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Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

(46)

ROUGH DRAFT

memorandum

TO Frank Jackson, M-DO DATE August 14, 1991

THRU Ross Miller, HS-1 Acting Section Leader, Operational Health Physics MAIL STOP/TELEPHONE K487/7-7137

FROM Gerald Schlapper, HS-1, Operational Health Physics SYMBOL HS-1-91:OHP-22

SUBJECT SURVEY OF FIRING POINTS OPERATED BY M DIVISION

During the period July 1 through August 2, 1991, radiation protection surveys were conducted at various firing sites operated by M Division. The general purposes of these surveys were to characterize the radiation environment of the immediate site areas, document the behavior of the depleted uranium found at these sites to include the transportability of the uranium, and provide feedback to the operating groups regarding need for any additional radiation and/or contamination controls. Specific results for all sites are appended to this memo. Survey results are as of the date of the survey and some variation with time should be expected primarily as a result of the normal firings and subsequent clean up activities.

Firing points currently in use are reasonably free of uranium contamination. The level of "general" contamination found seems to correlate reasonably well with the amount of depleted uranium that has been "fired" at any location. In no case was a dose rate found that exceeded 5 mr/hr at a distance of 30 cm from the surface. Also the dpm when averaged over areas (as allowed in the footnotes) do not exceed limits of Attachment 2 of 5480.11. Note that some reported values are higher due to the fact that they reflect data from a 15 square cm pancake probe. Analysis of a limited number of soil "grab samples" shows that the overall D38 concentration levels are approximately "background" levels.

Beta-gamma measurements of the shoes and clothing of the HS-1 surveyors throughout this survey effort showed no "pick up" or retention of D38. Surveys of the shoes of firing site personnel, picked at random also showed no D38 present. HS vehicle tires were also surveyed and again no contamination was found. Surveys of forklifts present at some firing sites also showed no contamination. Assembly magazine areas were surveyed with an alpha scintillator and again no D38

contamination was found. The D38 certainly appears to be non-transportable.

Based on the results of these surveys, the following recommendations are made for TA-14, TA-15, TA-36 and TA-39:

- The use of "duty shoes" that are normally left at the site.
- Facilities for hand-washing should be provided in areas where food and drink are consumed.
- Locations chosen for "D38 contamination signs" should insure that the signs are visible.
- Coveralls should be worn for major cleanup activities and surveyed after use.
- Any material transferred off-site from a D38 contaminated firing site should be monitored.
- "Souvenirs" should not be openly stored in offices. If these items are needed for presentations a central storage area should be provided.
- As part of visitor inprocessing, a statement should be included regarding the restriction on removal of "souvenirs" from sites. Also, the visitor should be informed of the presence of D38 and also that D38 is radioactive material.
- To further document the non-transportability of the D38, a urine sample should be obtained from those individuals routinely involved in D38 firings.

Due to the elevated levels of D38 at the abandoned EF site, this site should be fenced to limit entry. Soil contamination signs and controlled area signs should be placed along the fence at approximately 20 foot intervals. Due to the very low levels at TA-40 only a D38 contamination sign is suggested for the firing site 4 area.

There is some uncertainty regarding additional posting required for the firing sites. Guidance provided by HPB/AL in a memo dated March 13, 1990, indicates that controlled area posting is required for any areas where "...elevated radiation fields or radioactive materials may be present". The firing sites are currently administratively controlled due to the presence of high explosives. This control when coupled with the current signs indicating the presence of D38 and where applicable X-ray production should be sufficient. Additional access control for radiological purposes seems redundant. If radiological control is deemed necessary by DOE reviewers, site personnel will be required to complete an HP checklist and to view the occupational worker video before they have unescorted access to the firing sites. It is strongly recommended that the areas controlled for radiological purposes be limited in size and number in order to reduce escort requirements. Based on the survey results there are NO used firing site areas with radiation and/or contamination levels such that designation as a radiological area would be required. Also note that for purposes of fire control, addition of any fencing around these sites is not desirable.

Radiation Survey of Firing Sites

Depleted Uranium - D38 (^{238}U)

Los Alamos National Laboratory

ROUGH DRAFT

Prepared by Gerald A Schlapper
James R. Bland
HSE-1

Radiogical Survey on Firing Sites

Depleted Uranium - D38 (^{238}U)
Los Alamos National Laboratory

A. General Comments:

1. A D38 contamination survey was conducted during the period of ~~14~~ 2 Aug July 1991 through ~~25 July~~ 1991 at the various firing points and storage bunkers located at the Los Alamos National Laboratory. These firing points and storage sites were evaluated to determine the levels of depleted uranium (D38) from weapon testing either as part of the weapon or from a depleted uranium penetrator. The evaluation consisted of radiation level measurements, soil samples, and air samples, if present during weapon firing.

2. The sites surveyed are listed below:

a. TA 14 - Q Site

b. TA 15
   (1) EF Site
   (2) R-44 Site
   (3) R-45 Site
   (4) R-306 Site
   (5) PHERMEX
   (6) DARHT

c. TA 36
   (1) IJ Site
   (2) Eenie Site
   (3) Daisy Mae
   (4) Meenie Site
   (5) Minie Site
   (6) Heavy Metal Site
   (7) Moe Magazine
   (8) Lower Slobbovia Site
   (9) Skunk Works

d. TA 39
   (1) Site 6
   (2) Site 7/57
   (3) Site 8
   (4) Site 56
   (5) Site 88
   (6) Soil Dump Site

e. TA 40
   (1) TA 40-4
   (2) TA 40-5
   (3) TA 40-8
   (4) TA 40-12
   (5) TA 40-15

B. Instruments:

The instruments used to evaluate the various locations during this survey are listed below:

1. Ludlum, GM, Model E-530, Serial # 1524, PN002362, Calibration date 6/14/91.

2. Ludlum, GM, Model E-530, Serial # 1494, PN 002375, Calibration date 4/24/91.

3. Ludlum, Model 2, Serial #(label over #), PN 006436, Calibration date 6/10/91; Probe(pancake) Model 44-9, PR 046259.

4. Ludlum, Model 3, Serial # (label over #), PN 006200, Calibration date 6/21/91; Probe(pancake), Model 44-9, PR 032830.

5. Ludlum, Model 3, PN 006176, Calibration date 1/23/91; Probe(GM), Serial # 38960.

6. Ludlum Model 139, Serial # (label over #), Calibration date 5/9/91; Probe(alpha), PR 048984.

7. Eberline Alpha Meter, Model PAC-7, Serial # 369, PN003012, Calibration date 2/15/91.

8. Eberline, Model ESP-1, Serial # 02712, PN 007433, Calibration date 5/13/91; Probe(pancake), Model HP269, Serial # 709453.

9. Eberline, Model ESP-1, Serial # 02443, PN 007370, Calibration date 1/16/91; Probe(pancake), Model HP260, Serial # 707923.

10. Eberline, Model ESP, Serial # 02964, PN007452, Calibration date 7/12/91, Thin Window Alpha Probe, Connects were cover to prevent electrostatic charge.

C. Survey Data.

The survey data for each site listed in paragraph A.2. is located in appropriate annex at the end of this report.

1. TA 14 (Annex A)

2. TA 15 (Annex B)

3. TA 36 (Annex C)

4. TA 39 (Annex D)

5. TA 40 (Annex E)

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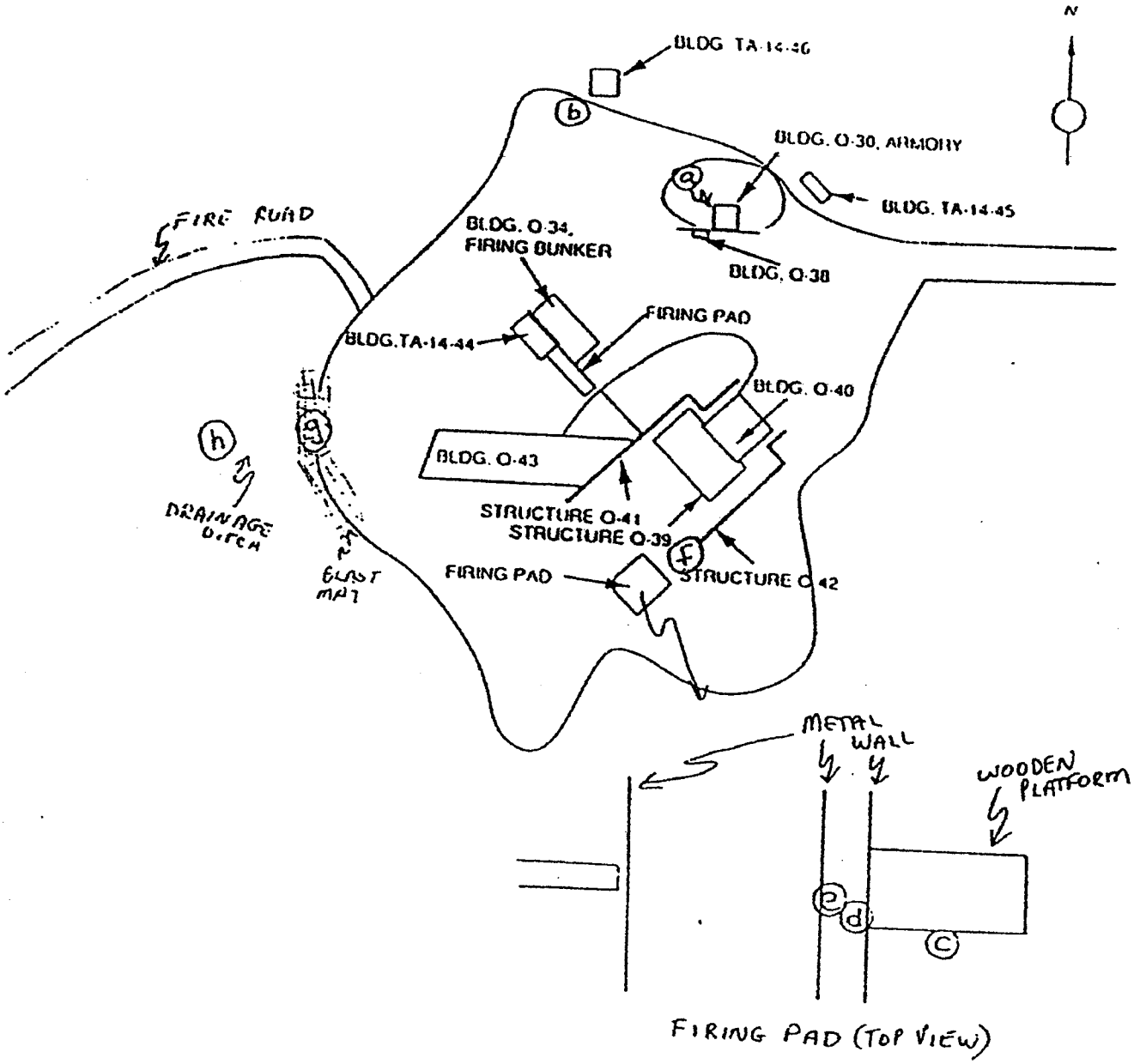
Annex A

Survey Data
TA 14, Q Site

1. This location was surveyed on 18 July 1991 by Gerald A. Schlapper and James R. Bland, HSE -I.

2. Diagram of Q-Site



FIRING PAD (TOP VIEW)

3. Instrumentation. The instrumentation used to survey this site are list in paragraph B.2.,B.3., and B.9..

4. Background Radiation Levels. The general radiation background levels in this area is ≈ 0.5 to 1 mR/hr at 30 cm.

5. Location of D38 at Q-Site.

a. The are several paint can containers and a cardboard box located inside Bldg Q-30, Armory that contain D38. (See location "a")

(1) Paint Cans: The radiation measurement at the surface of the paint cans containing D38 range from 1500 to 2500 cpm with a 1 to 3 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the paint cans.

(2) Cardboard Box: The radiation measurement at the surface of the cardboard box containing D38 is ≈ 40,000 cpm with a 4 mR/hr exposure rate. The exposure rate is 0.2 mR/hr at 30 cm from the cardboard box.

b. There are two pallets of metal targets and parts located west of Bldg Q-30 that have D38 contaminated metal (See location "b"). The radiation measurement at the surface of the contaminated metal is ≈ 15,000 cpm with a 2 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the pieces of contaminated metal. There is no visual pieces of D38 seen on the contaminated pieces of metal.

c. The firing pad has several areas of contamination. (See enlarged diagram of the firing pad provided above)

(1) Wooden platform. The radiation measurement at the surface of the wooden platform is slightly above background, approximately twice background.

