

U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 30-8339/81-01

Docket No. 030-08339

License No. 21-14973-01

Former Licensee: Michigan Chemical Corporation

Present Licensee: Velsicol Chemical Corporation  
500 N. Bankson Street  
St. Louis, MI

Facility Name: Velsicol Chemical Corporation

Inspection At: Velsicol Plant Site, St. Louis, MI

Inspection Conducted: April 20-24, 1981

Management Meeting: May 7, 1981

Inspectors: *M.C. Schumacher for*  
N. A. Nicholson

5/18/80

*M.J. Oestmann*  
M. J. Oestmann

5/18/81

Approved By: *M.C. Schumacher*  
M. C. Schumacher, Acting Chief  
Independent Measurements and  
Environmental Protection Section

5/18/81

*J.A. Paperiello*  
J. A. Paperiello, Chief  
Emergency Preparedness and Program  
Support Branch

5/21/81

Inspection Summary

Inspection on April 20-24, 1981, and Management Meeting on May 7, 1981  
(Report No. 30-8339/81-01)

Areas Inspected: Inspectors conducted confirmatory radiation surveys of Areas A, B-1, and B-2 of the plant site at St. Louis, Michigan, to verify measurements taken by two independent licensee contractors. Environmental samples on-site and control samples off-site were collected. This inspection involved 62 inspection-hours on-site by two inspectors.

Results: This NRC survey confirmed licensee contractors' measurements. Areas A, B-1, and B-2 are below the 20 microroentgens per hour standard

8106080 023

referenced in the licensee's Decontamination and Survey Plan, dated July 15, 1980. One location reading above this standard was found in Area C between the railroad tracks adjacent to the Area A southern boundary. The licensee will isolate the contaminated material prior to Area A decommissioning.

## DETAILS

### 1. Persons Contacted

- 2/3/ N. R. Netzel, Industrial Hygienist, Velsicol Chemical Corp.
  - 1/ W. Whitney, Site Manager, Velsicol Chemical Corp.
  - 1/ D. Robinson, Conestoga-Rovers & Associates, Consultants
  - 1/ R. G. Shepherd, Conestoga-Rovers & Associates
  - E. D. Picazo, Health Physicist, Dames and Moore
  - 1/ P. M. Moskowitz, Health Physicist, Dames & Moore
  - J. M. Hennigan, Michigan Department of Public Health
  - 3/ J. M. Rademacher, Velsicol Chemical Corporation, Vice President  
Environmental Health and Regulatory Affairs
  - 3/ D. Graham, Esq., Velsicol Chemical Corp., Deputy General Counsel
- 1/ Attended on-site exit meeting on April 24, 1981.  
2/ Telephone exit discussion on April 24 and May 1, 1981.  
3/ Attended meeting in NRC Region III Office on May 7, 1981

### 2. Site Description

This chemical processing facility has been divided into Areas A, B, and C as referenced in the licensee's Decontamination and Survey Plan, dated July 15, 1980. Phase I work involves decommissioning Area A and portions of Area B designated as B-1 and B-2. Phase I areas comprise approximately 920,000 square feet. The following is a description of each area:

- a. Area A (approximately 435,000 square feet): Allegedly, no radioactive material was handled, processed, stored, or transported into or across this area at any time. This area consists of the salt buildings complex, magnesium dolomite kiln, disposal pit, and numerous storage tanks. Currently, contractors are removing equipment and debris from buildings in preparation for decommissioning.
- b. Area B-1 (approximately 50,000 square feet): Uranium and thorium mill tailings may have been transported on roads through this area to Area C for processing. No processing or storage of radioactive material took place in this area which consists of the calcium chloride dome, building, and evaporation area. No one is currently working in this area.
- c. Area B-2 (approximately 435,000 square feet): As with B-1, no radioactive material was stored or processed except for the roads where the material was transported. Buildings in this area include numerous storage tanks, a truck garage (#534), the clubhouse (#515), and several abandoned buildings. The repair shop (#516) has been excluded from Area B-2 and has been transferred to Area C as discussed during the April 9, 1981, meeting between

representatives of Region III and Velsicol Chemical Corp. Two buildings in this area, the clubhouse (#515) and the truck garage (#534), are used by Michigan Chemical Corporation personnel.

The clubhouse is occupied by office workers during business hours; the garage is used as a repair shop and the area immediately north of the garage is a parking area for tractor-trailers not in use. Michigan Chemical Corporation personnel gain access to this area through a locked gate at the southern boundary of Area B-2.

- d. Area C: This includes all areas outside of Areas A and B. Uranium and thorium mill tailings were allegedly processed, handled, stored, and transported in these areas.

At the time of the inspection, several tanks and buildings identified on original maps were found to be non-existent. It appears that these buildings and tanks have been missing for several years. These are tanks T-101, T-102, T-859, T-418, T-216, T-127, T-401, T-404, and Buildings 517, and 518. Currently, no electricity is supplied to Areas A, B-1 and B-2.

3. Confirmatory Survey:

The licensee contracted two independent consultants, R. H. Galbraith, Certified Radiological Physicist, and Dames & Moore, to conduct radiation surveys of Areas A, B-1 and B-2 to verify that these areas--both open grid points and buildings--had not been inadvertently contaminated with uranium and thorium mill tailings. The licensee submitted the Galbraith data to the NRC on March 6, 1981, and the Dames & Moore data on April 9, 1981.

Confirmatory radiation surveys were made by Region III inspectors of Areas A, B-1, and B-2 and selected sections of Area C. The Galbraith grid system was used during this survey. Instruments used and corresponding calibration data are listed in Attachment 1. Direct reading and smear results are included on corresponding building and open grid diagrams designated as Attachment 2. The surveys yielded the following results:

- a. Direct surveys for alpha contamination were less than 100 dpm per 100 square centimeters.
- b. Smear surveys for removable alpha contamination were less than 10 dpm per 100 square centimeters.
- c. Direct surveys for beta-gamma contamination were less than 20 microrads per hour at one meter.
- d. Smear surveys for removable beta-gamma contamination were less than 100 dpm per 100 square centimeters.

The only exception to these results is the hot spot located in and between the railroad tracks east of the salt building complex, adjacent to the southern Area A boundary. This topic is discussed in Section 4 below.

Surface soil samples were taken in the B-2 area and the hot spot section. Soil was collected from the surface to a depth of approximately three to four inches for each of the samples. Control samples were collected one quarter mile southwest (upwind) and northeast (downwind) of the plant. Seven of the eight samples analyzed showed activity comparable to that in an Illinois background soil sample collected for comparison in Glen Ellyn, Illinois. The eighth sample, taken from the hot spot (Section 4) was quantified by Argonne National Laboratory as containing 3 pCi/g of  $^{226}\text{Ra}$  and less than 1 pCi/g of  $^{228}\text{Ra}$ .

A liquid sample taken from the disposal pit in northwest Area A showed  $^{226}\text{Ra}$  activity indistinguishable from that in background samples of tap water and snow collected in Glen Ellyn, Illinois.

The NRC survey results confirmed those reported by the licensee in March and April, 1981. During this survey, the inspectors were accompanied by representatives from Dames and Moore and the Michigan Department of Public Health, both of whom made simultaneous direct beta-gamma readings with NaI micro R instruments listed in Attachment 1. Results compared between all three parties were in general agreement. Smear surveys were also taken by Dames and Moore.

#### 4. Contaminated Section (Hot Spot)

The only area where elevated readings were noted was a hot spot in Area C in and between the railroad tracks adjacent to the Area A boundary, south of buildings 540, 501, and 502. Licensee consultants identified this hot spot prior to this inspection; the survey data was submitted to the NRC on March 6, 1981. NRC direct beta-gamma surveys indicated a hot spot reading 20-50 microrads per hour (including a background of about 8 microrads per hour). Complete survey details are shown in Attachment 2.

The inspectors expressed concern that contamination from the hot spot could possibly be spread by movement of people and machinery doing decommissioning work. The licensee representative agreed to positively isolate the involved area to prevent subsequent spread of contamination before decommissioning of Area A begins.

#### 5. Inspectors' Observations

On April 23, 1981, the inspectors noted the dismantling of the calcium chloride warehouse, about a 75 feet x 250 feet pre-fabricated building located in Area B, outside of B-1 and B-2, just east of the calcium chloride building. Empty, unused drums, piping, and brick were stored in this building at that time. The inspectors made a cursory survey

with a tissue equivalent ion chamber and observed total exposure rates, including background, of about 6-10 microrads per hour. However, the licensee had not performed a detailed survey of this warehouse, which was to be sold, and ultimately transferred off-site. The inspectors informed the licensee that no buildings outside the designated Phase I areas were to be removed without a thorough survey and specific NRC approval. At the close of the inspection, dismantling work had ceased and the licensee agreed to postpone any subsequent dismantling activities until further NRC approval is granted.

6. Exit Interviews

- a. The inspection results were discussed with licensee representatives on-site and by telephone (Paragraph 1) at the close of the inspection on April 24, 1981. The inspectors stated that their measurements in the specified areas were in general agreement with those of the licensee's contractors and were below the 20 microroentgens per hour level specified in the Decontamination and Survey Plan of July 15, 1980, except for the Area C hot spot discussed in Paragraph 4. The licensee's representative indicated that the contaminated area would be removed before the start of work in Area A in order to prevent possible spread of contamination. The licensee's representative also agreed not to dismantle any building without NRC approval.
- b. On May 1, 1981, after completion of the counting of soil samples, Region III notified licensee representative, Mr. N. Netzel, that work in the specified area could begin providing the hot spot was first removed as discussed in the exit interview of April 24, 1981.
- c. On May 7, 1981, licensee representative met with NRC representatives (Paragraph 1) in the Region III office regarding measures to isolate the hot spot prior to beginning work in Area A. It was agreed that positive isolation of the hot spot would be acceptable and probably preferable to removal. The licensee agreed to cover the hot spot with a plastic liner topped by steel plates or wooden planks prior to Area A decommissioning.

Attachments: Attachments 1, 2 and 3

ATTACHMENT 1

Confirmatory Measurements--Instruments Used

1. NRC

Health Physics Instruments, Inc., Tissue Equivalent Survey Meter, Model 1010, calibrated April 13, 1981.

Eberline Instrument Corporation, Portable Alpha Counter, Model PAC-1 SAGA, Serial 1941, NRC Tag #000715, calibrated February 21, 1981 with AC-3B ZnS probe.

Eberline Instrument Corporation, Portable Katemeter Scaler (Rascal), Model PRS-1, Serial 414, with ZnS probe and Model SPA-3 NaI (Tl) probe, calibrated April 14, 1981.

Canberra Low Level Alpha/Beta Counting System, Model 2201 for counting smears.

Nuclear Data Computer Based Multichannel Analyzer with Germanium detector, Model 6620 for counting soil and water samples.

2. Michigan Department of Public Health

Eberline Portable Micro R Meter, Model PRM-7, S/N 213.

3. Dames & Moore

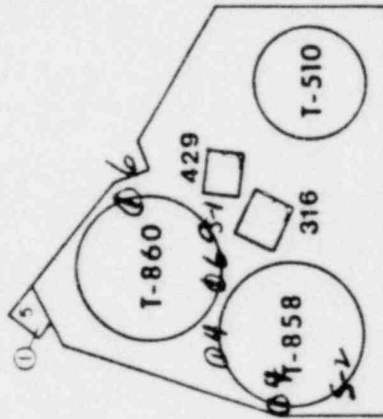
Ludlum Model 19 Micro R Meter, Serial 14514, calibrated March 30, 1981, by Applied Health Physics.

ATTACHMENT 2

NRC's Survey Results using Galbraith's Modified Map and Grid of Areas A,  
B-1 and B-2.



