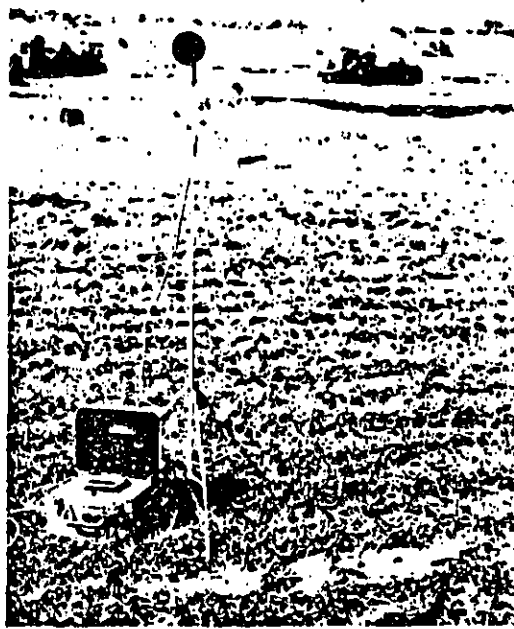


#32

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# 33

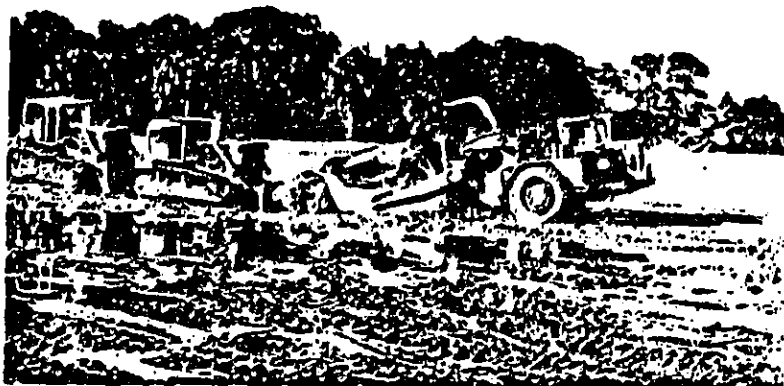


# 34

213



#35



#36

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