(2) Ground Underneath Wooden Platform. The radiation measurement at the surface of the ground underneath the wooden platform is ≈ 5000 cpm with a 0.2 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the ground. (See location "c")

(3) Metal Blast Wall. The inside of the metal blast wall next to the wooden platform had some pits that contained D38. The D38 contamination is not visible. The radiation measurement at the surface of the pitted metal blast wall is ≈ 20,000 cpm with a 0.6 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the blast wall. (See location "d")

(4) Metal Blast Wall. The second metal blast wall from the wooden platform had some pits that contained D38. The D38 contamination is not visible. The radiation measurement at the surface of the pitted metal blast wall is ≈ 10,000 cpm with a 0.6 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the blast wall. (See location "e")

d. There is a visible piece of oxidized D38 located on the ground northeast of the firing pad. The radiation measurement at the surface of the piece of D38 is 160,000 cpm with a 6 mR/hr

exposure rate. The exposure rate is 0.1 mR/hr at 30 cm. (See location "f")

e. The blast mats located at the edge of the drop off, used to control erosion, has several areas of D38 contamination. The radiation measurement at the surface of the contaminated blast mats is ≈ 20,000 cpm with a 0.8 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the blast mats. (See location "g")

f. The drainage over the edge of the drop off had small pieces of visible D38. The radiation measurement of the pieces found were ≈ 500 cpm with a 0.1 mR/hr exposure rate. (See location "h")

6. Soil Samples.

a. A soil sample was taken approximately one inch underneath the piece of D38 location"f". The results of the 2.4×10^{-4} µCi/g

b. A soil sample was taken underneath the wooden platform at the firing pad, location "c". The results 1.9×10^{-3} µCi/gm

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Annex B

Survey Data
TA 15

1. This location was surveyed on 19 July 1991 by Gerald A. Schlapper and Bob Cox, HSE -1. The following area were surveyed:

a. EF Site (Location A)
b. R-44 Site (Location B)
c. R-45 Site (Location C)
d. R-306 Site (Location D)

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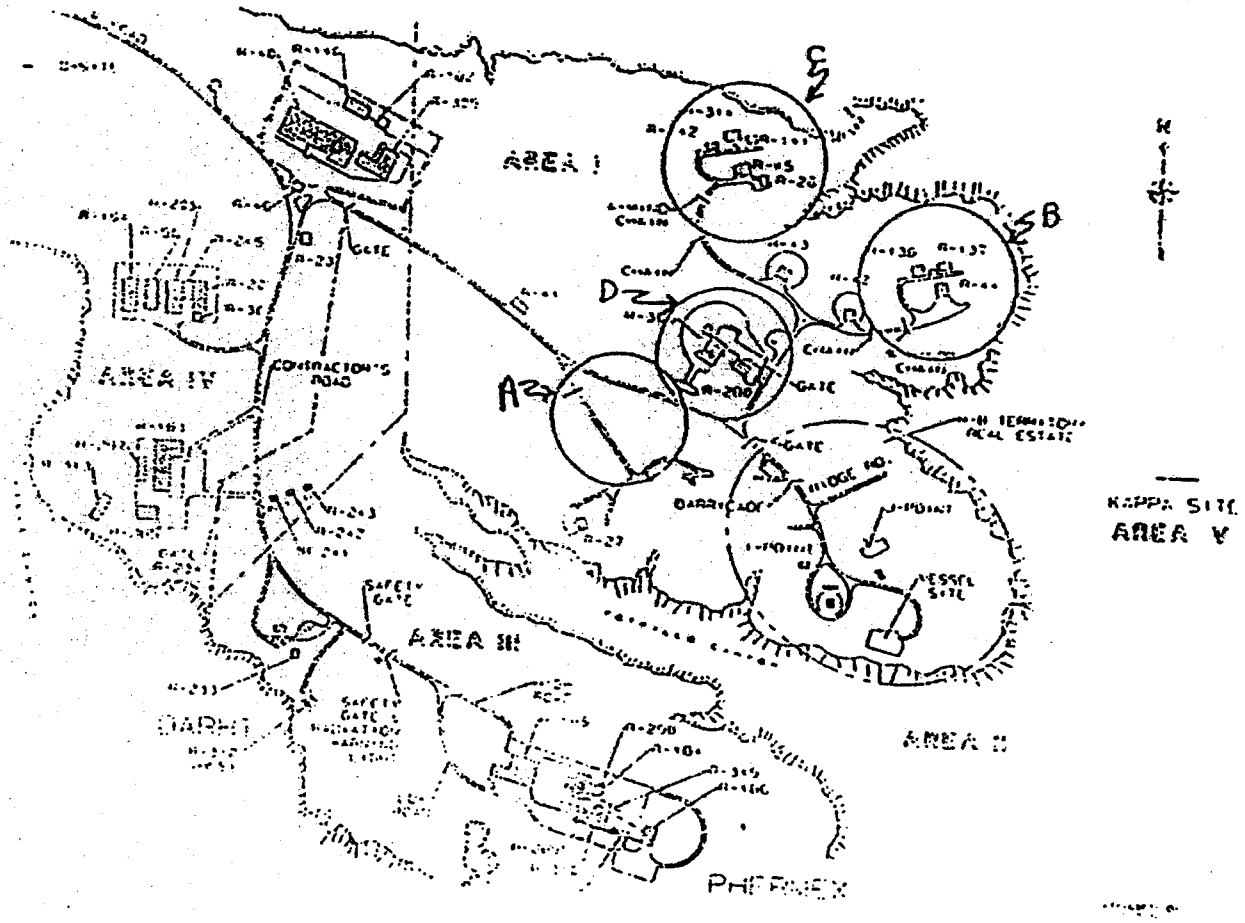
2. Diagram of the Entire TA 15 Site.



3. Instrumentation. The instrumentation used to survey this site are list in paragraph B.2., B.3., and B.9..

4. **EF Site, TA 15**: Survey data and information

a. Diagram of EF Site.

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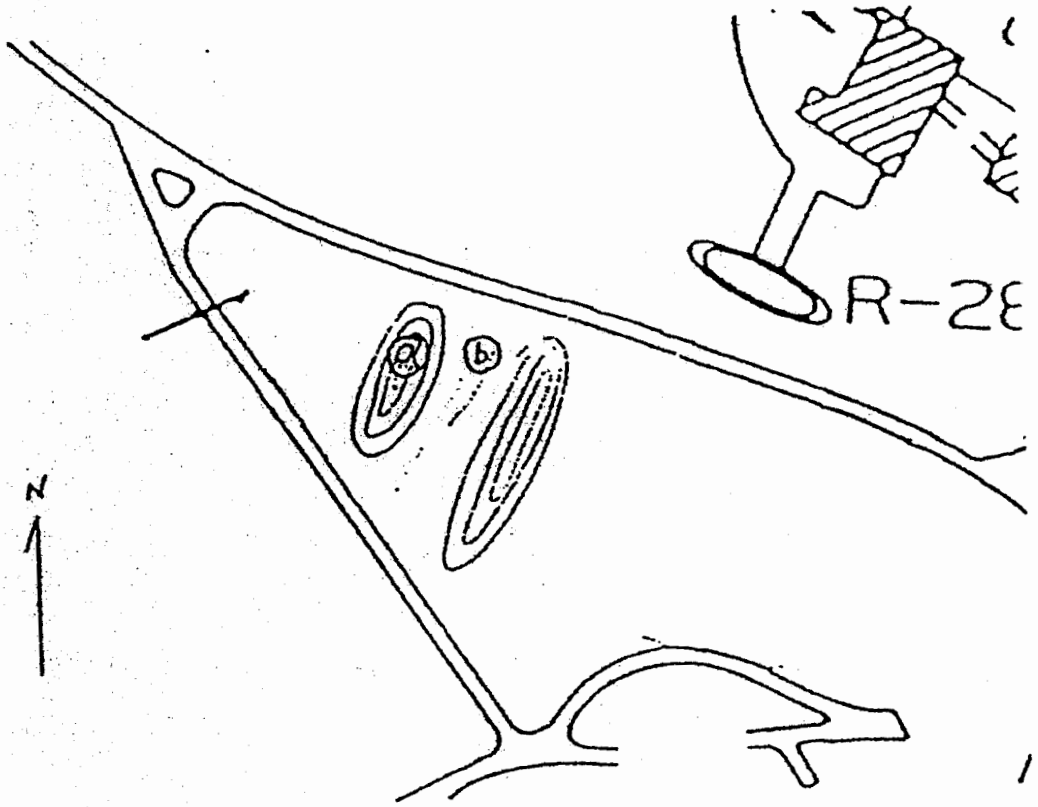


b. Background Radiation Levels. The general radiation background levels in this area is ≈ 0.5 to 1 mR/hr at 30 cm.

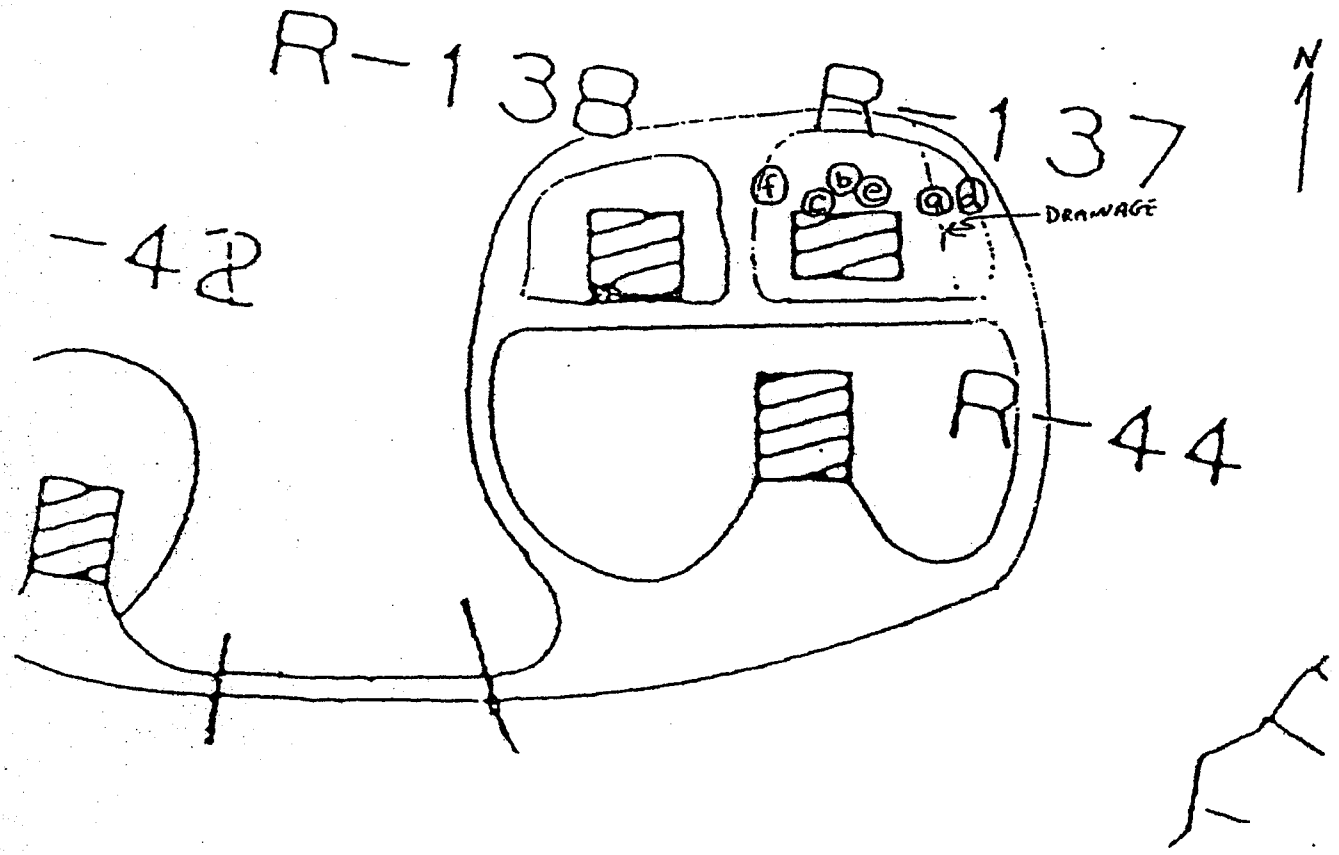
c. Location of D38 at EF Site.

(1) Top of soil mound, location "a" on EF Site diagram. The radiation measurement at the surface of the soil is ≈ 170,000 cpm with a 20 mR/hr exposure rate. The exposure rate is less than 5 mR/hr at 30 cm from the soil surface.

(2) There is contamination in the eroded area between the two mounds. The radiation measurement at the surface of the soil between the two mounds is ≈ 825,000 cpm with a 80 mR/hr exposure rate. The exposure rate is less than 5 mR/hr at 30 cm from the soil surface. (See location "b" on EF Site diagram)

5. R-44, TA 15 Site: Survey Data and Information

a. Diagram of R-44 Site



b. Background Radiation Levels. The general background radiation levels in this area is ≈ 0.1 mR/hr at 30 cm.

c. Location of D38 at R-44.

(1) Eroded drainage area east of Bldg R-137. The radiation measurement at the surface of the soil is ≈ 32,000 cpm with a 0.5 mR/hr exposure rate. The exposure rate is ≈ 0.1 mR/hr at 30 cm from the surface of the soil. (See location "a" on the D-44 Site diagram)

(2) Small pieces of D38 on the ground in front of the blast wall, Bldg R-137. The radiation measurement at the surface of the soil over the small D38 pieces is ≈ 4,000 cpm with a 1 to 2 mR/hr exposure rate. The exposure rate is ≈ 0.1 mR/hr at 30 cm from the surface of the soil. (See location "b" on the D-44 Site diagram)

(3) The blast wall (shield) on the side of Bldg R-137 has several areas of contamination. The radiation measurement at the surface of the blast wall is ≈ 175,000 cpm with a 10 mR/hr exposure rate. The exposure rate is ≈ 0.5 mR/hr at 10 cm from the blast wall. (See location "c" on the D-44 Site diagram)

(4) The ground east of Bldg R-137 on the other side of the eroded drainage area. The radiation measurement at the surface of the ground is ≈ 25,000 cpm with a 50 mR/hr exposure rate. The exposure rate is ≈ 1 mR/hr at 30 cm from the contaminated ground. (See location "d" on the R-44 Site diagram)

(5) The general outside area had numerous small pieces of D38 on the ground. The radiation measurement of these small pieces ranged from ≈ 1500 to 2000 cpm with a range of 1 to 2 mR/hr exposure rate. The exposure rate is ≈ 0.1 mR/hr at 30 cm from the surface of the ground.