AREA A



TRANSFERABLE  
CONTAMINATION

SHEARS

S-1 INSIDE TANK  
860 PORTABLE

S-2 INSIDE NW  
PORTABLE OF  
TANK 858

α dpm/100cm<sup>2</sup> Below 100cm

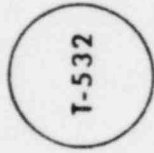
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0

EXPLANATION  
○ HPI MICRO RADING AT 1 METER  
S-1 SHEAR SAMPLE

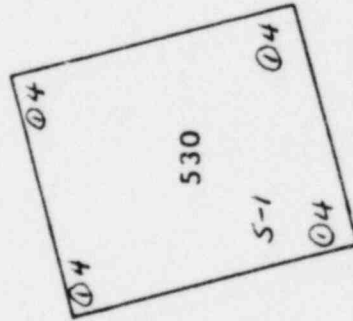
CONTAINMENT AREA  
NORTH OF STONE ELEVATOR AND WEST OF  
BOILER HOUSE INCLUDING TANKS T-118  
T-510, T-858 AND T-860  
(COORDINATE 11.9)

AREA 6



WELL SHACK

SWITCH HOUSE



TRANSFERABLE CONTAMINATION

SMEAR

S-1 ENTRANCE TO SOUTH GARAGE DOOR 0.4

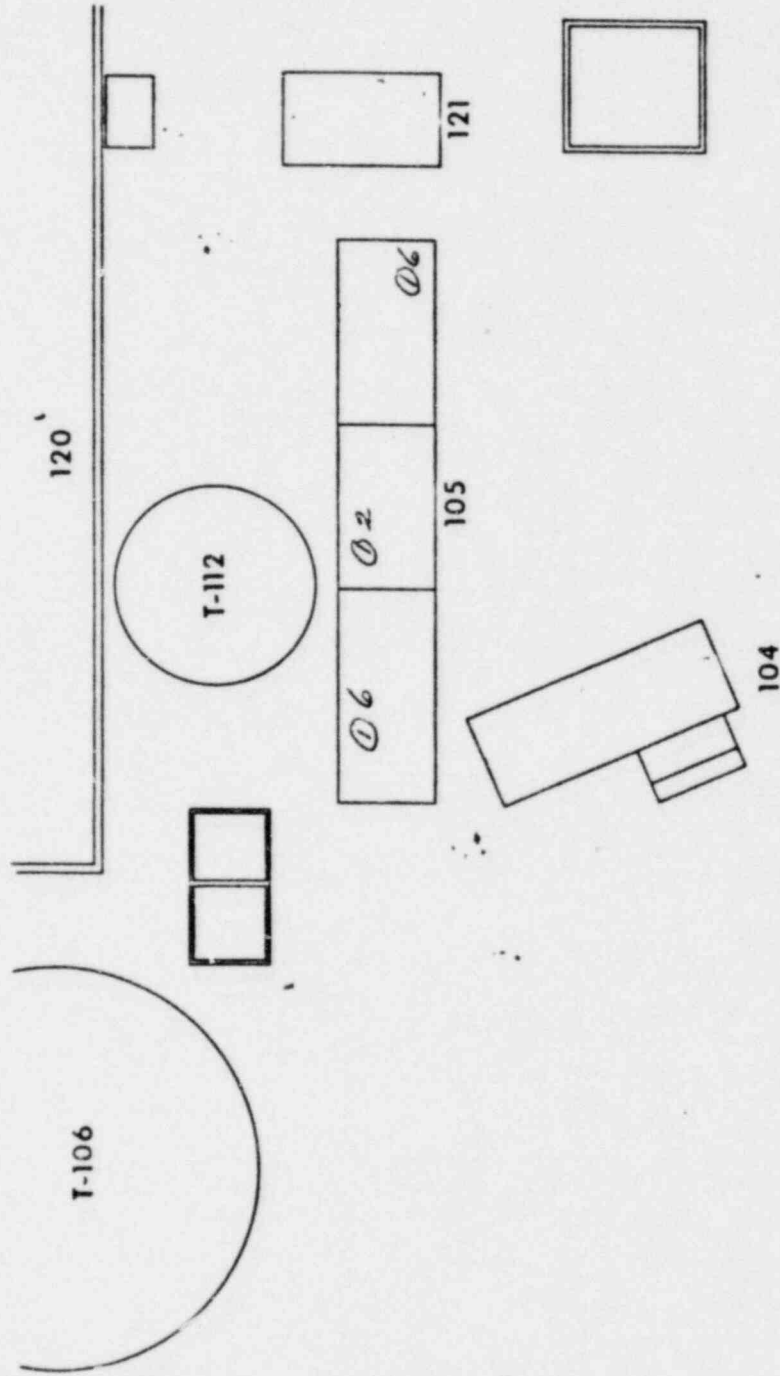
adm/100m<sup>2</sup> 2.8 ppm/100m<sup>2</sup>

1.8

EXPLANATION  
① HPI MICROREAD/HR AT 1 METER  
S-1 SMEAR SAMPLE

AREA NORTH OF BULLFRENCH HOUSE IPH W/DAVE  
NO. 13 WELL, T-532 AND BUILDING 530  
COORDINATES

AREA A

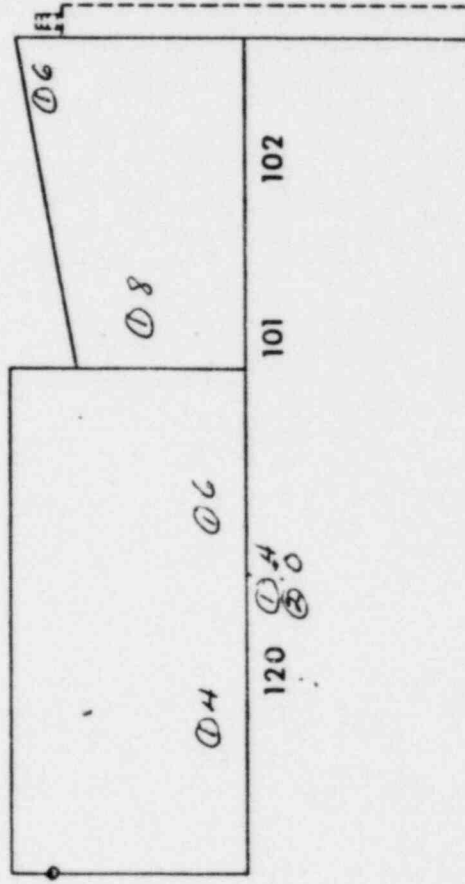


EXPLANATION  
○ INPI MICROBIOLOGIC AT 1 METER

AREA NORTH OF PAN HOUSE 101  
INCLUDING BUILDINGS 104, 105 AND 121  
(COORDINATES)

101-1011-10  
101-1011-10  
101-1011-10

AREA A



EXPLANATION  
 ① HPI - HIGH RADIATION AT 1 METER  
 ② EBERLING RASCAL ALPHA PENE CPN/100 CM<sup>2</sup>

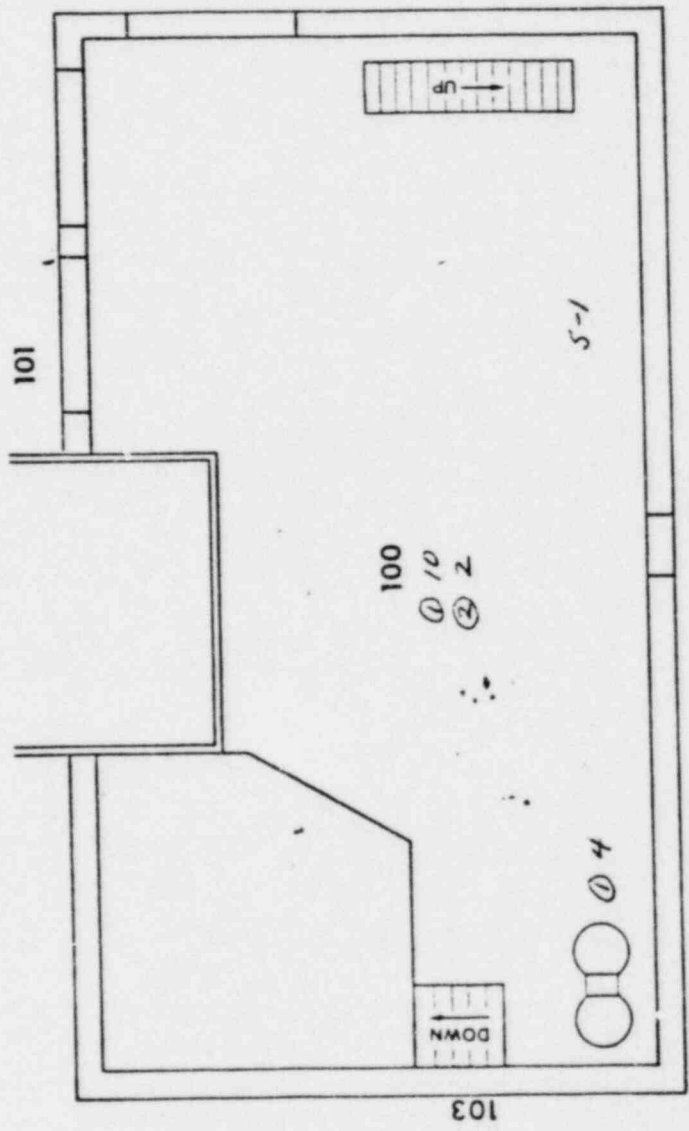
EXPLANATION

F. W. W. & J. W.

U.S. ENVIRONMENTAL PROTECTION AGENCY  
 OFFICE OF RADIATION PHYSICS AND CHEMISTRY  
 FEDERAL BUREAU OF INVESTIGATION

AREA EAST OF BUILDINGS 120 101 AND  
 102 (SALT WATER HOUSE)  
 (COORDINATE)

AREA A



TRANSFERABLE  
CONTAMINATION

SMEC

S-1 1<sup>st</sup> FLOOR  
SUCORNER  
EAST CF  
CONVEYER  
BELT

$\alpha$  dpm/100dm<sup>2</sup>  $\beta$  dpm/100dm<sup>2</sup>

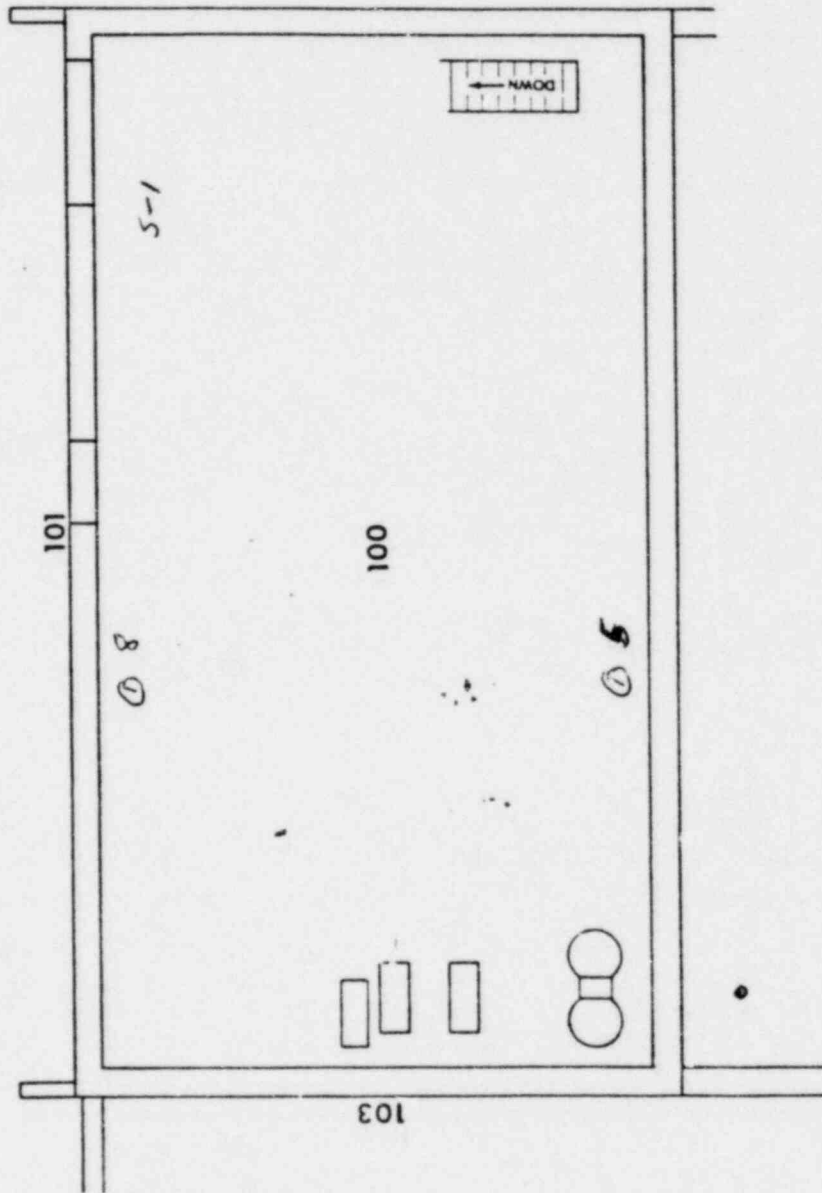
0 0

EXPLANATION

- ① MPI HIGH RADIATION AT 1 METER
- ② EBERLINE RASCAL ALPHA PROBE 4PM/100DM<sup>2</sup>
- S-1 SMEC SAMPLE

SALT REFINERY BUILDING No. 1  
FIRST FLOOR  
COORDINATES

AREA A



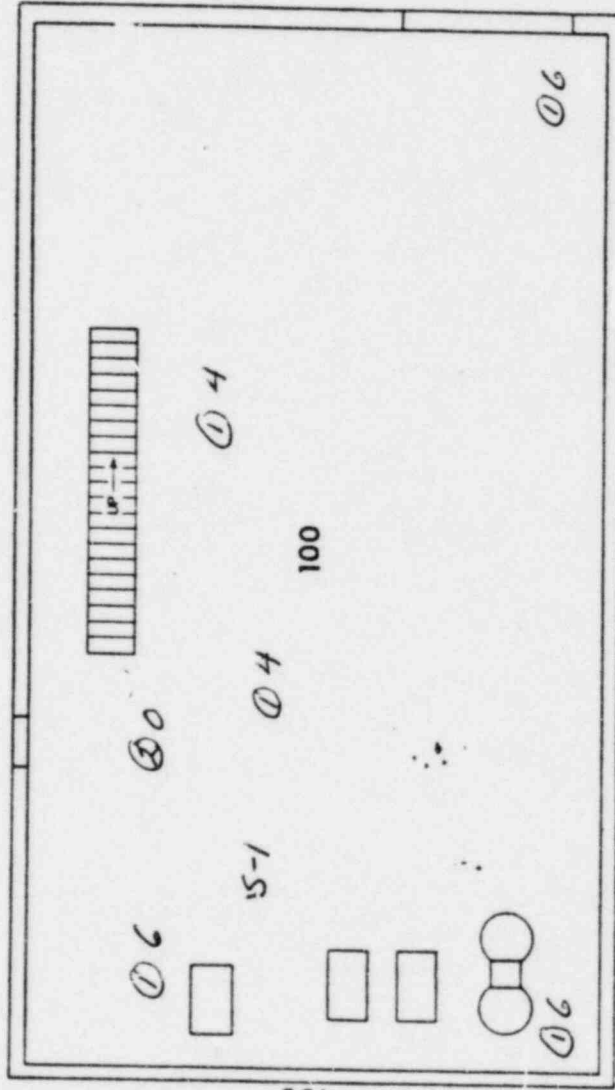
TRANSFERABLE  
 CONTAINMENT  
 SHEAR PIPE ON ADMIN. FLOOR. 2' Diameter  
 S-1 EAST WALL 0 0 CM.