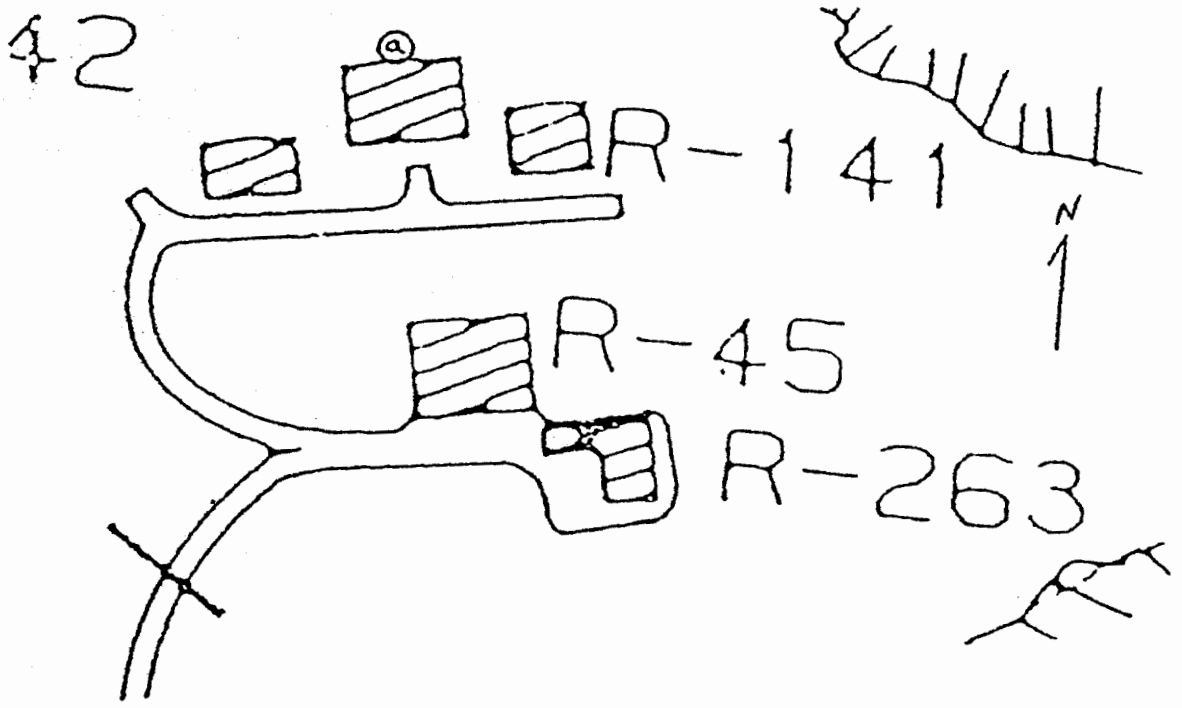
d. Soil Samples.

(1) A soil sample was taken approximately in front of the blast wall of Bldg R-137, see location "e" on the R-44 Site diagram. The results of the soil sample 5.64 x 10⁻² uCi/g

(2) A soil sample was northwest of Bldg R-137, see location "f" on the R-44 Site diagram. The results ~~5.64~~ 6.18 x 10⁻² uCi/g

6. R-45, TA 15 Site: Survey Data and Information

a. Diagram of R-45 Site



(2) The berm southwest of Bldg R-306. The radiation measurement at the surface of the ground at the berm is ≈ 8,000 cpm with a 0.3 mR/hr exposure rate. The exposure rate is ≈ 0.1 mR/hr at 30 cm from the surface of the ground. (See location "b" on the R-306 Site diagram)

(3) The old blast shield located northwest of Bldg R-306 has contaminated areas. The radiation measurement at the surface of the blast shield is ≈ 80,000 cpm with a 5 mR/hr exposure rate. The exposure rate is ≈ 0.1 mR/hr at 30 cm from the surface of the wall. (See location "c" on the R-306 Site diagram)

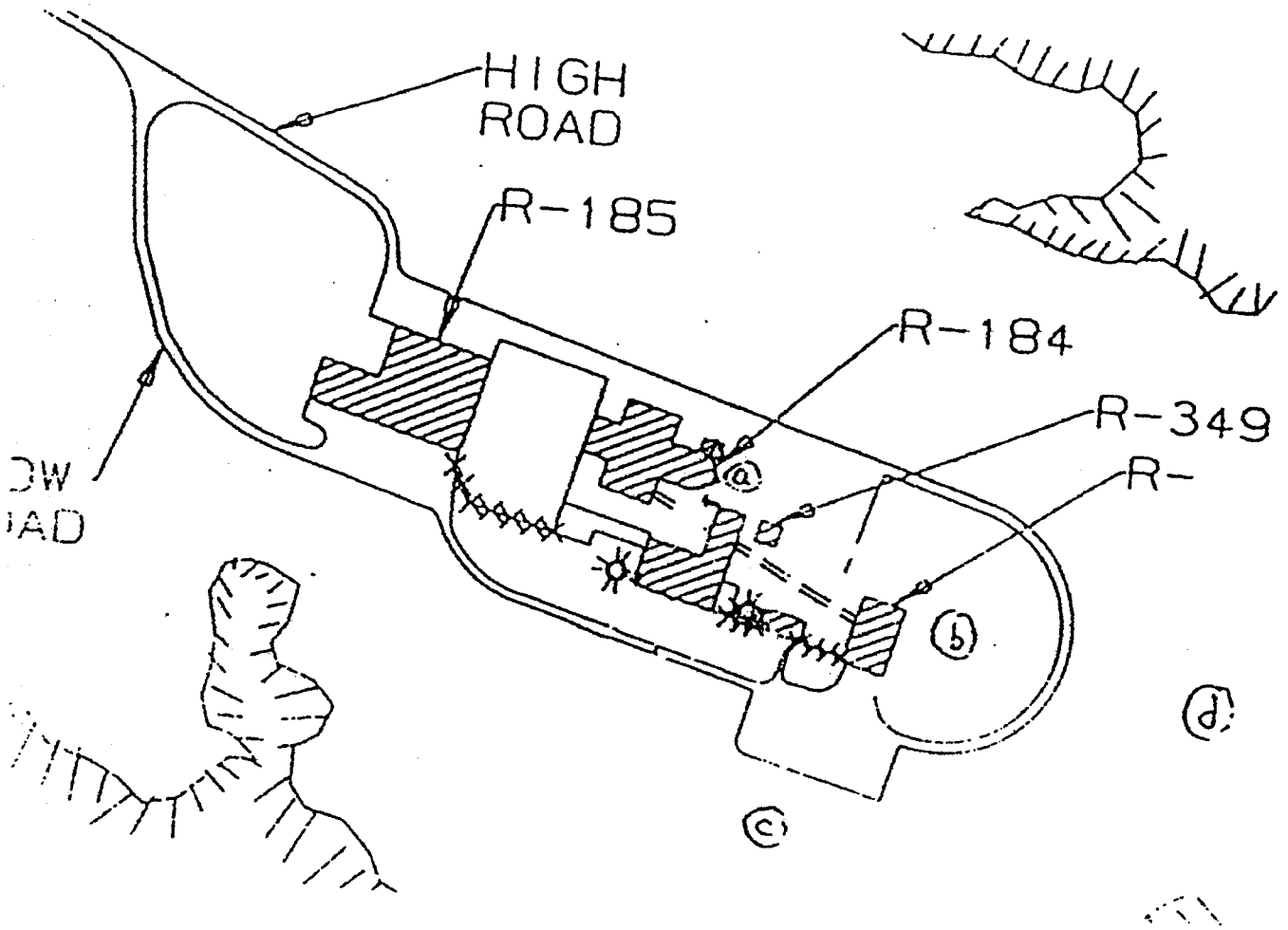
(4) There are several pieces of oxidized D38 on the ground northwest of Bldg R-306. The highest radiation measurement at the surface of the ground over a piece of D38 is ≈ 675,000 cpm with a 25 mR/hr exposure rate. The exposure rate is less than 1 mR/hr at 30 cm from the surface of the wall. (See location "d" on the R-306 Site diagram)

(5) There are several pieces of oxidized D38 on the remote ridge southwest of Bldg R-306. The radiation measurement at the surface of the ground over the pieces of D38 is ≈ 800,000 cpm with a 40 mR/hr exposure rate. The exposure rate is less than 5 mR/hr at 30 cm from the surface of the wall. (See location "e" on the R-306 Site diagram)

d. Soil Samples. No soil taken at this location.

8. PHERMEX, TA 15 Site: Survey Data and Information

a. Diagram of PHERMEX Site


HIGH
ROAD
R-185
R-184
R-349
R-
DW
IAD
a
b
c
d

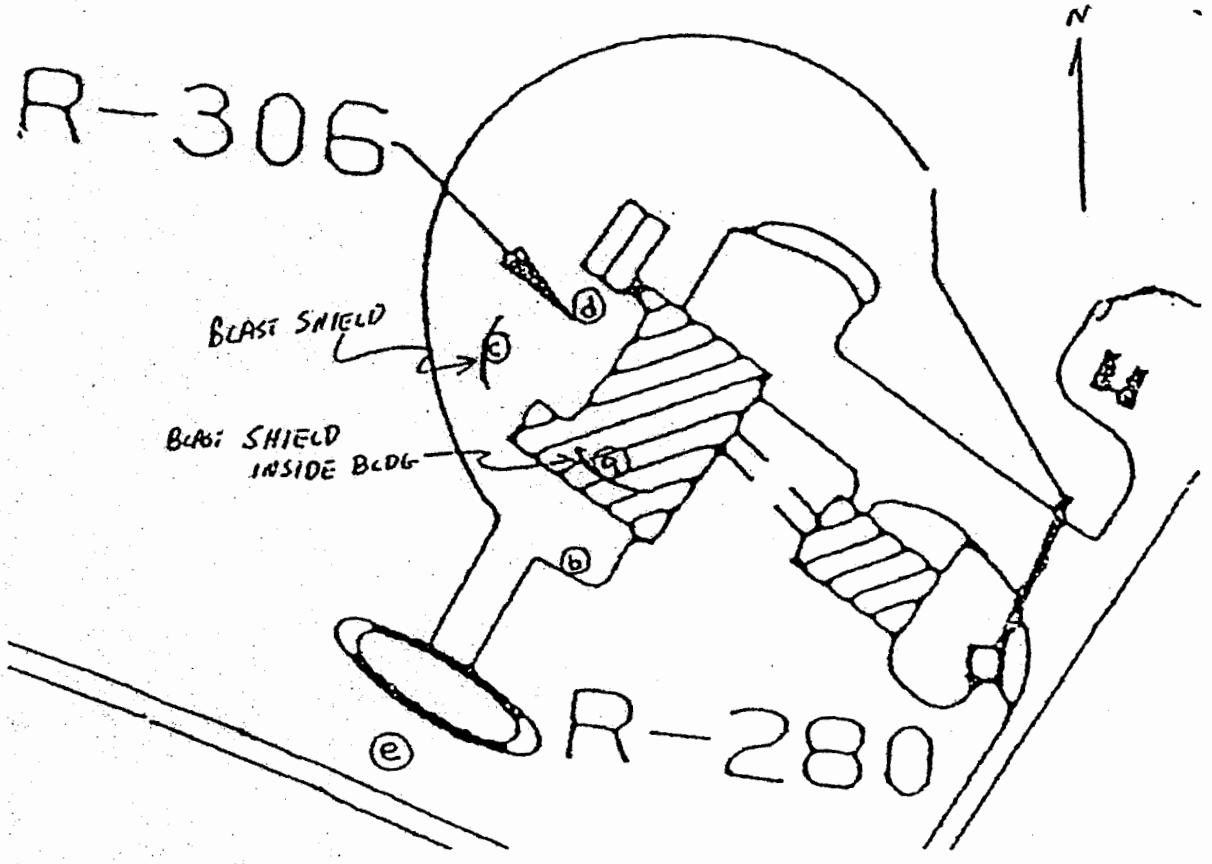
b. Background Radiation Levels. The general background radiation levels in this area is ≈ 0.1 mR/hr at 30 cm.

c. Location of D38 at R-45. The north wall of the Bldg R-314 was contaminated. The radiation measurement at the surface of the building ranged from 26,000 to 45,000 cpm with the highest reading of 10 mR/hr exposure rate. The exposure rate is ≈ 0.3 mR/hr at 30 cm from the surface of the wall. (See location "a" on the R-45 Site diagram)

d. Soil Samples. No soil samples taken at this location.

7. R-306, TA 15 Site: Survey Data and Information

a. Diagram of R-306 Site



b. Background Radiation Levels. The general background radiation levels in this area is ≈ 400 to 500 cpm with a 0.1 mR/hr exposure rate at 30 cm.

c. Location of D38 at R-306 Site.

(1) The blast shield inside Bldg R-306 has several contaminated pits. The radiation measurement at the surface of the blast shield is ≈ 210,000 cpm with a 5 mR/hr exposure rate. The exposure rate is less than 1 mR/hr at 30 cm from the surface of the wall. (See location "a" on the R-306 Site diagram)

b. Background Radiation Levels. The general background radiation levels in this area is ≈ 0.1 mR/hr exposure rate at 30 cm.

c. Location of D38 at PHERMEX Site.

(1) There are metal plates on the ground outside Bldg R-184 that are contaminated with D38. The highest radiation measurement at the surface of the metal plates is ≈ 50,000 cpm with a 5 mR/hr exposure rate. The exposure rate is less than 0.2 mR/hr at 30 cm from the surface of the metal plates. (See location "a" on the PHERMEX Site diagram)

(2) The general area outside Bldg R-186 has an elevated level due to D38 on the soil. The radiation measurement at the surface of the ground ranges between 1,000 to 2,000 cpm with a 0.5 mR/hr exposure rate. The exposure rate is ≈ 0.1 mR/hr at 30 cm from the surface of the ground. (See location "b" on the PHERMEX Site diagram)

(3) The old impact area is contaminated with D38. The radiation measurement at the surface of the blast shield is ≈ 40,000 cpm with a 2.5 mR/hr exposure rate. The exposure rate is ≈ 0.1 mR/hr at 30 cm from the surface of the wall. (See location "c" on the PHERMEX Site diagram)

(4) There is a material storage area outside the road that is contaminated with D38. The highest radiation measurement at the surface of the ground is ≈ 50,000 cpm with a 4 mR/hr exposure rate. The exposure rate is less than 1.5 mR/hr at 30 cm from the surface of the ground. (See location "d" on the PHERMEX Site diagram)

d. Soil Samples. No soil taken at this location.

8. DARHT, TA 15 Site: Survey Data and Information

a. Diagram of DARHT Area

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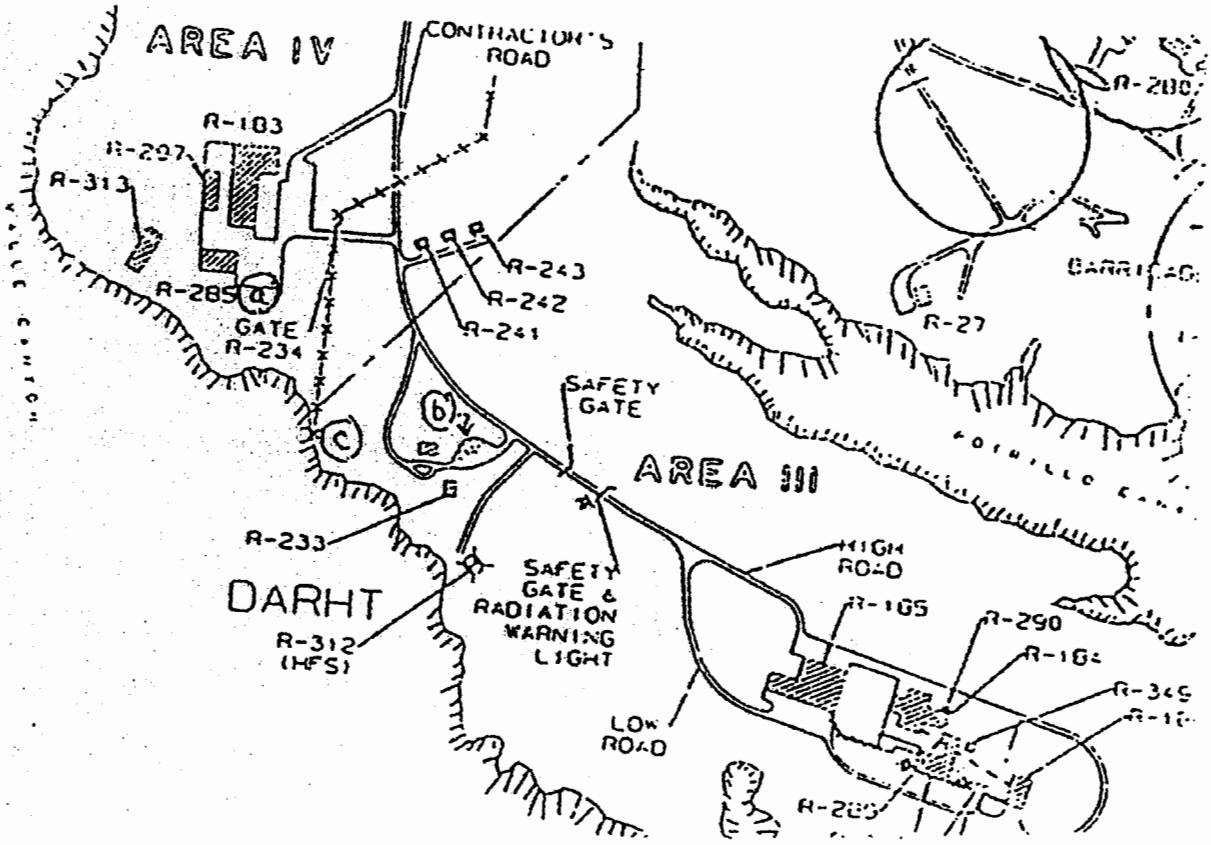

AREA IV
CONTRACTOR'S ROAD
R-183
R-297
R-313
R-285
GATE
R-234
R-243
R-242
R-241
SAFETY GATE
AREA III
R-233
DARHT
R-312
(HFS)
SAFETY GATE & RADIATION WARNING LIGHT
HIGH ROAD
LOW ROAD
R-105
R-290
R-27

b. **Background Radiation Levels.** The general background radiation levels in this area is ≈ 0.1 mR/hr exposure rate at 30 cm.

c. **Location of D38 at DARHT Area.**

(1) There is D38 contamination in the soil around the berm area by Bldg R-285. This location is where the vessels were washed out and D38 contamination was deposited on the ground. The highest radiation measurement at the surface of the ground is ≈ 50,000 cpm with a 5 mR/hr exposure rate. The exposure rate is less than 0.1 mR/hr at 30 cm from the surface of the ground. (See location "a" on the DARHT Area diagram)

(2) The general area between Bldg R-233 and the main road is contaminated with D38 on the soil. The highest radiation measurement at the surface of the ground is ≈ 10,000 cpm with a 0.5 mR/hr exposure rate. The exposure rate is ≈ 0.1 mR/hr at 30 cm from the surface of the ground. (See location "b" on the DARHT Area diagram)

(3) There is a material storage area that is contaminated with D38. The highest radiation measurement at the surface of the ground is ≈ 5,000 cpm with a 0.5 mR/hr exposure rate. The exposure rate is less than 0.1 mR/hr at 30 cm from the surface of the ground. (See location "c" on the DARHT Area diagram)

d. **Soil Samples.** No soil taken at this location.

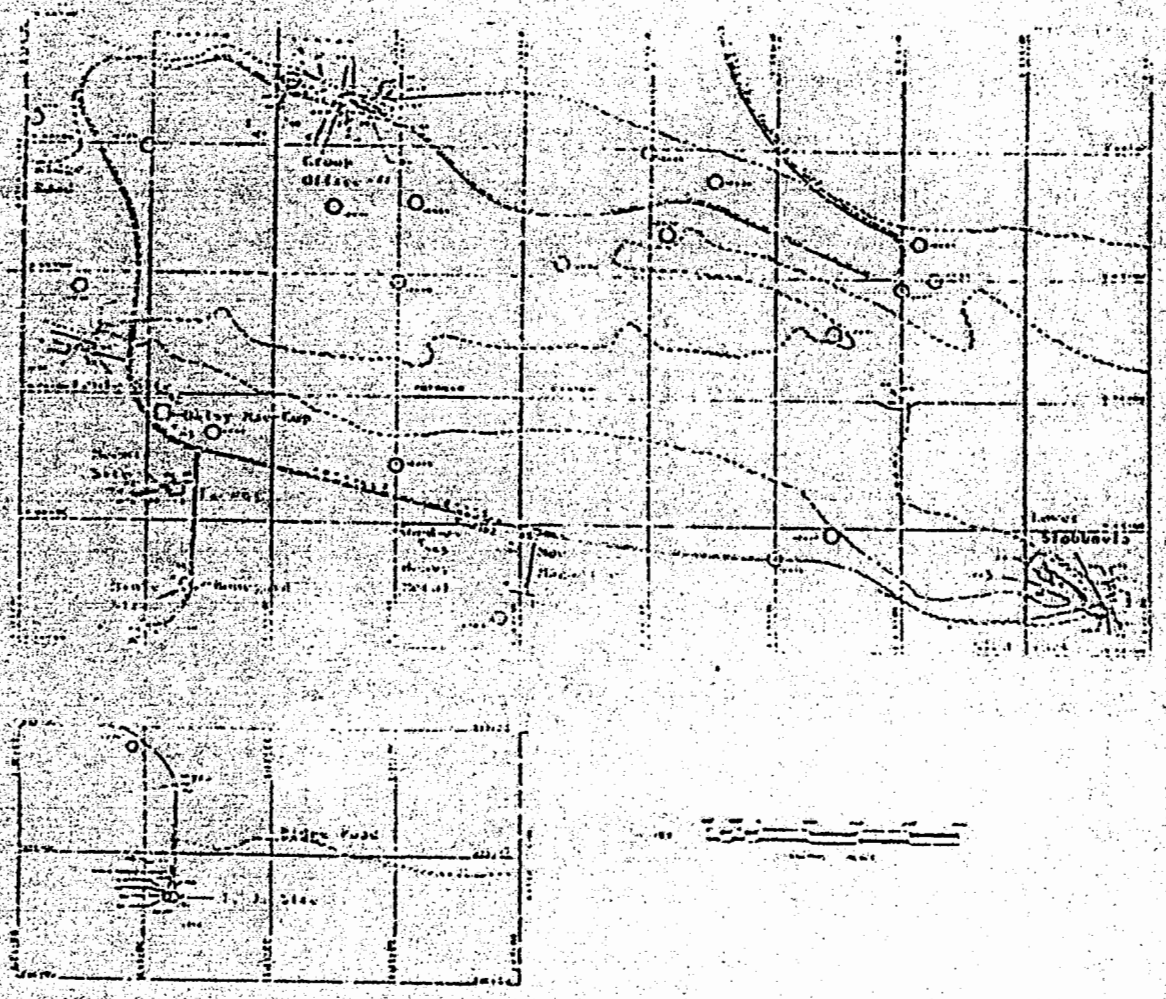
Annex C

Survey Data
TA 36

1. This location was surveyed during the period of 10 - 23 July 1991 by Gerald A. Schlapper, James R. Bland and Bob Cox, HSE -1. The following area were surveyed:

a. IJ Site
b. Eenie Site
c. Daisy Mae Site
d. Meenie Site
e. Minie Site
f. Heavy Metal Site
g. Moe Magazine
h. Lower Slobbovia Site
i. Skunk Works

2. <u>Diagram of the Entire TA 36 Site</u>



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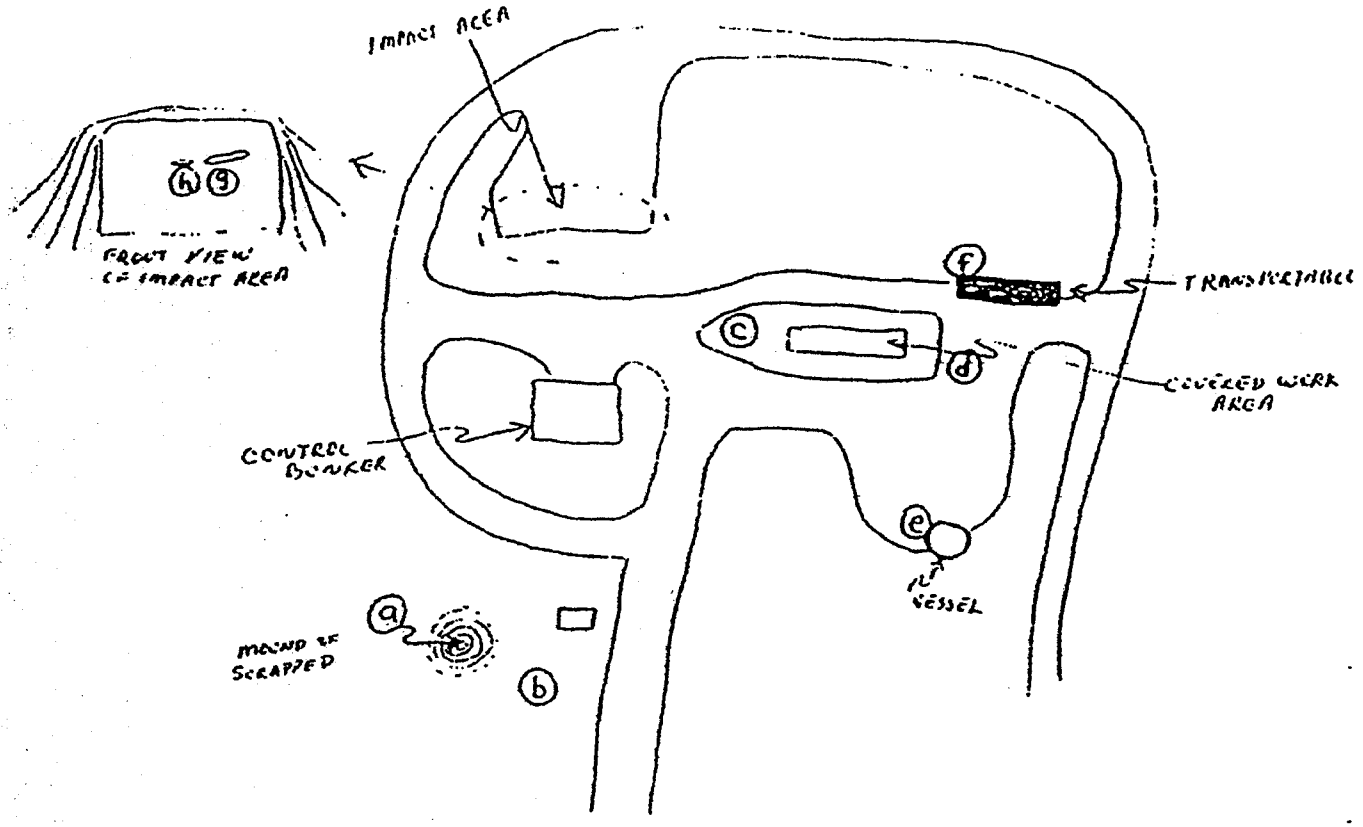
3. **Instrumentation.** The instrumentation used to survey this site are list in paragraph B.1., B.2., B.3., B.4., B.7., B.9. and B.10..

4. **IJ Site, TA 36:** Survey data and information

a. Diagram of IJ Site.



b. Background Radiation Levels. The general background radiation levels in this area is ≈ 0.1 mR/hr at 30 cm.

c. Location of D38 at IJ Site.

(1) There are numerous small pieces of D38 on the mound of dirt in the firing area. The highest radiation measurement at the surface of the soil is ≈ 185,000 cpm with a 3 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "a" on the IJ Site diagram)

(2) There are numerous pieces of D38 on the ground in the firing area, see location "b" on the IJ diagram. The radiation measurement at the surface of the soil in several locations are listed below:

(a) 175,000 cpm; 5 mR/hr(contact); 0.1 mr/hr at 30 cm

(b) 90,000 cpm; 2 mR/hr(contact); 0.1 mR/hr at 30 cm

(c) 80,000 cpm; 1.2 mR/hr(contact); 0.1 mR/hr at 30 cm

(d) 40,000 cpm; 0.5 mR/hr(contact); 0.1 mR/hr at 30 cm

(3) The ground to the left of the open shed is contaminated with D38. The radiation measurement at the surface of the soil is ≈ 140,000 cpm with a 4 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "c" on IJ Site diagram)

(4) The eroded area on the road to the right of the open shed is contaminated with D38. The radiation measurement at the surface of the soil is ≈ 180,000 cpm with a 6 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "d" on the IJ Site diagram)

(5) There are numerous pieces of oxidized D38 on the ground the metal blast vessel. The highest radiation measurement at the surface of the soil over one of these pieces is ≈ 85,000 cpm with a 20 mR/hr exposure rate. The exposure rate is less than 1 mR/hr at 30 cm from the soil surface. (See location "e" on the IJ Site diagram)

(6) There is a contaminated area behind the transportable trailer on the berm. The radiation measurement at the surface of the soil is ≈ 600,000 cpm with a 20 mR/hr exposure rate. The exposure rate is less than 1.5 mR/hr at 30 cm from the soil surface. (See location "f" on the IJ Site diagram)

(7) The impact hill has two areas of contamination.