EXPLANATION  
 ① HPI - MICROCAD/NIR AT 1METER  
 S-1 SHEAR SAMPLE

BALT REFINERY BUILDING No. 1  
 SECOND FLOOR  
 (COORDINATES)

DATE: 10/11/88  
 DRAWN BY: J. L. B. / M.  
 CHECKED BY: J. L. B. / M.

AREA A



SHEAR  
 5-1 HCS FLOW 0

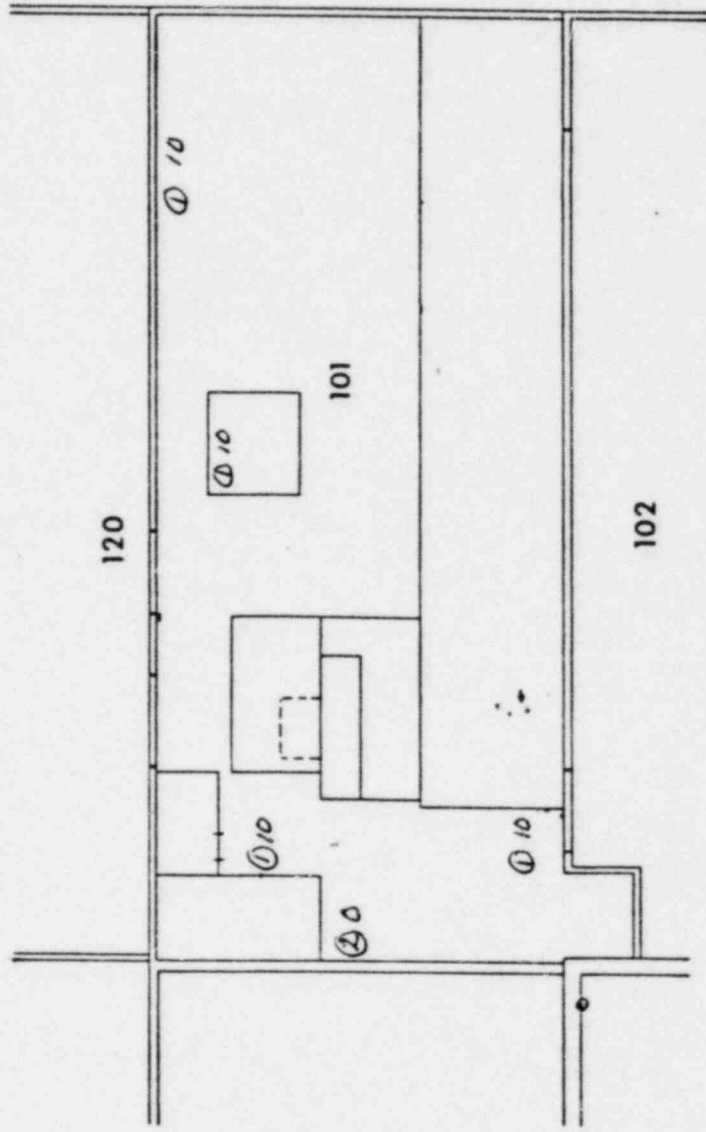
TRANSFERABLE  
 CONTAMINATION  
 ALPHA/100 MIC<sup>2</sup> Sedm. 100  
 cm. 0.6

EXPLANATION  
 ① HPI MICRONAD/NR AT 1 METER  
 ② EBELINE BASCOL ALPHA PRIDE CMH100CM<sup>2</sup>  
 5-1 SHEAR

SALT REFINERY BUILDING NO 100  
 FOURTH FLOOR  
 COORDINATES

DATE: 11/11/78  
 BY: [illegible]  
 TITLE: [illegible]

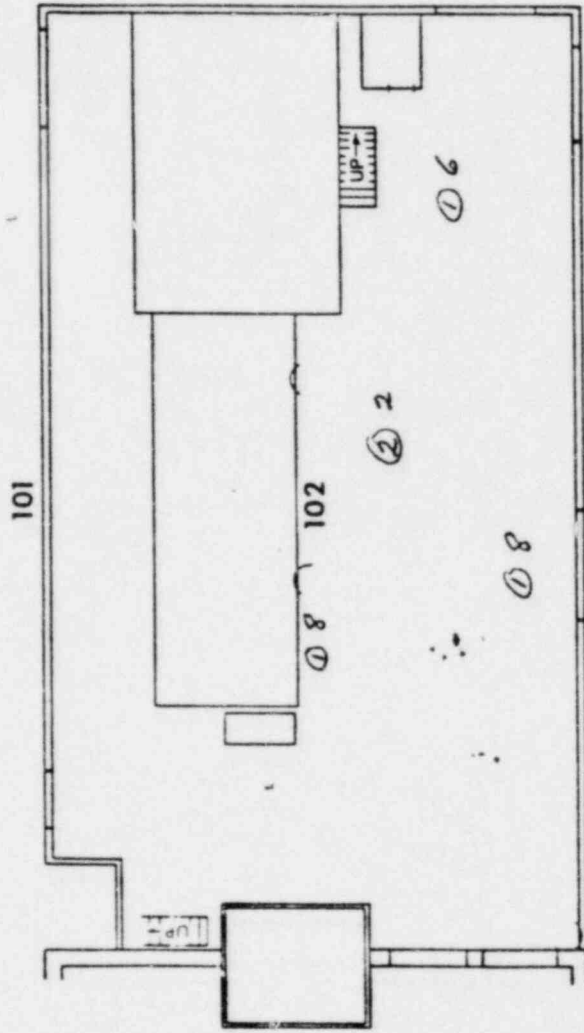
AREA A



EXPLANATION  
① MPI MICRO RADING AT 1 METER  
② EBELINE RACCAL ALPHA PROBE CPM/1000Hr



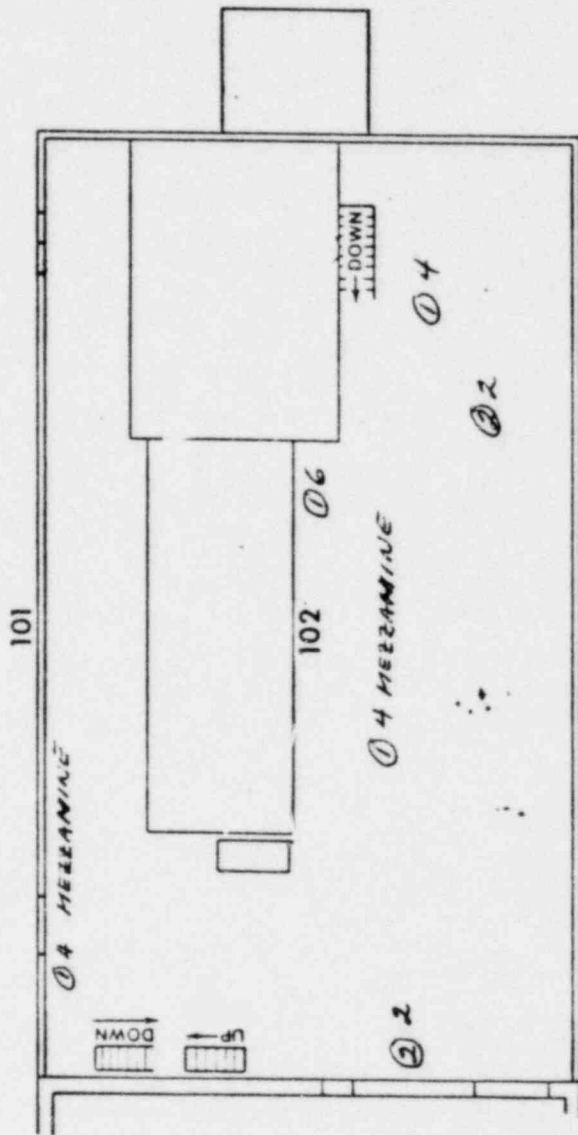
AREA A



EXPLANATION  
① NPE MICROCAD/14R AT 1 METER  
② EDGE LINE ALPHA PROSE 0PHI/100 d.m.

SALT WAREHOUSE No. 102 AND SALT ...  
(FIRST FLOOR OF 102)  
(COORDINATE S.)

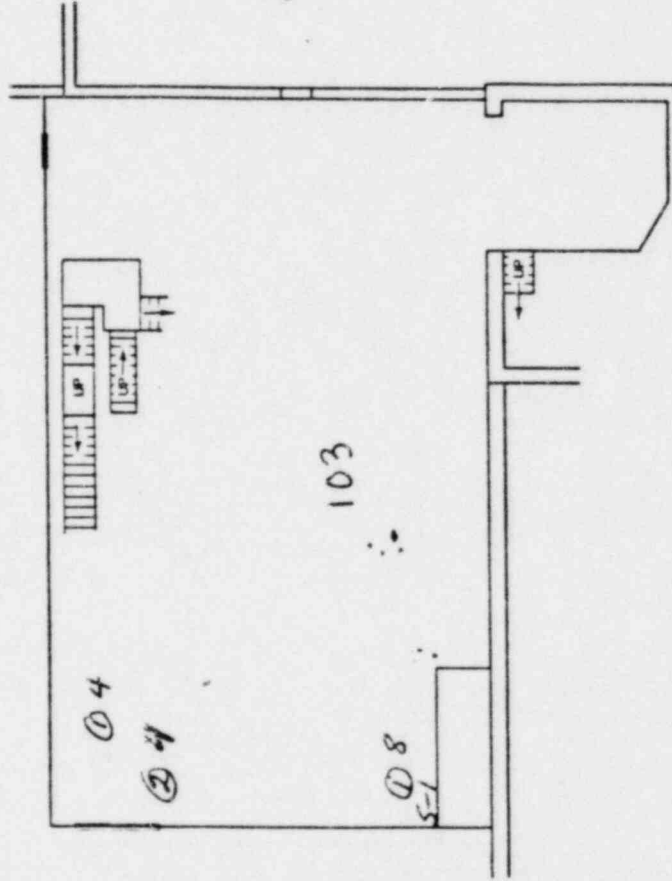
ALFA B



EXPLANATION  
 ① HPI - MICROPROBE AT 1 METER  
 ② EBERLINE RASCAL ALPHA PROBE 4PH/1008M. 2

○ SALT WAREHOUSE No. 102  
 SECOND FLOOR PLAN  
 TRUCK LOADING EQUIPMENT ROOM  
 (COORDINATES)

AREA A



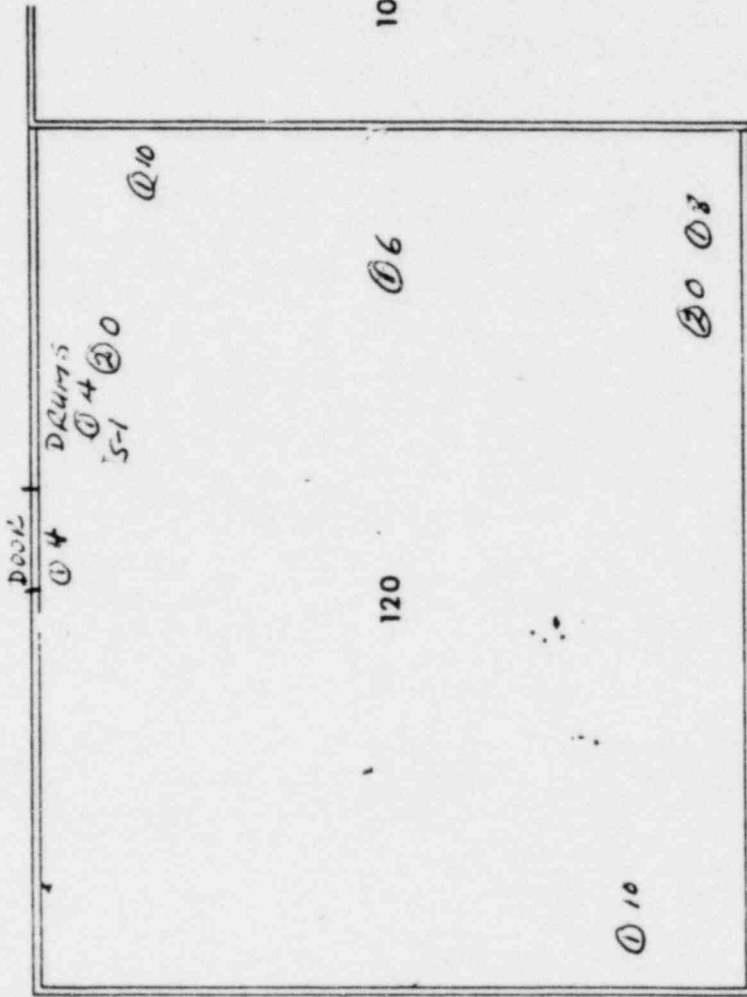
TRANSFERABLE  
 CONTAMINATION  
 $\alpha$ cpm/100cm<sup>2</sup>  $\beta$ cpm/100cm<sup>2</sup>

SHEAR  
 5-1 SW CORNER  
 PILOT  
 OPERATED  
 VALVE

0.7      0.6

EXPLANATION  
 ① API MICRORADINE AT 1 METRIC  
 ② GHERLINE ROSCAL ALPHA PROBE cpm/100cm<sup>2</sup>  
 ③ SHEAR 5-1 SHEAR SAMPLE