(a) Location "g" on the IJ Site diagram:

240,000 cpm; 5 mR/hr(contact);
less than 1 mR/hr at 30 cm

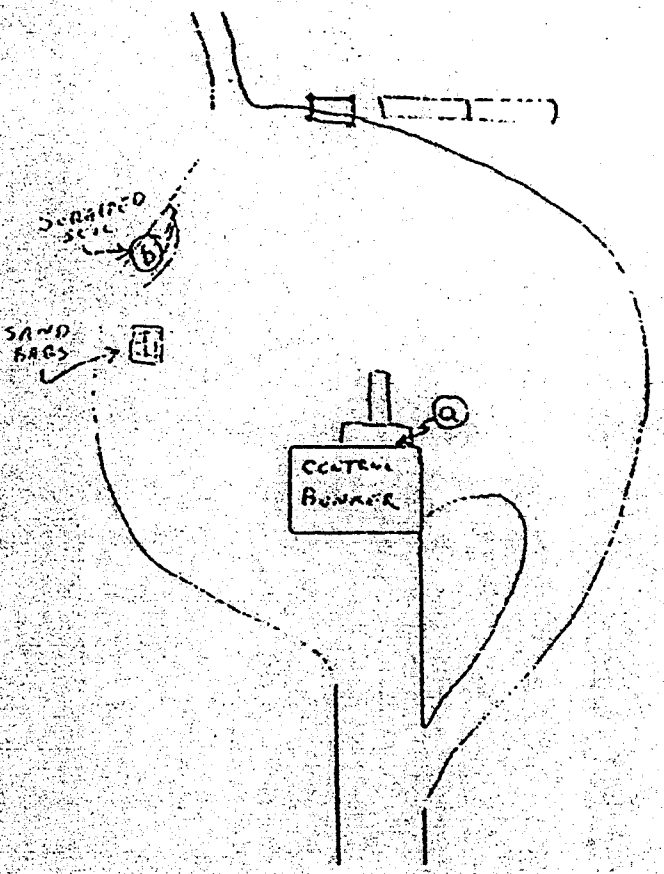
(b) Location "h" on the IJ Site diagram:

255,000 cpm; 20 mR/hr(contact)
less than 1 mR/hr at 30 cm

d. Soil Samples.

5. <u>Eenie, TA 36 Site</u>: Survey Data and Information

a. Diagram of Eenie Site



b. Background Radiation Levels. The general radiation background levels in this area is ≈ 0.1 mR/hr at 30 cm.

c. Location of D38 at Eenie Site.

(1) The blast mat in front of the control bunker has contaminated areas. The highest radiation measurement at the surface of the blast mat is ≈ 1000 cpm with a 0.1 mR/hr exposure rate. (See location "a" on the Eenie Site diagram)

(2) There are two area in the scrapped pile of soil that are contaminated, see location "b" on the Eenie Site diagram. The radiation measurement at these two area are listed below:

(a) 140,000 cpm; 5 mR/hr(contact); 0.1 mr/hr at 30 cm

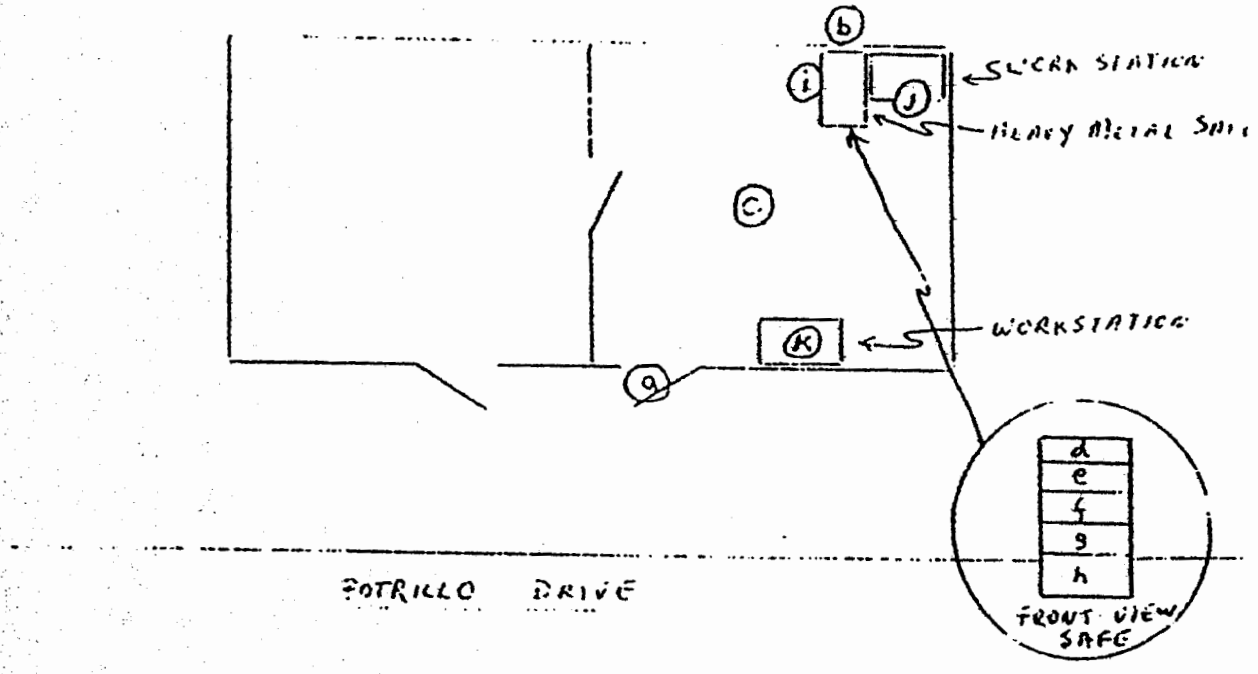
(b) 120,000 cpm; 4 mR/hr(contact); 0.1 mR/hr at 30 cm

d. **Soil Samples.** No soil taken at this location.

e. **Magazine/Makeup Building:** There is no evidence of D38 contamination in or around this building.

6. <u>Daisy Mae, TA 36 Site</u>: Survey Data and Information

a. **Diagram of Daisy Mae Site**



b. **Background Radiation Levels.** The general outside radiation background levels in this area is ≈ 0.1 mR/hr at 30 cm.

c. **Location of D38 at Daisy Mae Site.**

(1) The D38 is stored in a heavy metal safe located against the back wall of the building.

(2) No contamination was located in this room.

(3) There are elevated radiation levels inside and outside the building, possibly related to the bremsstrahlung radiation produced by the high energy beta particles of the D38 material hitting the heavy metal walls of the safe. The recorded radiation measurements and locations are listed below:

(a) Outside building at the front door → 0.1 mR/hr
(See location "a" on the Daisy Mae diagram)

(b) Outside the back of the building behind the safe area → 1 mR/hr(contact)
0.9 mR/hr(30 cm)
(See location "b" on the Daisy Mae diagram)

(c) Center of the room → 0.2 mR/hr(30 cm)
(See location "c" on the Daisy Mae diagram)

(d) Top drawer, front of safe → 1.5 mR/hr(contact)
0.4 mR/hr(30 cm)
(See location "d" on the Daisy Mae diagram)

(e) Second drawer, front of safe → 1.5 mR/hr(contact)
0.6 mR/hr(30 cm)
(See location "e" on the Daisy Mae diagram)

(f) Third drawer, front of safe → 2 mR/hr(contact)
0.8 mR/hr(30 cm)
(See location "f" on the Daisy Mae diagram)

(g) Fourth drawer, front of safe → 1.5 mR/hr(contact)
0.8 mR/hr(30 cm)
(See location "g" on the Daisy Mae diagram)

(f) Fifth drawer, front of safe → 1.5 mR/hr(contact)
0.8 mR/hr(30 cm)
(See location "h" on the Daisy Mae diagram)

(g) Side of safe, middle → 0.6 mR/hr(contact)
0.4 mR/hr(30 cm)
(See location "i" on the Daisy Mae diagram)

(h) Front edge of table, waist high → 0.2 mR/hr
(See location "j" on the Daisy Mae diagram)

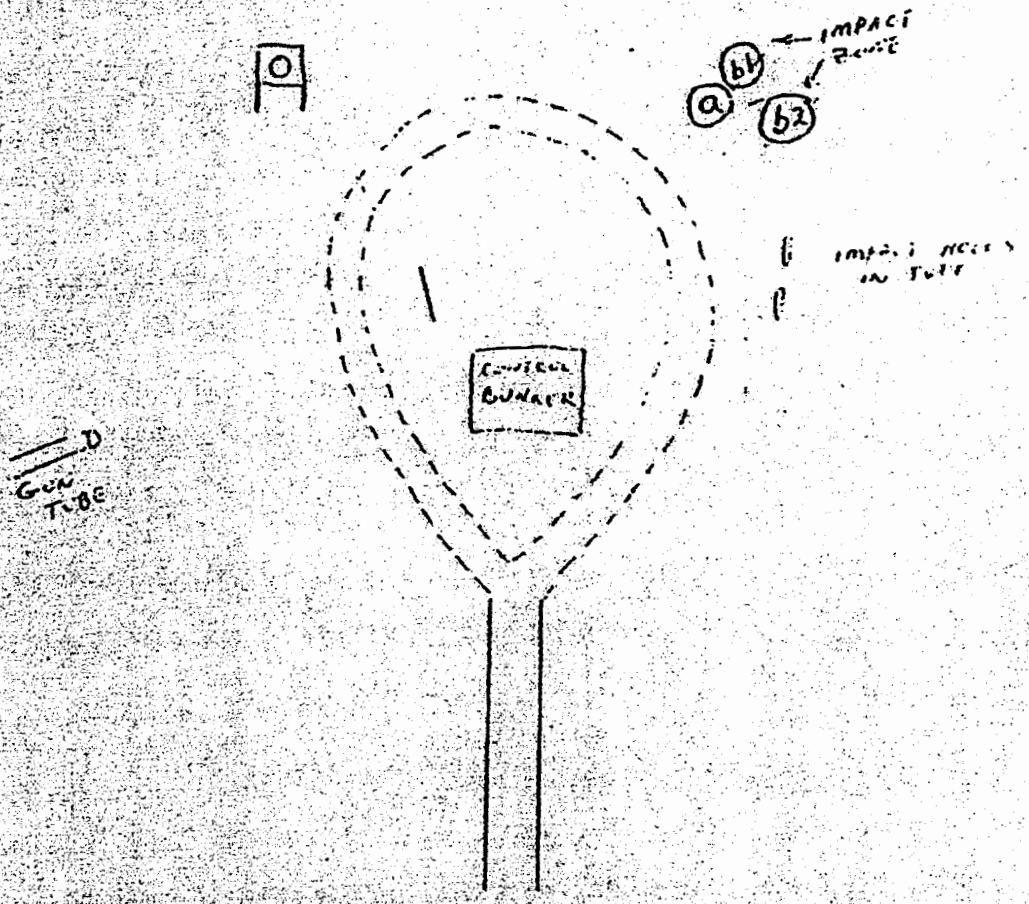
(i) Top of table → 0.1 mR/hr(contact)
0.1 mR/hr(30 cm)
(See location "k" on the Daisy Mae diagram)

d. Soil Samples. No soil taken at this location.

ROUGH DRAFT

7. **Meenie, TA 36 Site:** Survey Data and Information

a. Diagram of Meenie Site



b. Background Radiation Levels. The general outside radiation background levels in this area is ≈ 250 cpm at the surface of the soil and 0.1 mR/hr at surface of the soil and at 30 cm.

c. Location of D38 at Meenie Site.

(1) There are several small pieces of D38 in the impact area. The highest radiation measurement at the surface of the soil over a piece of D38 is ≈ 35,000 cpm with a 7 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "a" on the Meenie Site diagram)

(2) The rake at the firing point measured 500 cpm at the surface with a 0.1 mR/hr exposure rate.

(3) There was no other D38 contamination found on site.

d. Soil Samples. There were two soil samples taken in the impac area, location "b" on the Meenie Site diagram.

(1) Sample b1: 4.02×10^{-2} μCi/l

(2) Sample b2: 1.22×10^{0} μCi/l

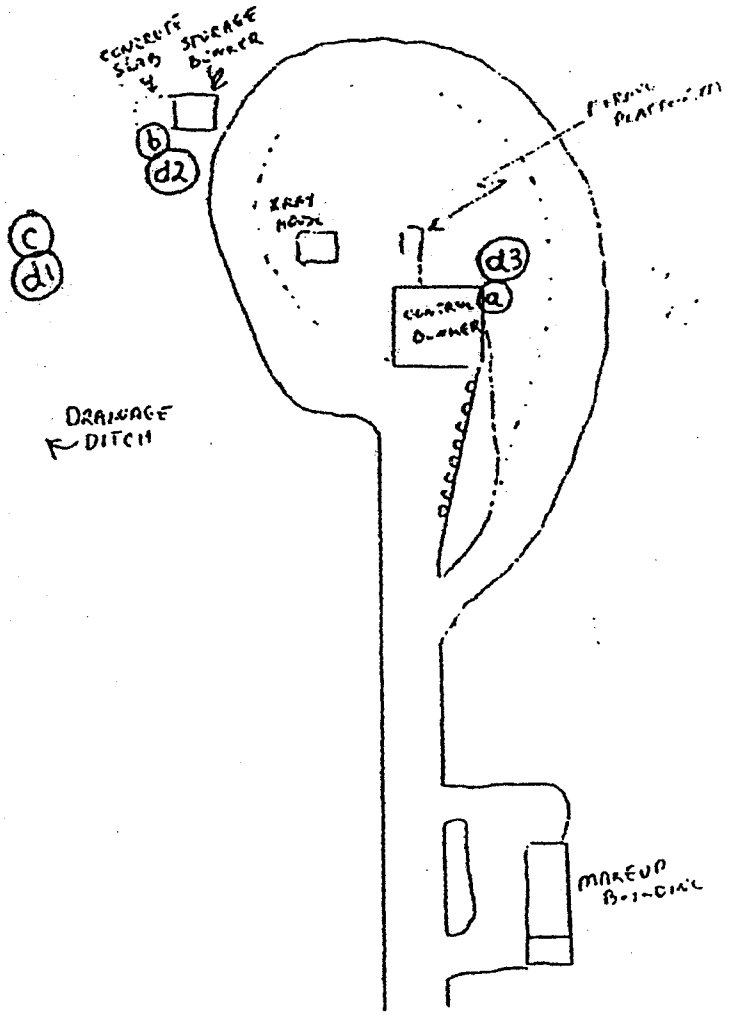
e. Magazine/Makeup Building: There is no evidence of D3 contamination in or around this building.