AREA A



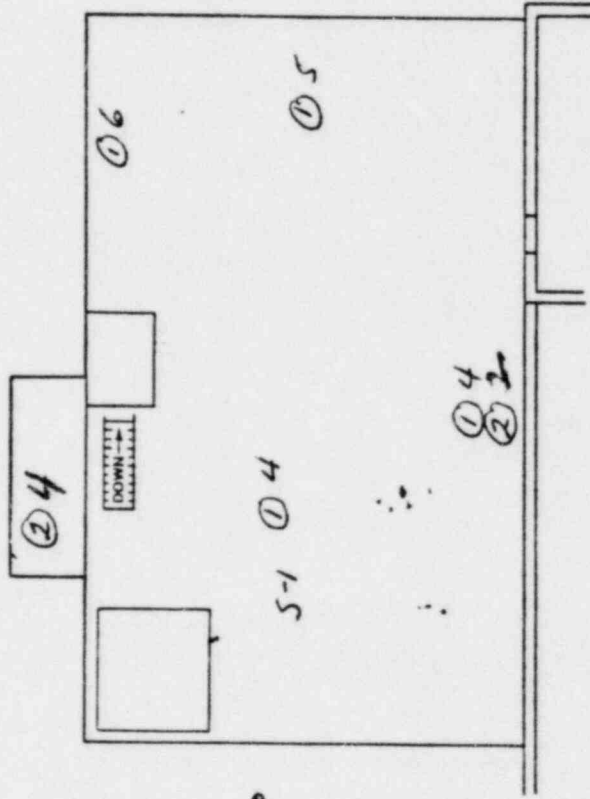
TRANSFERABLE  
CONTAMINATION  
α dpm/100cm<sup>2</sup> β dpm/100cm<sup>2</sup>  
0

SHEAR  
5-1 DRUMS  
0

EXPLANATION  
① NPI MICRO RAD/HR AT 1 METER  
② EBELINE BASICAL ALPHA PROBE CPN/100CM<sup>2</sup>  
5-1 SHEAR SAMPLE

SALT WARE HOUSE No. 170  
(COORDINATES)

AREA A



TRANSFERABLE  
CONTAMINATION

$\alpha$  dpm/100cm<sup>2</sup>  $\beta$  dpm/100cm<sup>2</sup>

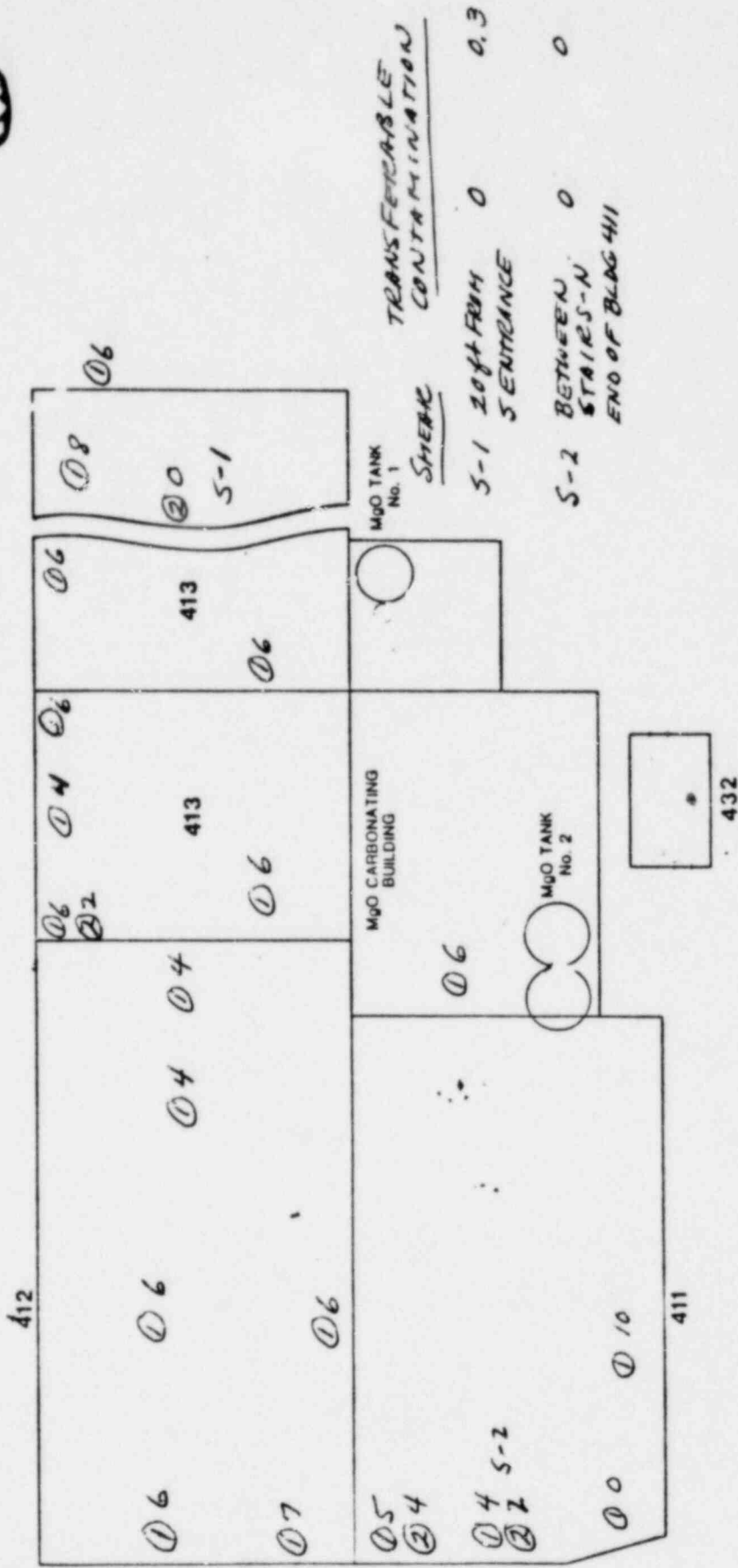
0.6

SHEAR

S-1 2" TANK  
FROM WEST  
WALL  
INTERIOR OF  
SHEAR OF  
SALT DISTILLATION  
COLUMN

EXPLANATION  
 ① HPI - MICRODRIER AT 1 METER  
 ② EBELINE RASCAL ALPHA PROBE 4pm/100cm<sup>2</sup>  
 S-1 SHEAR SAMPLE

AREA A

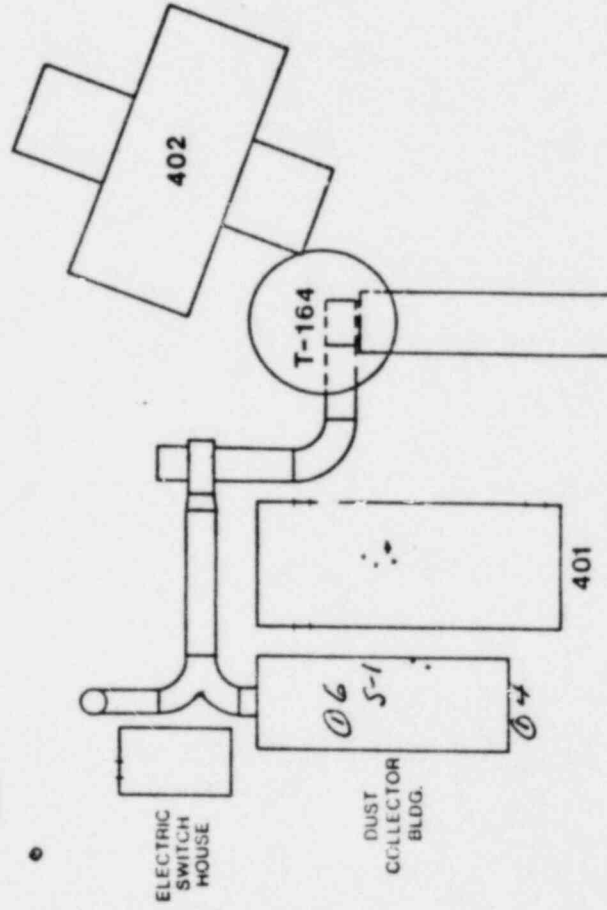
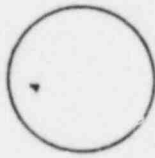


EXPLANATION  
 (1) HPI MICRORADIUM AT 1 METER  
 (2) EBELINE RASAL ALPHA PROBE 0.1M/100CM 2  
 ... SHEAR S-1, S-2

MgO BUILDINGS 411, 412, 413, AND 411 AND  
 ELECTRICAL SWITCH HOUSE 432  
 (COORDINATES)

TRANSFERABLE  
 CONTAMINATION  
 SHEAR  
 S-1 20ft FROM 0 0.3  
 S-2 BETWEEN 0  
 STAIRS-N  
 END OF BLDG 411

AREA A



TRANSFERABLE CONTAMINATION

SHEAR

S-1 DUST COLLECTOR

402

T-164

401

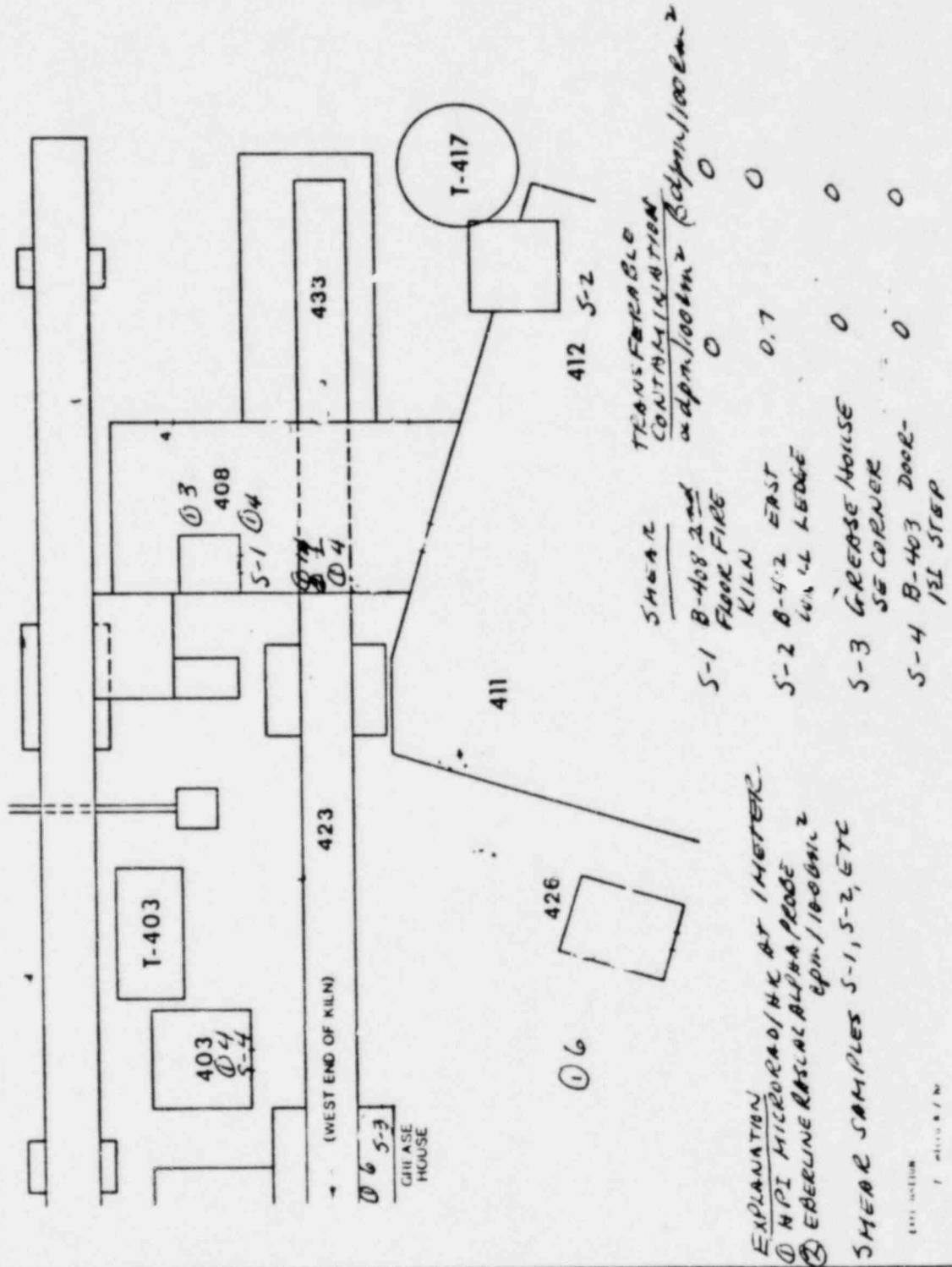
S-1

DUST COLLECTOR BLDG.

EXPLANATION  
① NPI MICRORADINE AT 1 METER  
S-1 SHEAR SAMPLE

AREA AT DOLOMITE DUST COLLECTOR  
STONE BIN AND CARB BLDG. BUILDING 401 AREA  
STONE ELVATOR No 402  
(COORDINATE)

AREA A

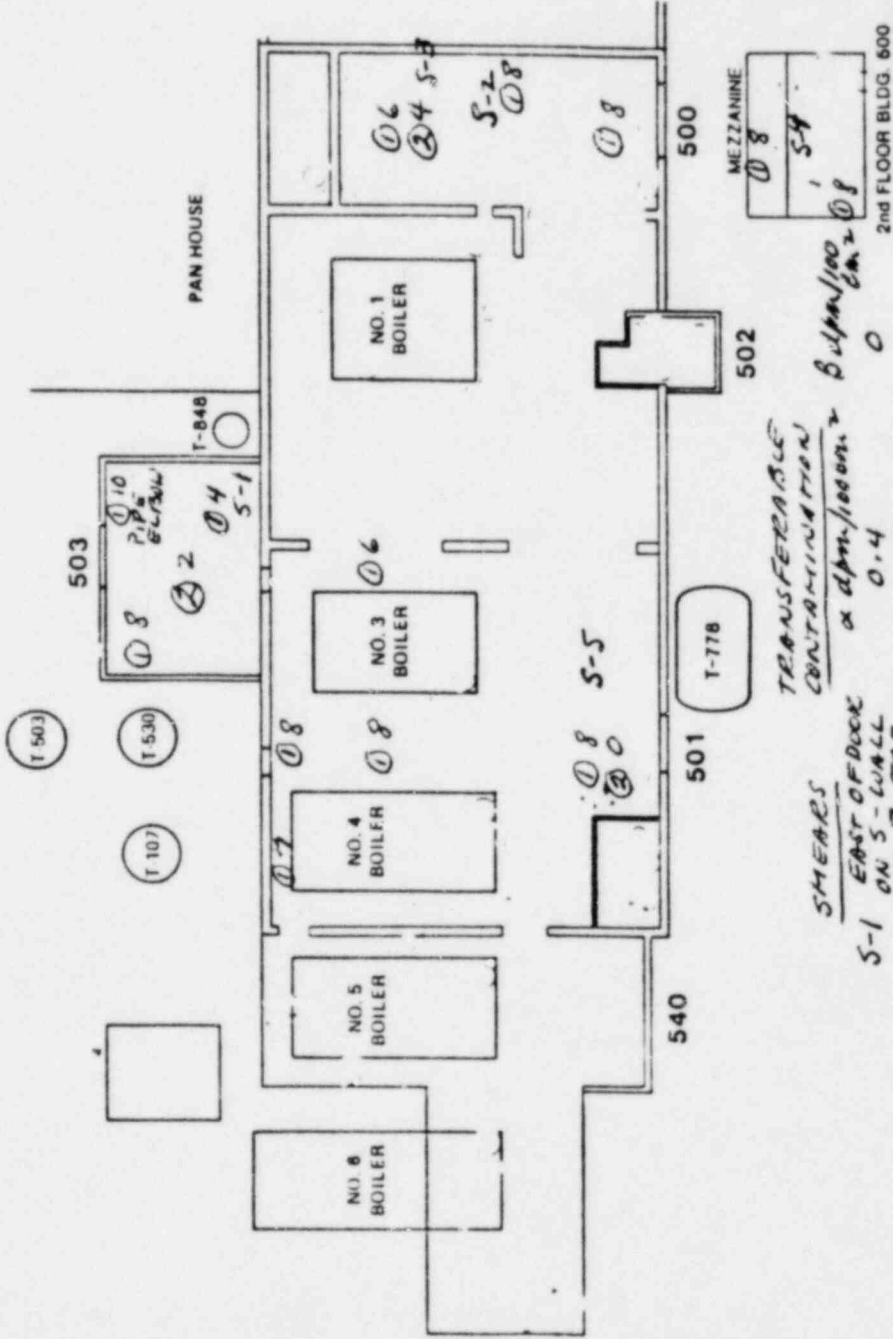


TWO KILNS AND EAST KILN AREA  
 (COORDINATES)





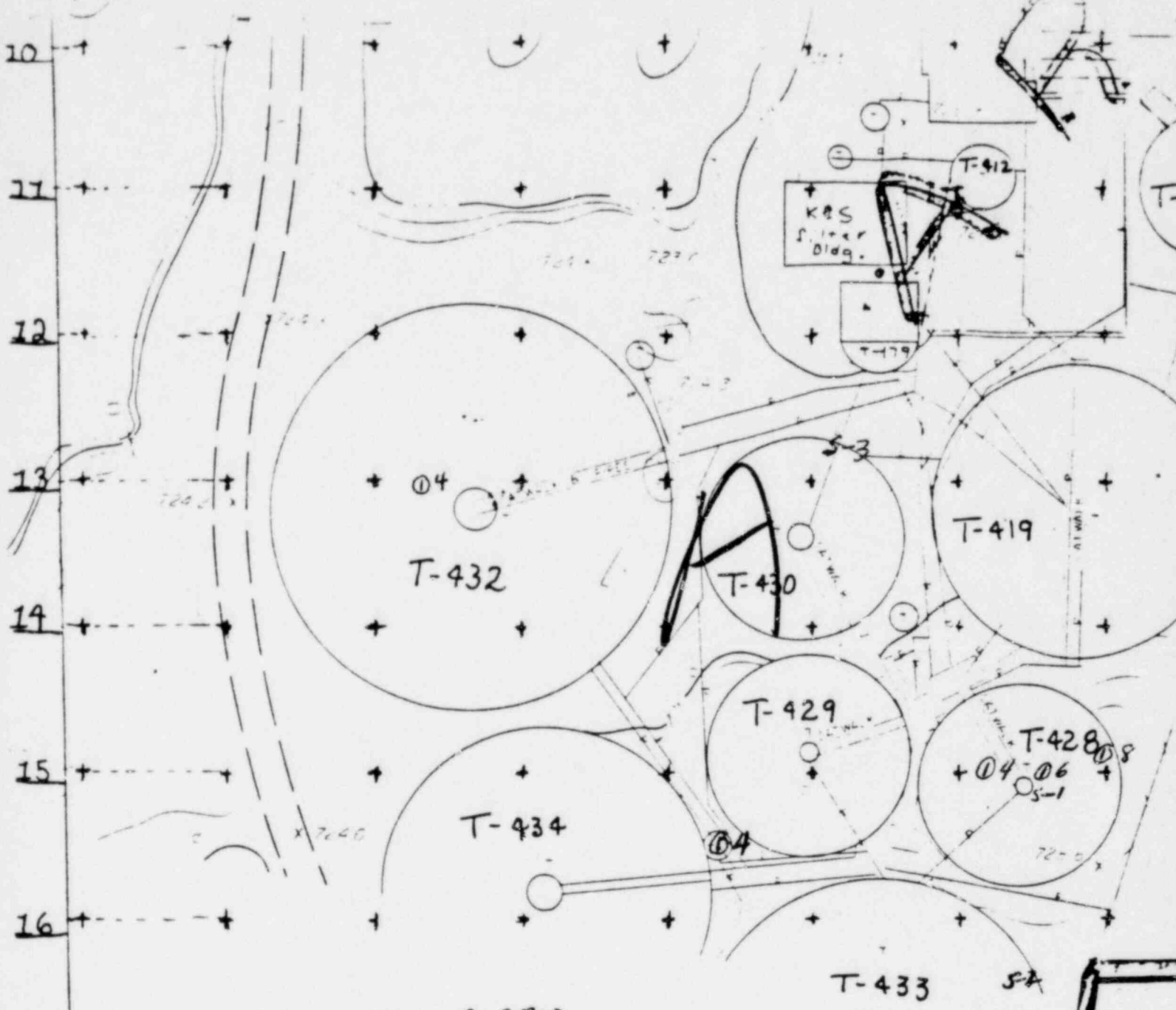
AREA A



EXPLANATION  
 ① NPI MICRORAD/HC AT 1 METER  
 ② EDRLIN ALPHA PROBE CPN/100 CM.<sup>2</sup>  
 SHEAR SAMPLES S-1, S-2

SHEARS	TRANSFERABLE CONTAMINATION	EXPLANATION
S-1 EAST OF DOOR ON S-WALL OF B-503	0.4	0
S-2 EAST SIDE-FLOOR OF B-500	0.4	0
S-3 STAIRS ALONG EAST WALL - B 500	0	0
S-4 MEZZANINE FLOOR	0.4	0
S-5 B-501 SOUTH OF BOILER 3	0	0

BOILER HOUSE BUILDINGS 500, 501, 502, 503 504  
 AND TANKS T-107, 503, 530, 714 AND 848  
 (COORDINATES)



MODIFIED GALBRAITH MAP GRID

EXPLANATION  
 ⊕ LOCATION OF SURVEY POINTS  
 ⊙ HPE MARKER/NE SHEAR

TRANSFERRED CONTAMINATION  
 $\alpha$  dpm/100cm<sup>2</sup>  $\beta$  dpm/100cm<sup>2</sup>

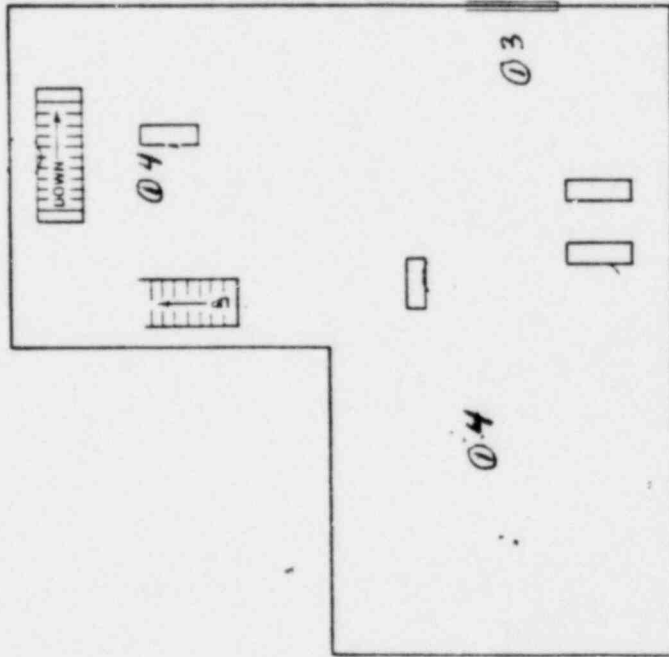
18	TANK T-428 S-1	CENTER SALT COLLECTOR HQD SPARGER	0.4	0				
	TANK T-429 S-2	TOP EAST SIDE OFF OF CATWALK	0	0				
	TANK T-430 S-3	NORTH DOOR EAST OF DNE	0	0.9				

JUNE 1974 DATE OF MAPPING JUNE 1975 FEBRUARY 1980

LED BY PHOTOGRAMMETRIC METHODS

BY D E F G H I J K

AREA B-1

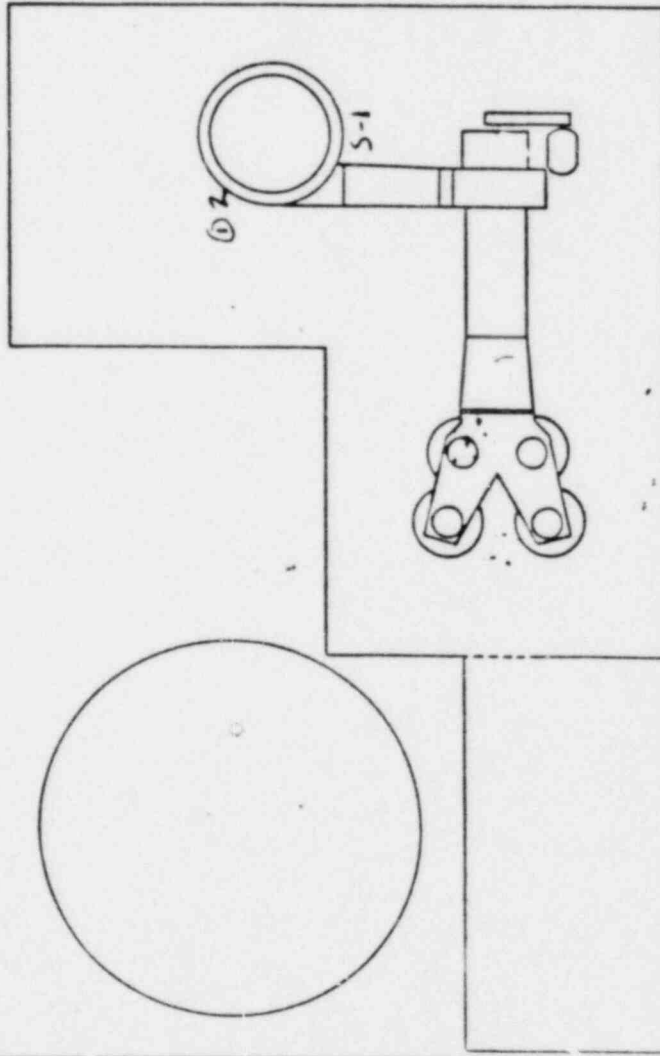


EXPLANATION  
① MPI 4 MICRORAD/HR AT 1 METER

EXPLANATION  
/ MICRO R / HR  
① MPI 4 MICRO RAD/HR AT 1 METER

CALCIUM CHLORIDE  
SECOND FLOOR  
(COORDINATES)