8. Minie Site, TA 36: Survey data and information

a. There were two surveys conducted at this site: one survey of the site prior to a weapon detonation but residual present from previous firings and one survey during and immediately after a D38 penetrator firing.

b. Survey data prior to weapon detonation.

(1) Diagram of Minnie Site (diagram 1).



(2) **Background Radiation Levels.** The general radiation background levels in this area is ≈ 300 cpm at the soil surface and less than 0.1 mR/hr at soil surface and 30 cm from the surface.

(3) **Location of D38 at Minie Site.**

(a) Eroded area by the top of the control bunker. The radiation measurement at the surface of the soil is ≈ 12,000 cpm with a 1 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. There is no visible D38 pieces in the soil. (See location "a" on the Minie Site diagram 1)

(b) The soil next to the concrete pad by the storage bunker. The radiation measurement at the surface of the soil is ≈ 2,000 cpm with a 0.1 mR/hr exposure rate. (See location "b" on Minie Site diagram 1)

(c) A measurement was taken on the side of the hill and the radiation measurement ranged from 400 to 500 cpm at the soil surface with a 0.1 mR/hr exposure rate. There are no visible D38 pieces on the hill side. (See location "c" on Minie Site diagram 1)

(4) **Soil Samples.** There were three soil samples taken in the impact area, location "d" on the Minie Site diagram 1.

(a) Sample d1: 1.02×10^{-1} uCi/l

(b) Sample d2: 1.70×10^{-2} uCi/l

(c) Sample d3: 6.97×10^{-2} uCi/l

c. Survey data during and immediately after a weapon penetrator detonation at Minie Site.

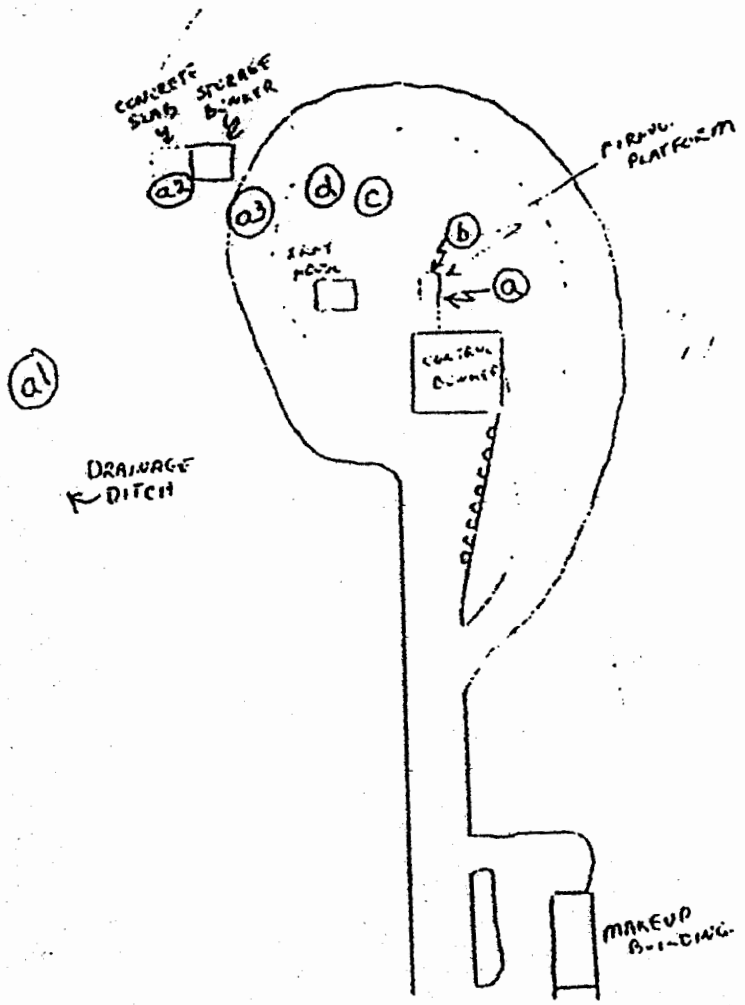
(1) There was a preliminary survey of the firing site immediately before the firing of the D38 penetrator and a air sampler was position 55 feet down wind from the firing position. The air sampler was located on the concrete pad by the storage bunker. The survey team started the survey 15 minutes after the D38 penetrator was fired.

(2) Background Radiation Levels. The general radiation background levels in this area is ≈ 300 cpm at the soil surface and less than 0.1 mR/hr at soil surface and 30 cm from the surface.

2.92 dpm/m^3 ⟶ uCi/m^3
in cloud

0.74 dpm/m^3 all Inside

(3) **Diagram of Minie Site during and immediately after. (diagram 2)**



(4) **Location of D38 at Minie Site.**

(a) Same area with elevated radiation measurement as listed above. There were no new areas of contamination noted at this site prior to the firing of the penetrator.

(b) There was a copper foil x-ray tripper at the firing site that was contaminated with D38. The radiation measurement at the surface of the copper foil was ≈ 5,000 cpm with a 6 mR/hr exposure rate. The exposure rate was less than 1 mR/hr at 30 cm from the copper foil. (See location "a" on the Minie Site diagram 2)

(c) There was a metal target that the D38 penetrator hit that was contaminated with D38. The radiation measurement at the surface of the metal target was ≈ 20,000 cpm with a 17 mR/hr exposure rate. The exposure rate was less than 1 mR/hr at 30 cm from the metal target. (See location "b" on the Minie Site diagram 2)

(d) There were two metal plates (4" x 6") that were contaminated only on one side with D38. The radiation measurement at

the surface of the metal plates were ≈ 65,000 cpm with a 12 mR/hr exposure rate and ≈ 40,000 cpm with a 7 mR/hr exposure rate. The exposure rate was less than 1 mR/hr at 30 cm from both metal plates. (See location "c" & "d" on the Minie Site diagram 2)

(5) **Air Sampler Results.** The sampler was located on the concrete pad of the storage bunker, location "e" on the Minie Site diagram.

(6) **Soil Samples.** There were three soil samples taken in the impact area, location e on the Minie Site diagram.

(a) Sample a1: (lost)

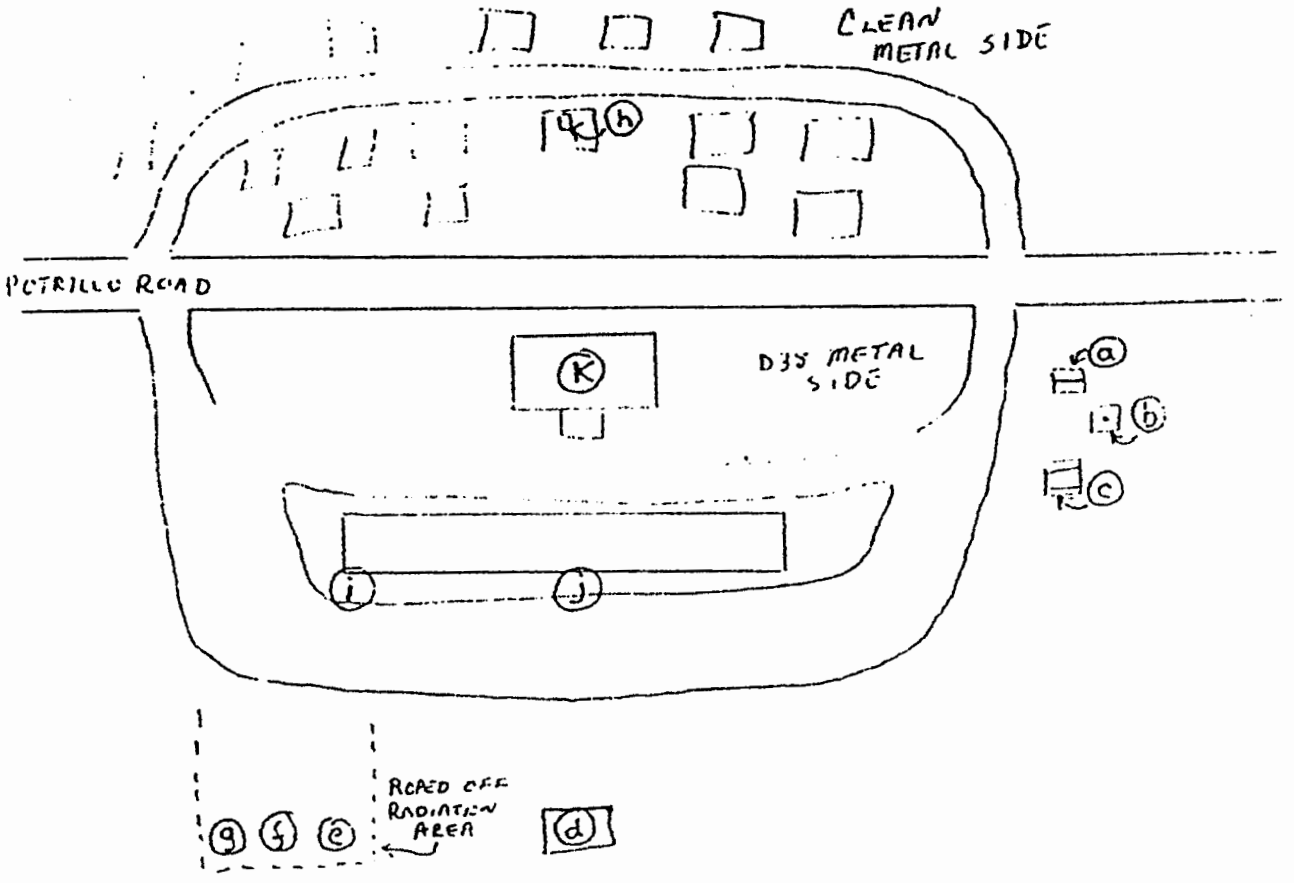
(b) Sample a2: 1.55×10^{-1} uCi/l.

(c) Sample a3: 4.36×10^{-3} uCi/l.

9. **Heavy Metal, TA 36 Site:** Survey Data and Information

a. The Heavy Metal site is the location where metal not yet involved with weapon testing is stored and metal target present during weapon testing is stored prior to evaluation.

b. Diagram of Heavy Metal Site



c. **Background Radiation Levels.** The general outside radiation background levels in this area is ≈ less than 0.1 mR/hr at 30 cm.

d. **Location of D38 at Heavy Metal Site.**

(1) There is the remains of a D38 penetrator in a metal block. The radiation measurement at the surface of the metal target was ≈ 720,000 cpm with a 50 mR/hr exposure rate. The exposure rate is less than 3 mR/hr at 30 cm from the metal target. (See location "a" on the Heavy Metal Site diagram)

(2) There is the remains of a D38 penetrator in another metal block. The radiation measurement at the surface of the metal target was ≈ 600,000 cpm with a 25 mR/hr exposure rate. The exposure rate is less than 0.8 mR/hr at 30 cm from the metal target. (See location "b" on the Heavy Metal Site diagram)

(3) There is a hole in a metal structure that is contaminated with D38. The radiation measurement at the surface of the metal target was ≈ 700,000 cpm with a 40 mR/hr exposure rate. The exposure rate is ≈ 1 mR/hr at 30 cm from the metal target. (See location "c" on the Heavy Metal Site diagram)

(4) There is a metal plate on a wooden pallet that is contaminated with D38. The radiation measurement at the surface of the metal target was ≈ 120,000 cpm with a 7 mR/hr exposure rate. The exposure rate is ≈ less than 1 mR/hr at 30 cm from the metal plate. (See location "d" on the Heavy Metal Site diagram)

(4) There is a metal plate on a wooden pallet in the roped off radiation area that is contaminated with D38. The radiation measurement at the surface of the metal target was ≈ 80,000 cpm with a 3 mR/hr exposure rate. The exposure rate is ≈ less than 0.1 mR/hr at 30 cm from the metal plate. (See location "e" on the Heavy Metal Site diagram)

(5) There is a metal plate on the middle wooden pallet in the roped off radiation area that is contaminated with D38. The radiation measurement at the surface of the metal target was ≈ 160,000 cpm with a 7 mR/hr exposure rate. The exposure rate is ≈ less than 0.1 mR/hr at 30 cm from the metal plate. (See location "f" on the Heavy Metal Site diagram)

(6) There are two metal plates on another wooden pallet in the roped off radiation area that is contaminated with D38. The radiation measurement at the surface of the metal target was ≈ 120,000 cpm with a 5 mR/hr exposure rate and ≈ 110,000 cpm with a 4 mR/hr exposure rate. The exposure is ≈ less than 0.1 mR/hr at 30 cm from both metal plates. (See location "g" on the Heavy Metal Site diagram)

(7) There is a metal plate on the clean metal side of the road that is contaminated with D38. The radiation measurement at the surface of the metal plate is ≈ 1,000 cpm with a 0.2 mR/hr exposure rate. The exposure rate is ≈ less than 0.1 mR/hr at 30 cm from the

metal plate. (See location "h" on the Heavy Metal Site diagram)

e. Radiation Levels.