AREA B-1



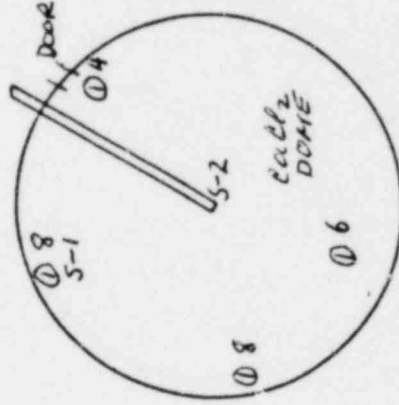
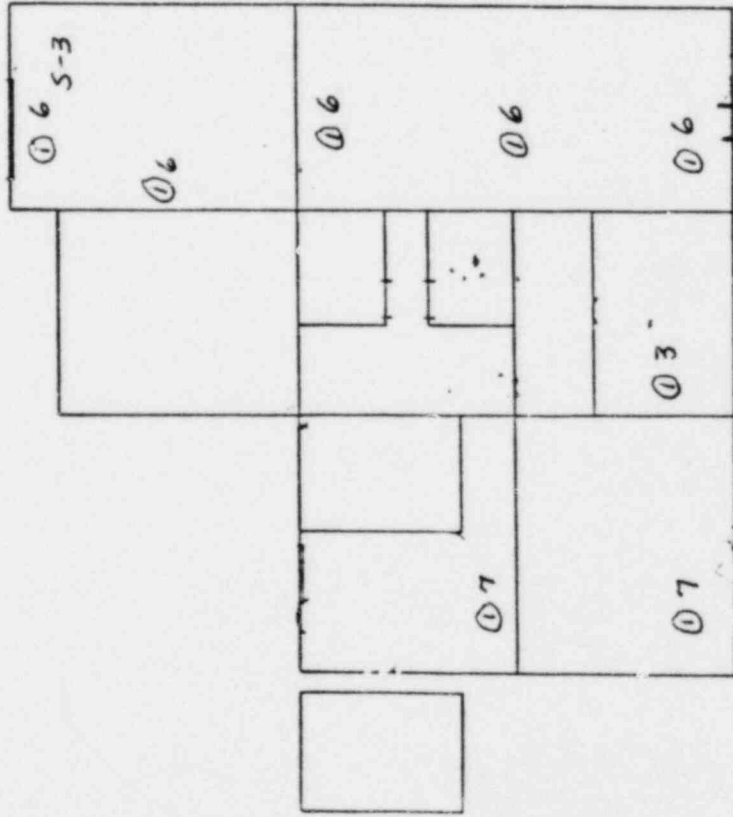
TRANSFERABLE  
 CONTAMINATION  
 α 2ppm/100cm<sup>2</sup> β 2ppm/100cm<sup>2</sup>  
 S-1 CaCl<sub>2</sub> RAMP-ELBOW OF  
 HURPER 0.4 0.6

EXPLANATION  
 0 HPI 2 MICRORAD/HK AT 1 METER  
 S-1 SHEAR SAMPLE S-1

EXPLANATION  
 1 MICRORAD/HK  
 S-1 SHEAR SAMPLE

CALCIUM CHLORIDE MOUF  
 (COORDINATES)

AREA B-1



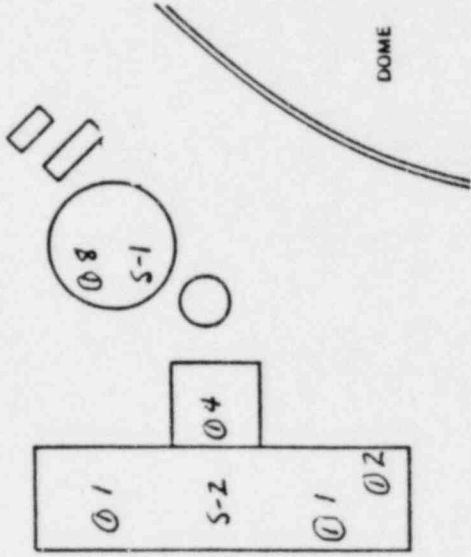
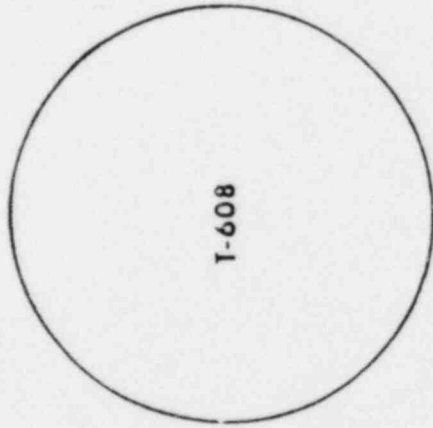
TRANSFERABLE  
CONTAMINATION  
α dipyr/100cm<sup>2</sup> - 8 dipyr/100  
cm<sup>2</sup>

SHEAR	CaCl <sub>2</sub> DOME - N CENTER	0.7	0.9
S-1	CaCl <sub>2</sub> DOME - CENTER - BASE OF SCAFFOLD	0.4	0
S-2	CaCl <sub>2</sub> BLDG. - FIRST FLOOR	0	0

EXPLANATION  
0 HPI 7 MICRORADIMR AT THESE  
S-1, S-2 SHEAR SAMPLES

CALCIUM CHLORIDE FIRST FLOOR  
INCLUDING DOME - SHIFTLIGHTS  
(COORDINATES)

AREA B-1



TRANSFERABLE CONTAMINATION  $\frac{\alpha \text{ dpm}/100 \text{ cm}^2}{\beta \text{ dpm}/100 \text{ cm}^2}$  1.5

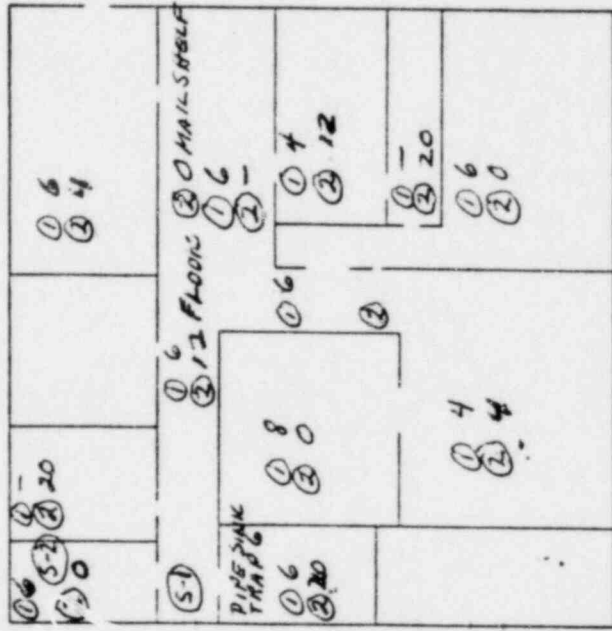
SMEAR  
S-1 HOPPER NORTH SIDE BUILDING - LOWER PART OF HOPPER 0

S-2 OBLONG TANK - SOUTH SIDE 0.4

EXPLANATION  
① HPI-4 MICROCARD/HR AT 1 METER  
S-1, S-2 SMEAR SAMPLES

CALCIUM CHLORIDE CONTAINMENT AREAS  
NORTH OF THE HOPPER  
(COORDINATES)

AKEH B-2



SHEARS LOCATION

- 5-1 FLOOR - NORTH CENTRAL DOOR 0.4 0.3
- 5-2 KITCHEN PIPES/TEARS - OUTSIDE 0.0 0.0

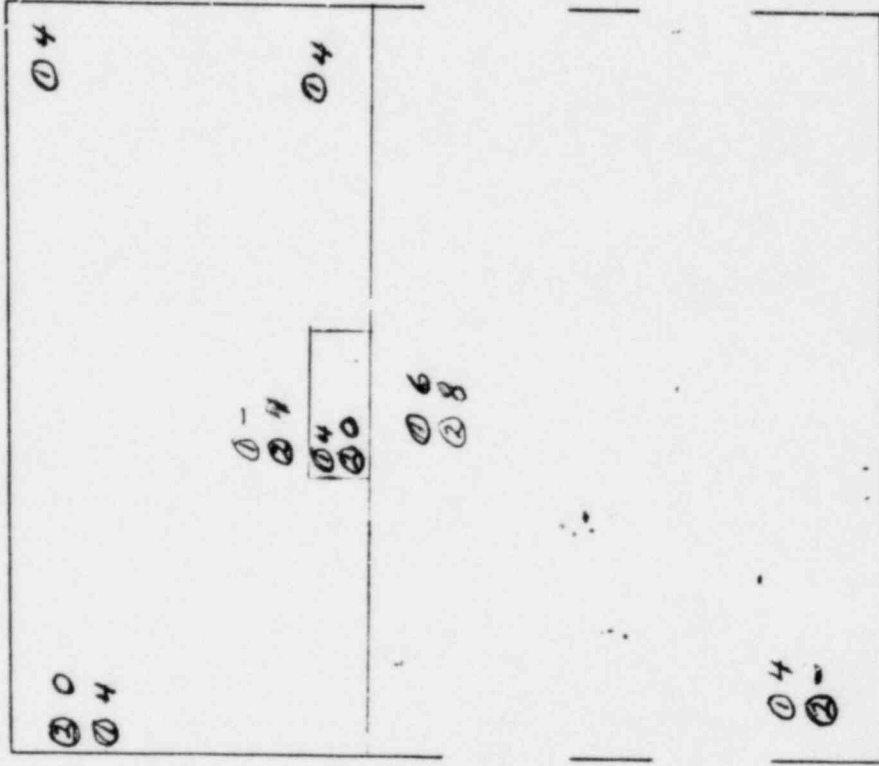
TRANSFERABLE  
CONTAMINATION  
2.4 0.4 0.3

- EXPLANATION
- ① NPI 7 MICRO RAIN/HR at 1 METER
  - ② EBEE-ALPHA PROX 0 CPN/1000ML 2
  - ③ SHEAR 5-1, 5-2

CONESTOGA RIVERS  
DESIGNATION A-III

CLUB HOUSE  
COORDINATES 43 D-E

AREA B-2



EXPLANATION  
 ① HPI 7 MICRO RAD/HR AT 1 METER  
 ② EDER, ALPHA PROBE 0 cpm/100cm<sup>2</sup>

UNRESTORED ROVERS  
 DESIGNATION A107

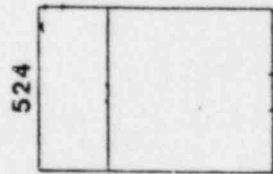
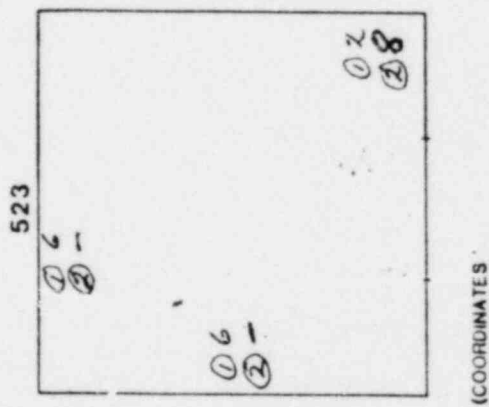
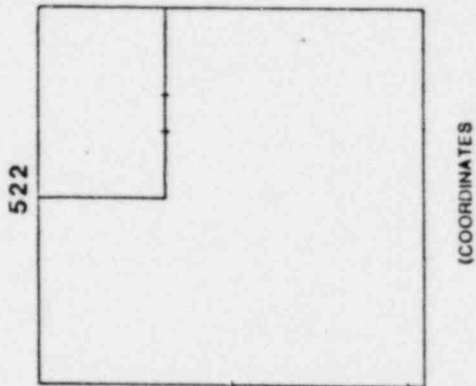
TRUCK GARAGE BUILDING No. 534  
 COORDINATE 43 GA

EXPLANATION

1 11-10-57  
 2 11-10-57



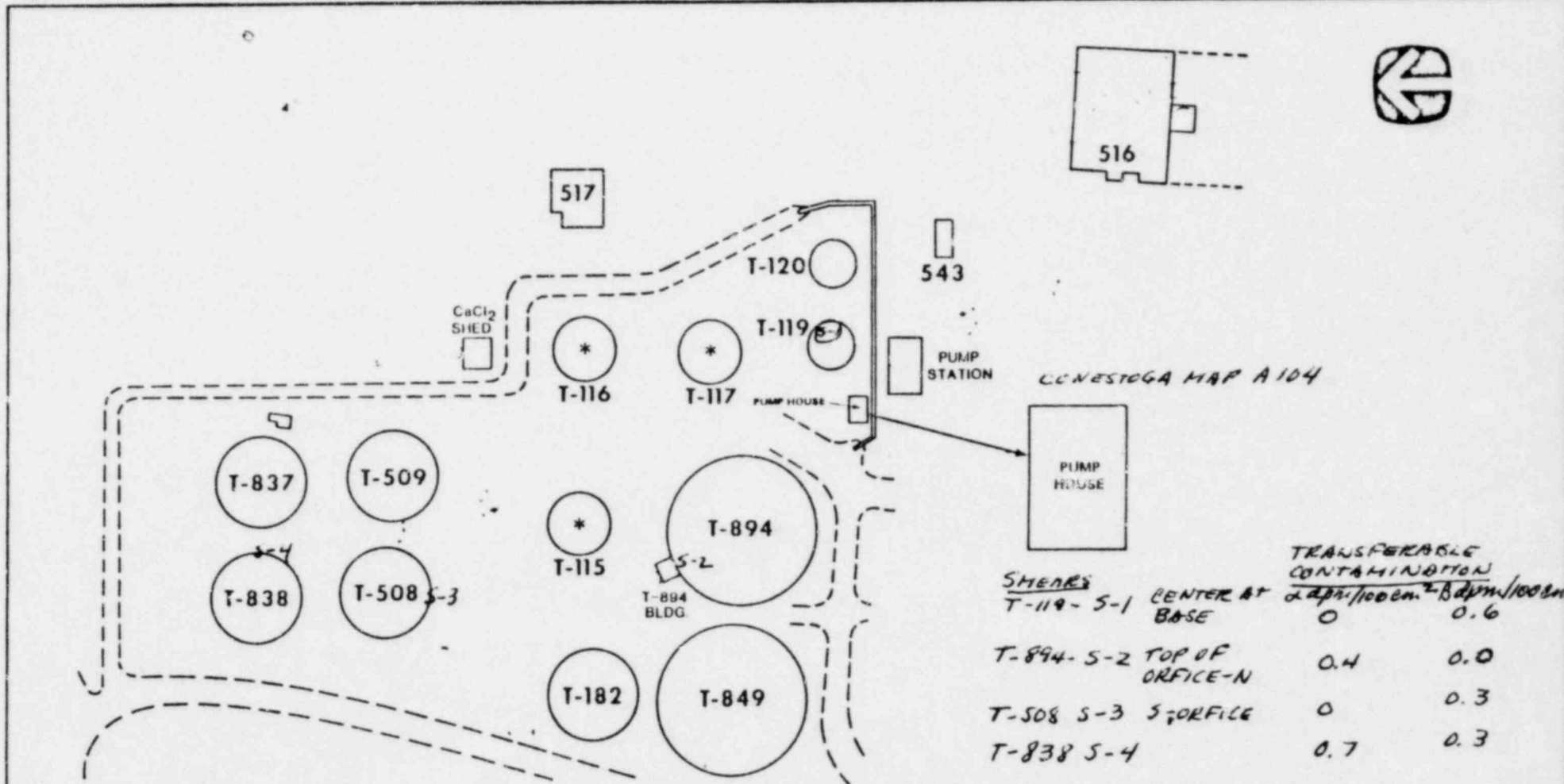
AREA B-2



EXPLANATION  
 ① HPI-6 MICRO RADIUM AT 1 METER  
 ② EDER ALPHA PROBE 0.5 CM / 100 CM

LYNESTOGA ROVERS  
 DESIGNATION A108 A109 A110  
 BUILDINGS 522, 523, AND 524  
 BLDG 523-41C

AREA B-2



SHEAR'S		TRANSFERABLE CONTAMINATION	
	CENTER AT	$\frac{\mu\text{Ci}/100\text{cm}^2}{\text{hr}}$	$\frac{\text{Bq}/\text{cm}^2}{100\text{cm}^2}$
T-119-S-1	BASE	0	0.6
T-894-S-2	TOP OF ORFICE-N	0.4	0.0
T-508 S-3	S-ORFICE	0	0.3
T-838 S-4		0.7	0.3

EXPLANATION  
 ① MPI T MICRORAD/HR AT 1 METER  
 ② EBER. ALPHA PROBG 0CPM/100cm<sup>2</sup>

CALCIUM CHLORIDE TANK FARM AND BUILDINGS 517, 543.

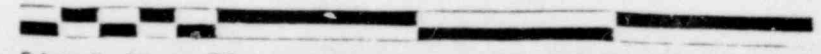
EXPLANATION  
 T Micro Rad/hr  
 \* \* \* \* \*  
 \* \* \* \* \*

# MODIFIED GALBRAITH MAP + GRID

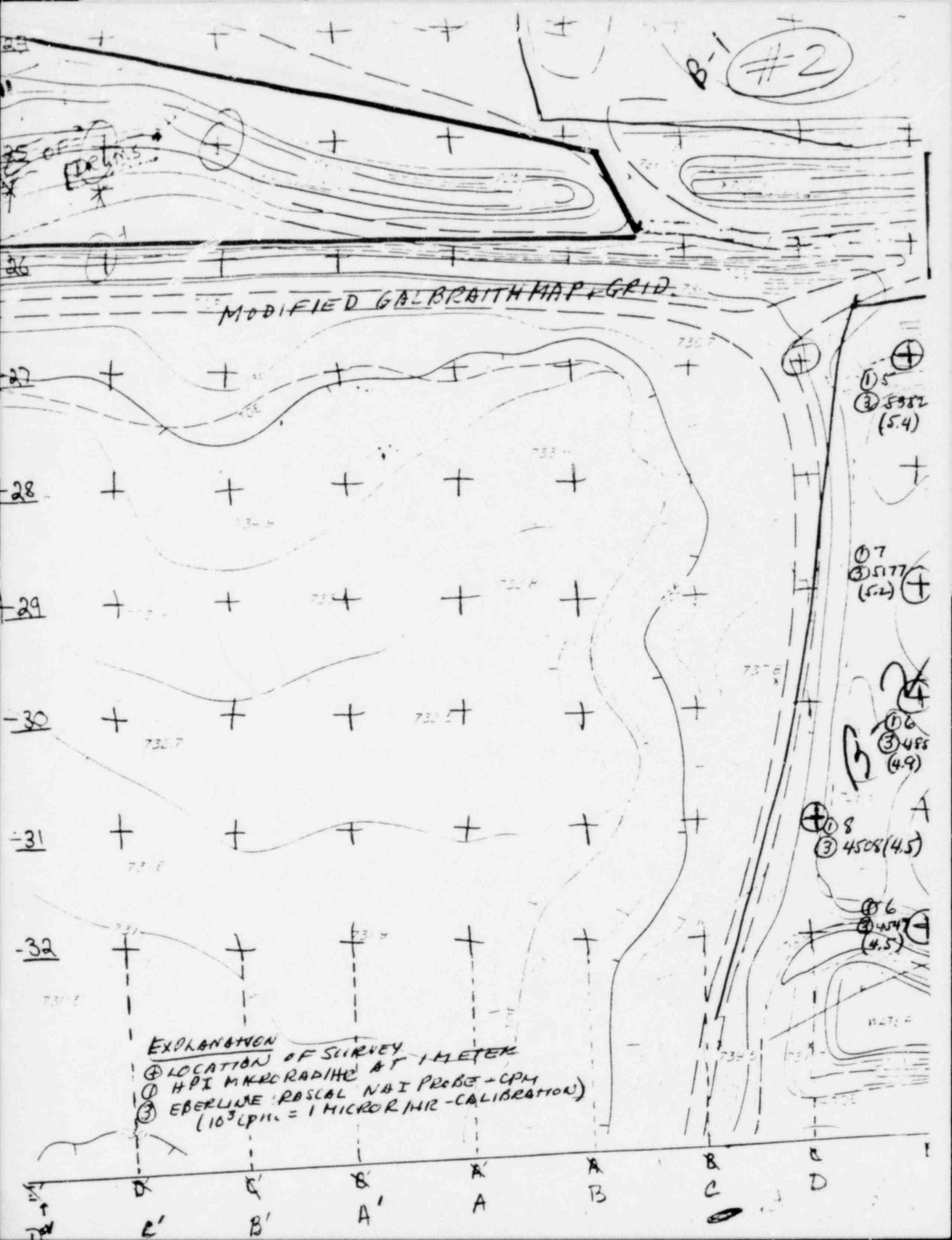


**EXPLANATION**  
 ⊕ LOCATION OF SURVEY  
 ① HPL MICRORAD/HR AT 1 METRIC  
 ② EBER, ALPHA PROBE CPM/100CM<sup>2</sup>  
 ③ EBER RASCAL-NAI PROBE CPM (10<sup>3</sup> CPM = 1 MICROR/HR CALIBRATION)

E	F	G	H	I	J	K	L
		50	0	50	100	150	M



B-1 #2



MODIFIED GALBRAITH MAP GRID

EXPLANATION OF SURVEY  
 ④ LOCATION OF SURVEY  
 ① HPI MICROGRAPHS AT 1 METER  
 ② EBELINE ROSCAL NAI PROBE - CPM  
 (10<sup>3</sup> CPM = 1 MICRORAD - CALIBRATION)

① 5  
② 5382 (5.4)

⑦ 5177 (5.2)

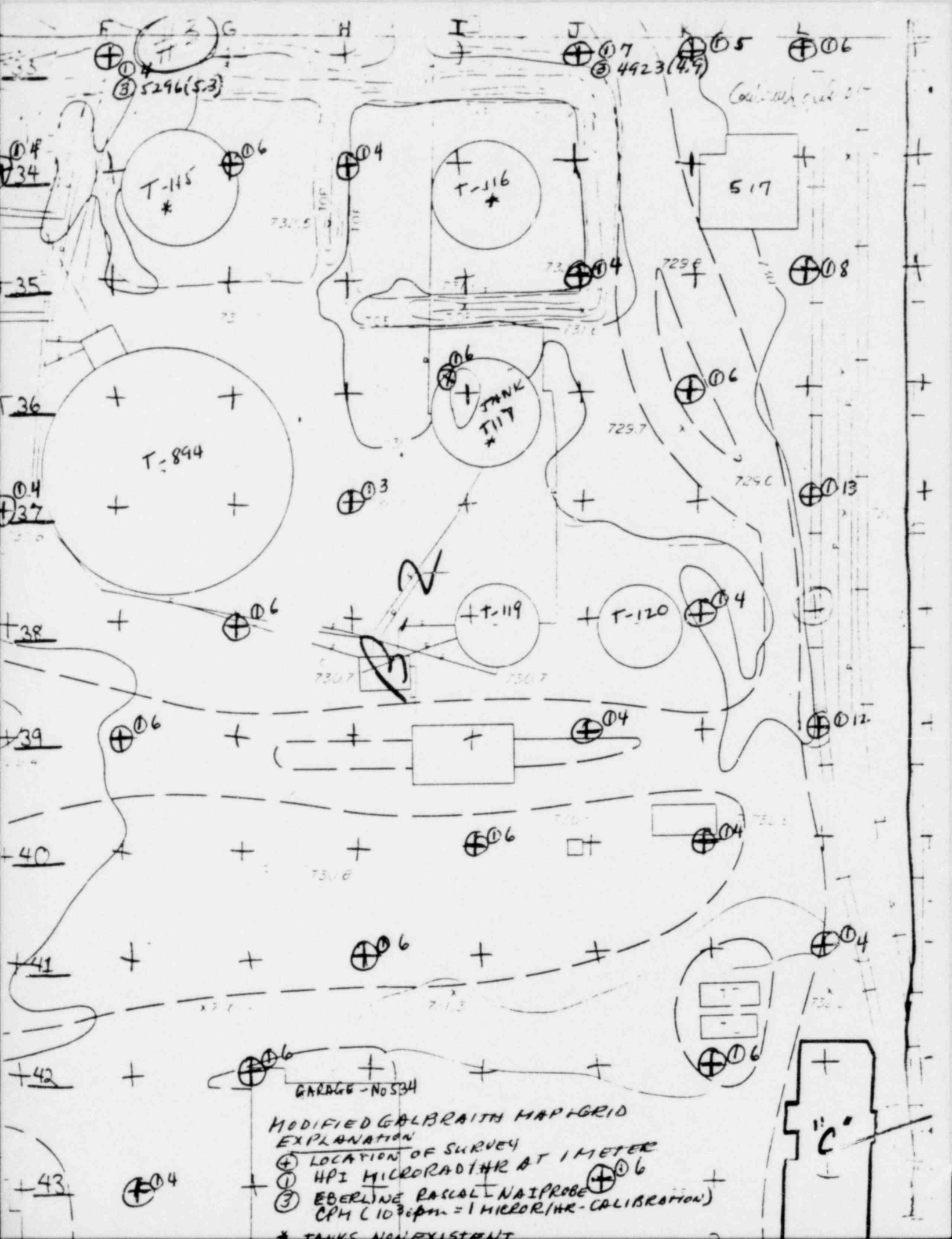
④ 4985 (4.9)

⑧ 4508 (4.5)

⑥ 4547 (4.5)

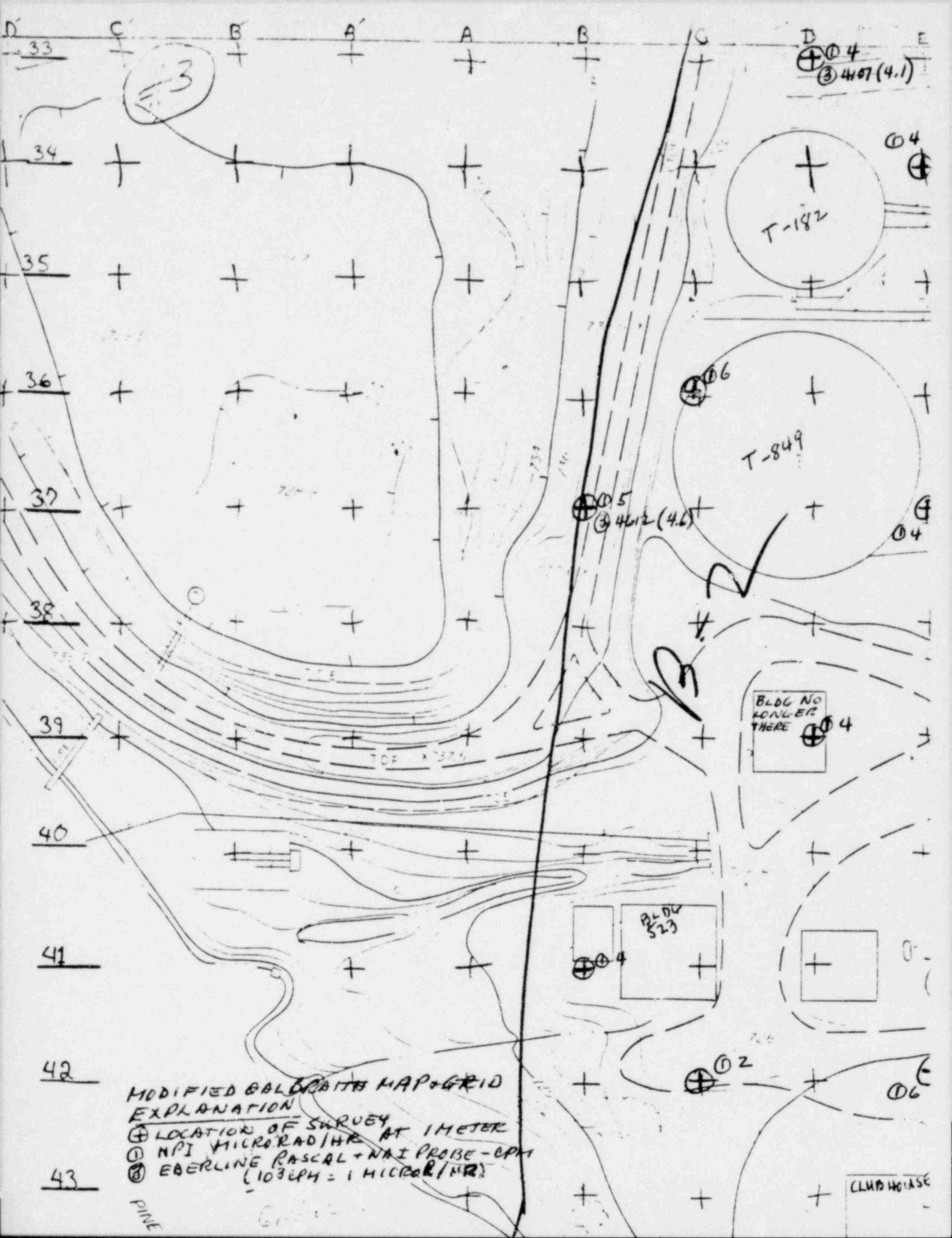
25  
26  
27  
28  
29  
30  
31  
32

D C B A A B B C D  
C' B' A' A B C D



**MODIFIED GALBRAITH MAP GRID  
EXPLANATION**

- ⊕ LOCATION OF SURVEY
- ① HPI MICORAD/HR AT 1 METER
- ③ EBERLINE PASCAL NAIPROBE  
CPH (10<sup>3</sup>cpm = 1 MICOR/HR - CALIBRATION)
- \* TANKS NON-EXISTENT