(1) There are elevated radiation levels outside a metal building. The highest radiation measurement was detected at the corner of the metal building which was ≈ 0.7 mR/hr waist high and 10 cm from the metal building wall, see location "i" on the Heavy Metal Site diagram.

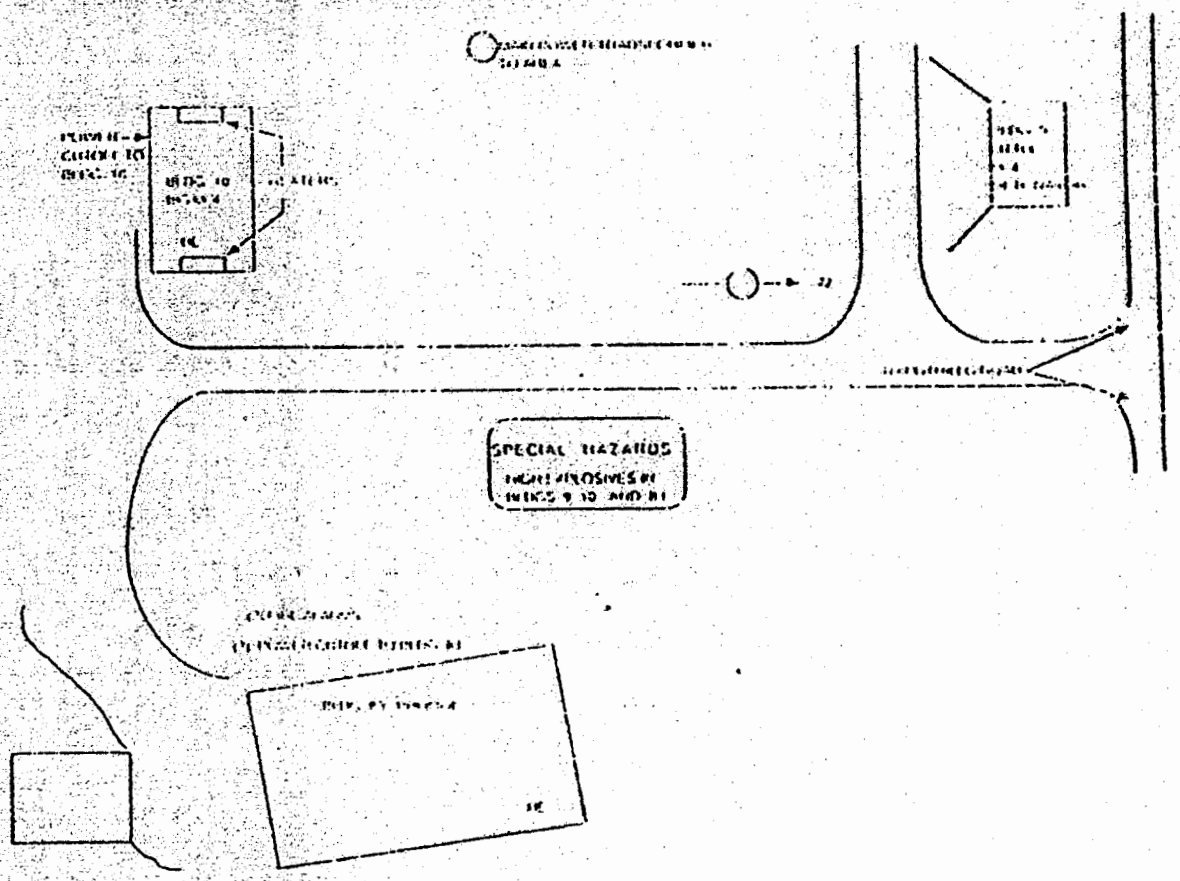
(2) The radiation level decrease towards the middle of the building which was ≈ 0.2 mR/hr waist high and 10 cm from the metal building wall, see location "j" on the Heavy Metal Site diagram.

(3) The radiation level inside the evaluation work area was 0.1 mR/hr or less, see location "k" on the Heavy Metal Site diagram.

f. Soil Samples. No soil taken at this location.

10. <u>Moe Magazine Site, TA-36</u>.

a. Diagram of Moe Magazine Site.

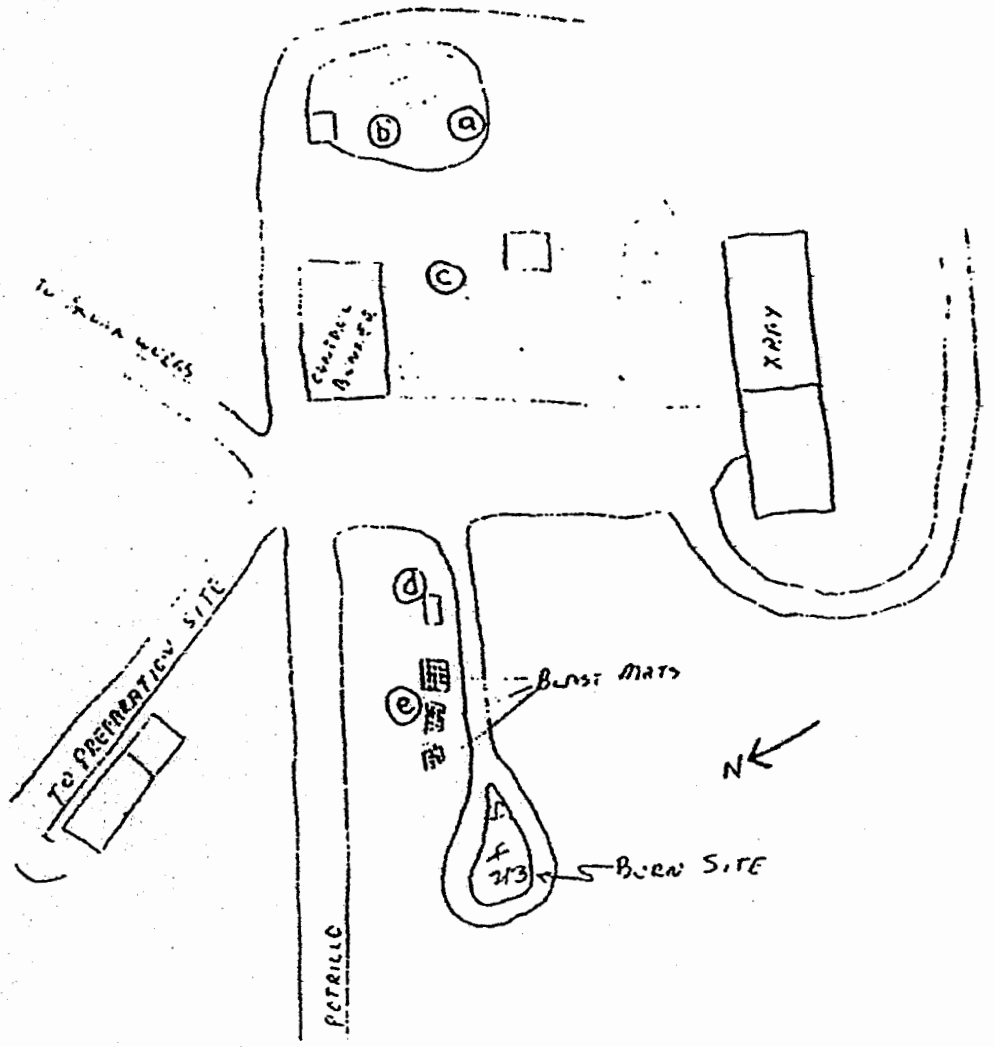


b. Background Radiation Levels. The general outside radiation background levels in this area is ≈ 250 cpm at the surface of the soil and less than 0.1 mR/hr at the 30 cm.

c. Radiation Levels. The radiation levels inside and outside the three magazines, Little Moe, Big Moe and Pro Moe, were background levels. No evidence of contamination at this site.

11. Lower Slobbovia Site, TA 36.

a. Diagram of Lower Slobbovia.



c. Background Radiation Levels. The general outside radiation background levels in this area is ≈ less than 0.1 mR/hr at 30 cm.

d. Location of D38 at Lower Slobbovia Site.

(1) There is a small piece of D38 on the mound of soil. The radiation measurement at the surface of the soil is ≈ 500 cpm with a 0.2 mR/hr exposure rate. The exposure rate is less than 0.1 mR/hr at 30 cm from the soil. (See location "a" on the Lower Slobbovia Site diagram)

(2) There is a small piece of D38 on the mound of soil. The radiation measurement at the surface of the soil is ≈ 2,000 cpm with a 0.4 mR/hr exposure rate. The exposure rate is less than 0.1 mR/hr at 30 cm from the soil. (See location "b""on the Lower Slobbovia Site diagram)

(3) There is a small piece of D38 on the mound of soil. The radiation measurement at the surface of the soil is ≈ 10,000 cpm with a 0.5 mR/hr exposure rate. The exposure rate is less than 0.1 mR/hr at 30 cm from the soil. (See location "c" on the Lower Slobbovia Site diagram)

(4) There is a pitted 4 x 8 foot metal plate that is contaminated with D38. This metal plate is located next to the dirt road of the burning site. The radiation measurement at the surface of the metal plate is ≈ 10,000 cpm with a 0.5 mR/hr exposure rate. The exposure rate is less than 0.1 mR/hr at 30 cm from the metal plate. (See location "d" on the Lower Slobbovia Site diagram)

(5) The blast mats next to the dirt road of the burning site are contaminated with D38. The highest radiation measurement at the surface of the blast mat is ≈ 1500 cpm with a 0.8 mR/hr exposure rate. The exposure rate is less than 0.1 mR/hr at 30 cm from the blast mat. (See location "e" on the Lower Slobbovia Site diagram)

e. Soil Samples. There were three soil samples taken in the burn area, see location "f" on the Lower Slobbovia diagram.

(a) Sample f1: 1.2×10^{-1} uCi/gm

(b) Sample f2:

(c) Sample f3: 9×10^{-1} uCi/l (?)

12. Skunk Works Site, TA-36.

a. Background Radiation Levels. The general outside radiation background levels in this area is ≈ 500 cpm at the surface of the soil and less than 0.15 mR/hr at the 30 cm.

b. There is no evidence of D38 contamination at this site. The radiation levels were background levels outside and inside the two buildings located at this site.

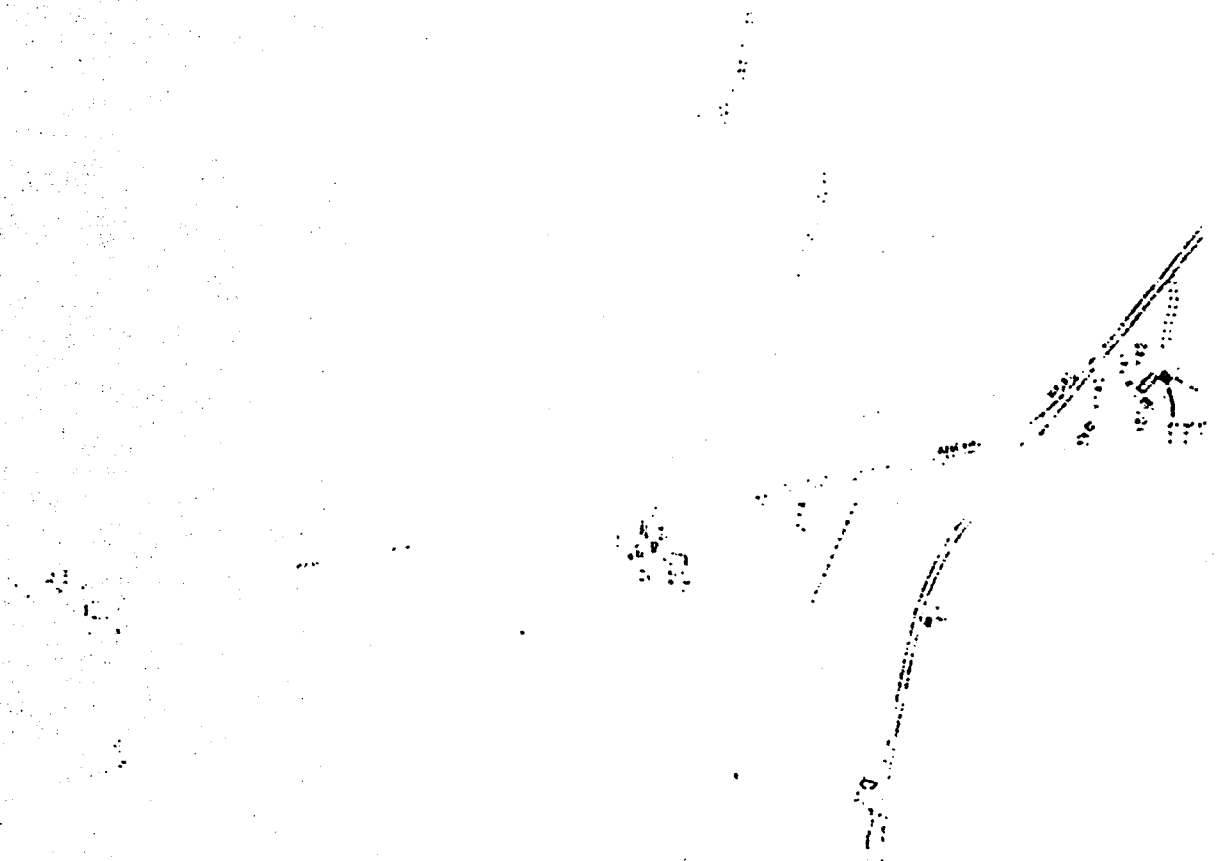
Annex D ROUGH DRAFT

Survey Data
TA 39

1. This location was surveyed on 24 July 1991 by Gerald A. Schlapper and James R. Bland, HSE -1. The following area were surveyed:

a. Site 6
b. Site 7/57
c. Site 8
d. Site 56
e. Site 88
f. Dump site for soil

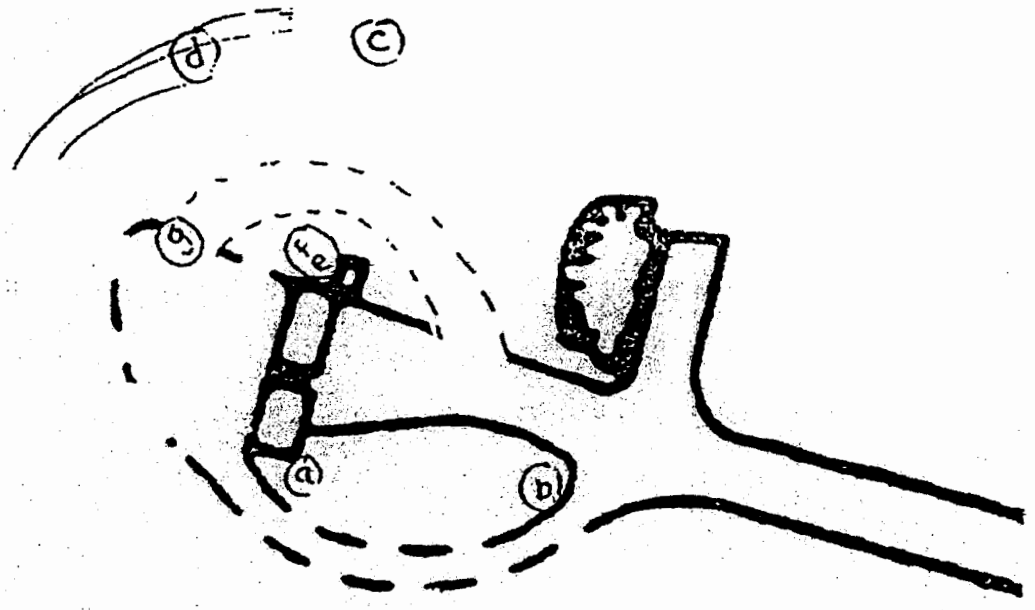
2. Diagram of the Entire TA 39 Site.