**MODIFIED BALBOA MAP GRID EXPLANATION**

- ⊕ LOCATION OF SURVEY AT 1 METER
- ④ NPI MICORAD/HR
- ⑤ EBERLINE RASCAL + NAI PROBE - CPM (103CPM = 1 MICORAD/HR)

PINE

CLUB HOUSE

BLDG NO LONGER THERE

BLDG 523

T-182

T-849

3

④ 4  
③ 4107 (4.1)

④ 5  
③ 4112 (4.6)

④ 6

④ 4

④ 4

④ 4

④ 4

④ 2

④ 6

33

34

35

36

37

38

39

40

41

42

43

TOP 1737

724

739

725

Gravel

F G H I J K

44

B-2

⊕ ④

45

46

47

48

49

50

51

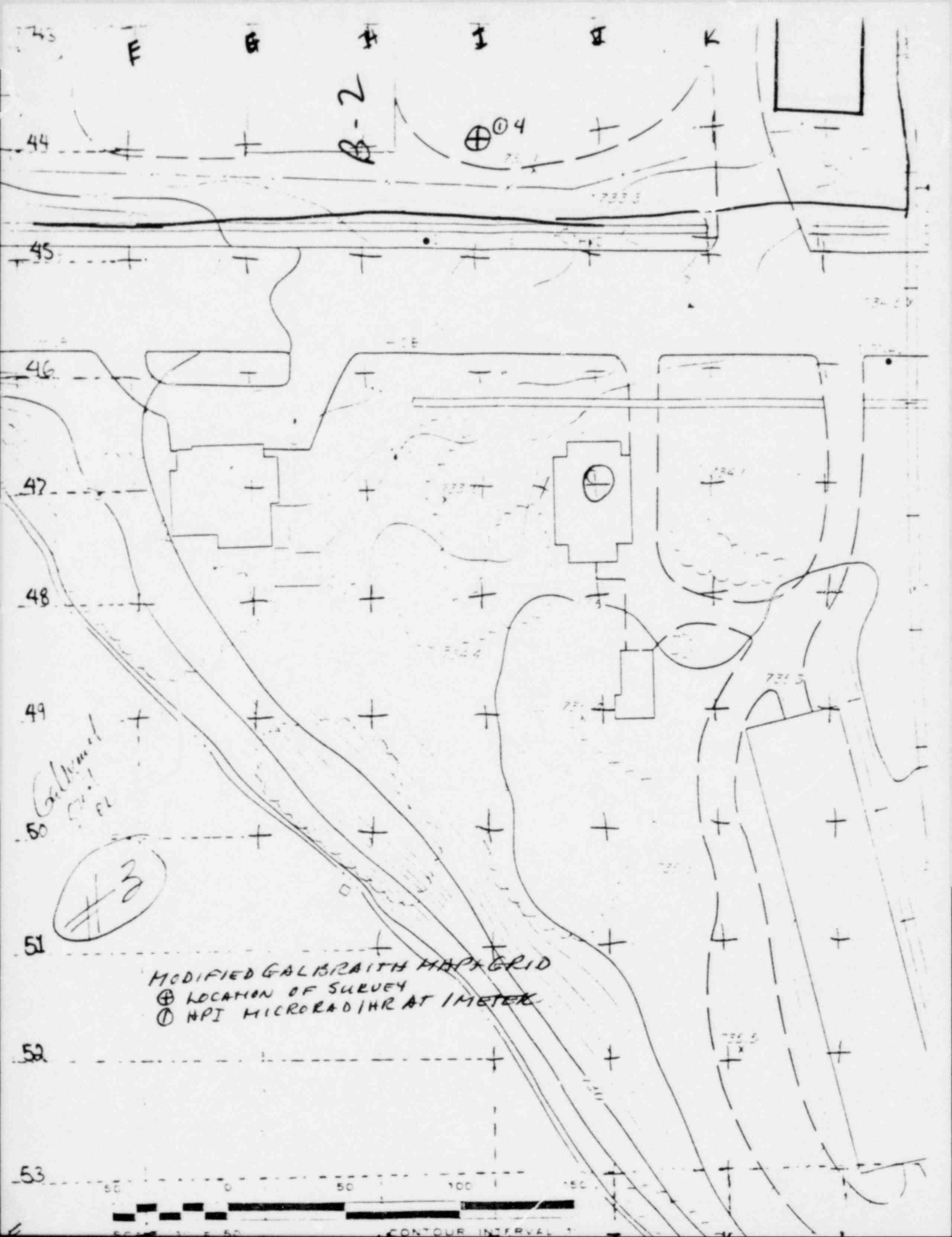
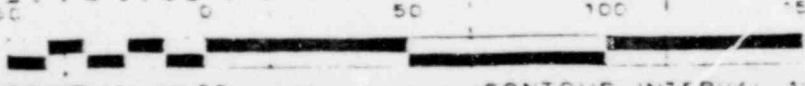
52

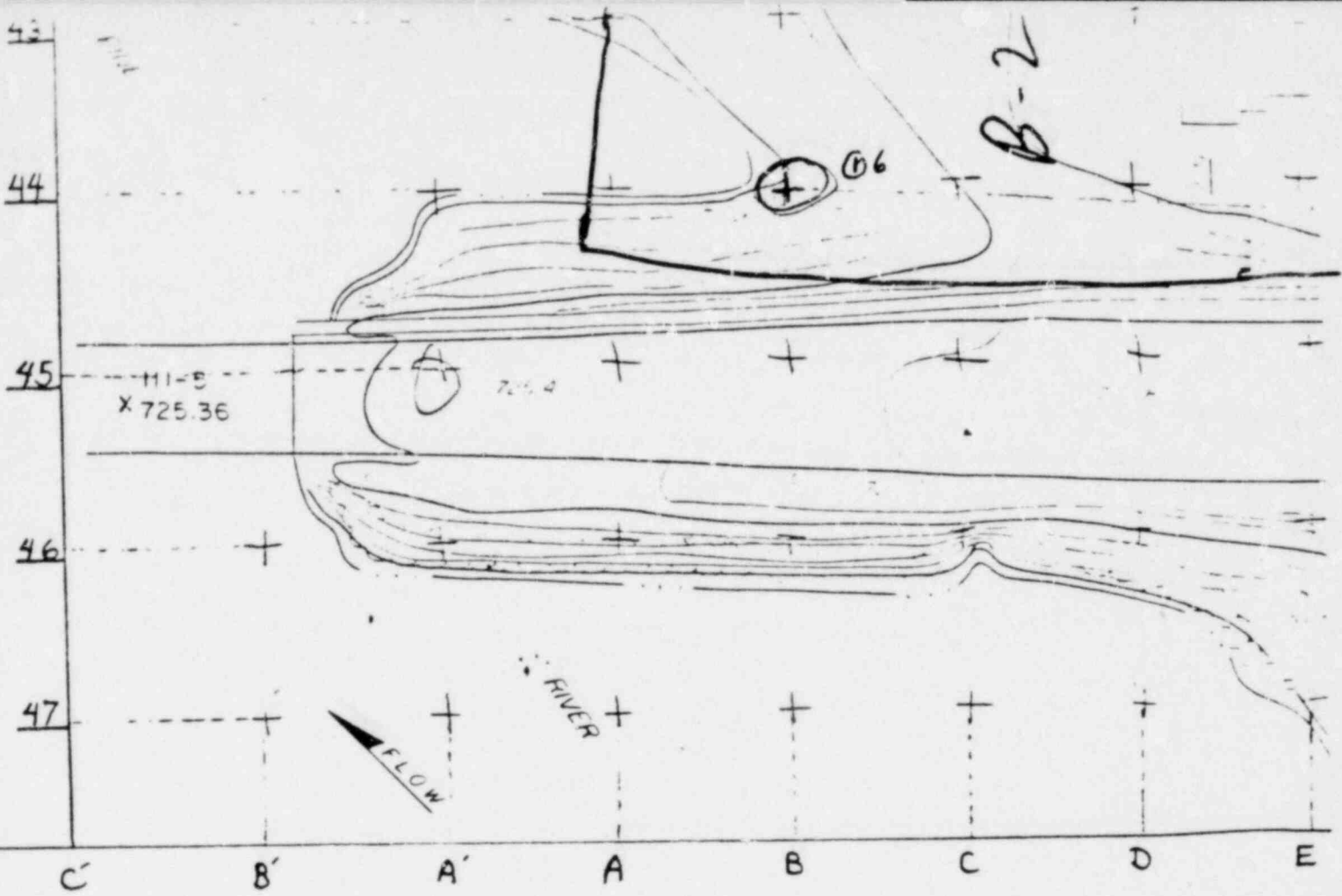
53

*Galbraith  
Map  
FL*

#3

MODIFIED GALBRAITH MAP GRID  
⊕ LOCATION OF SURVEY  
④ NPI MICRORADIHR AT 1 METER





#3

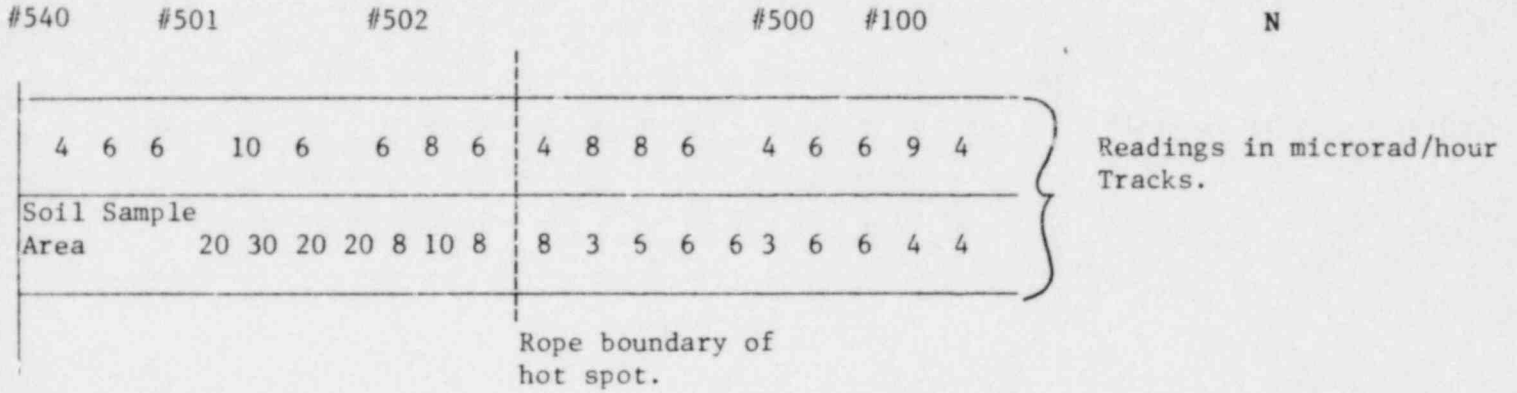
Galbraith Grid OK

MODIFIED GALBRAITH MAP GRID  
 ⊕ LOCATION OF SURVEY  
 ○ HPI MICRORAD/HR AT 1 METRE

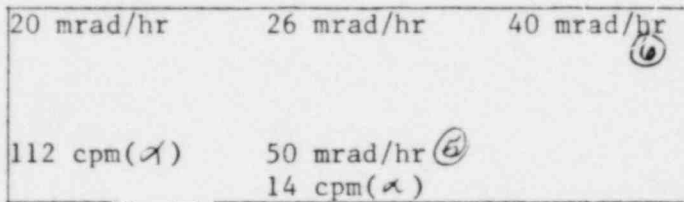


ATTACHMENT 3

Hot Spot Area



Soil Sample Area



8'

- (5) Soil Sample VL 8105
- (6) Soil Sample VL 8106

15'