3. Instrumentation. The instrumentation used to survey this site a list in paragraph B.2., and B.3..

4. Site 6, TA 39: Survey data and information

a. Diagram of Site 6.



b. Background Radiation Levels. The general outside radiation background levels in this area is ≈ less than 0.1 mR/hr at 30 cm from the soil.

c. Location of D38 at Site 6, TA-39.

(1) There are several small pieces of D38 on the soil. The highest radiation measurement at the surface of the soil is ≈ 20,000 cpm with a 3 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "a" on the Site 6 diagram)

(2) There is a small piece of D38 in the drainage ditch. The radiation measurement at the surface of the soil is ≈ 40,000 cpm with a 2 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "b" on the Site 6 diagram)

(3) There is a small piece of D38 on the side of the hill The radiation measurement at the surface of the soil is ≈ 15,000 cp with a 1.8 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "c" on the Site 6 diagram)

(4) There is a small piece of D38 on the side of the hill. The radiation measurement at the surface of the soil is ≈ 500 cpm with a 0.1 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "d" on the Site 6 diagram)

(5) There is a small piece of D38 on the soil. The radiation measurement at the surface of the soil is ≈ 10,000 cpm with a 0.9 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "e" on the Site 6 diagram)

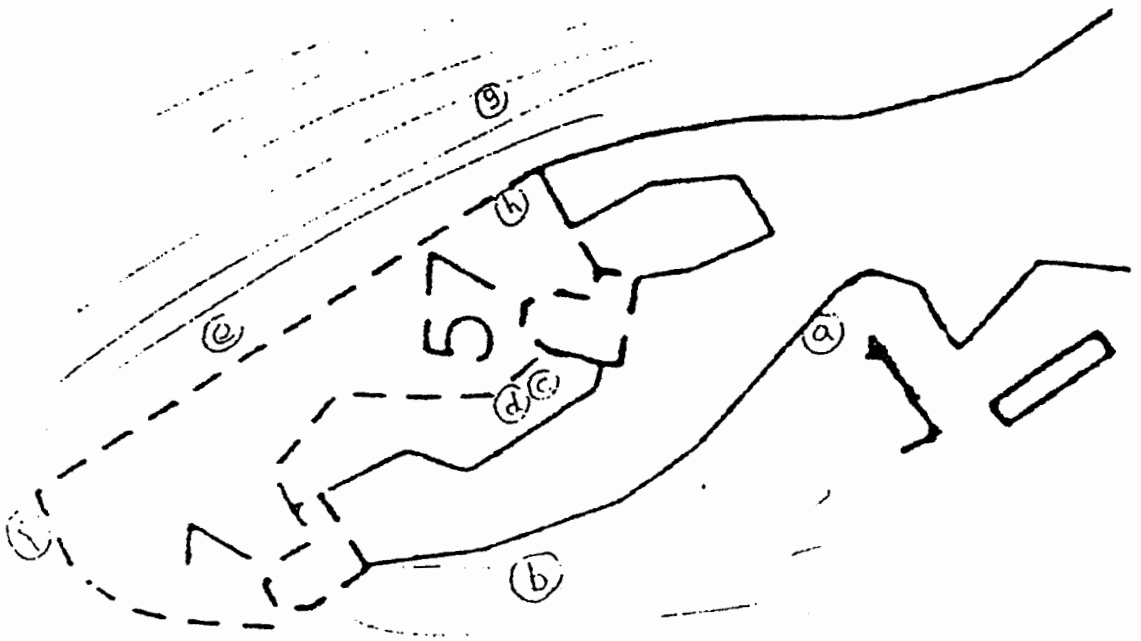
(6) There is a small piece of D38 on the soil. The radiation measurement at the surface of the soil is ≈ 30,000 cpm with a 2 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "f" on the Site 6 diagram)

(4) There is a small piece of D38 on the soil. The radiation measurement at the surface of the soil is ≈ 25,000 cpm with a 2 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "g" on the Site 6 diagram)

d. Soil Samples. There was no soil sample taken at this site.

5. <u>Site 7/57, TA 39</u>: Survey data and information

a. Diagram of Site 7/57.



b. Background Radiation Levels. The general outside radiation background levels in this area is ≈ 0.1 mR/hr at 30 cm from the soil.

c. **Location of D38 at Site 7/57, TA-39.**

(1) There is an area where the radiation level is approximately twice the normal background of the area. The radiation measurement is ≈ 500 cpm with a 0.2 mR/hr at the surface of the ground. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "a" on the Site 7/57 diagram)

(2) There are numerous small pieces of D38 on the hill side. The highest radiation measurement at the surface of the soil is ≈ 100,000 cpm with a 35 mR/hr exposure rate. The exposure rate is 0.3 mR/hr at 30 cm from the soil surface. (See location "b" on the Site 7/57 diagram)

(3) There is a small piece of D38 on top of the bunker area. The radiation measurement at the surface of the soil is ≈ 45,000 cpm with a 6 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "c" on the Site 7/57 diagram)

(4) There are numerous small pieces of D38 along the edge of the firing site. The highest radiation measurement at the surface of the soil is ≈ 1,000 cpm with a 0.2 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "d" on the Site 7/57 diagram)

(5) There are numerous small pieces of D38 along the edge of the firing site. The highest radiation measurement at the surface of the soil is ≈ 100,000 cpm with a 30 mR/hr exposure rate. The exposure rate is 0.2 mR/hr at 30 cm from the soil surface. (See location "e" on the Site 7/57 diagram)

(6) There is a small piece of D38 on the soil. The radiation measurement at the surface of the soil is ≈ 300,000 cpm with a 30 mR/hr exposure rate. The exposure rate is 0.2 mR/hr at 30 cm from the soil surface. (See location "f" on the Site 6 diagram)

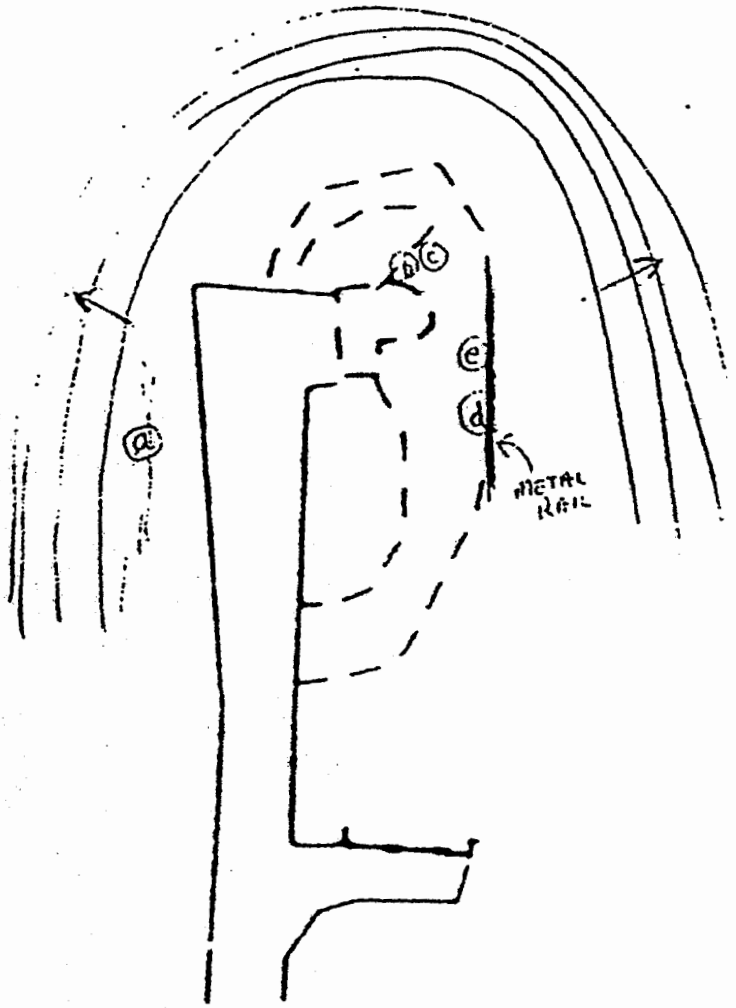
(7) There is a small piece of D38 at base of the hill and the firing site. The radiation measurement at the surface of the soil is ≈ 20,000 cpm with a 2 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "g" on the Site 7/57 diagram)

(8) There is a small piece of D38 on the side of the hill. The radiation measurement at the surface of the soil is ≈ 45,000 cpm with a 4 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "h" on the Site 6 diagram)

d. **Soil Samples.** There was no soil sample taken at this site.

6. **Site 8, TA 39**: Survey data and information

a. Diagram of Site 8.



b. Background Radiation Levels. The general outside radiation background levels in this area is ≈ 0.1 mR/hr at 30 cm from the soil.

c. Location of D38 at Site 8, TA-39.

(1) There is a small piece of D38 in the drainage ditch. The radiation measurement at the surface of the soil is ≈ 20,000 cpm with a 5 mR/hr exposure rate. The exposure rate is 0.4 mR/hr at 30 cm from the soil surface. (See location "a" on the Site 8 diagram)

(2) There is a small piece of D38 on top of the bunker area. The radiation measurement at the surface of the soil is ≈ 20,000 cpm with a 8 mR/hr exposure rate. The exposure rate is 0.2 mR/hr at 30 cm from the soil surface. (See location "b" on the Site 8 diagram)

(3) There is a 1½ by 3 inch piece of D38 on top of the bunk area. The radiation measurement at the surface of the piece of D38 is ≈ 40,000 cpm with a 40 mR/hr exposure rate. The exposure rate is 0.4 mR/hr at 30 cm from the soil surface. (See location "c" on the Site 8 diagram)

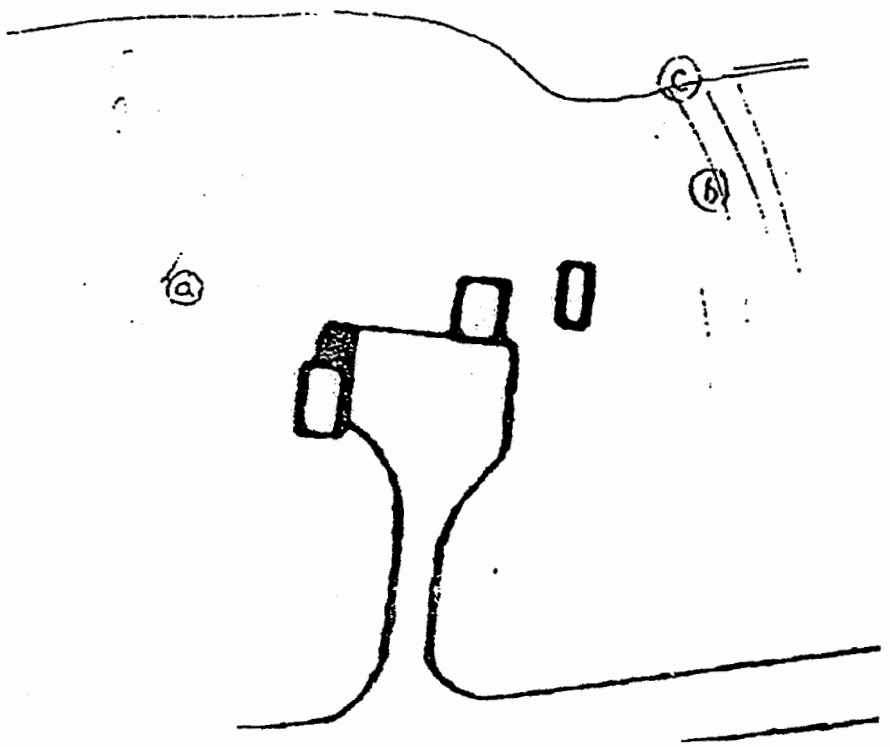
(4) There is a metal rail that has numerous pits that are contaminated with D38. The highest radiation measurement at the surface of the soil is ≈ 15,000 cpm with a 0.4 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "d" on the Site 8 diagram)

(5) There is a 1 by 1 inch piece of D38 on the soil next to the metal rail. The radiation measurement at the surface of the piece of D38 is ≈ 30,000 cpm with a 40 mR/hr exposure rate. The exposure rate is 0.4 mR/hr at 30 cm from the soil surface. (See location "e" on the Site 8 diagram)

d. **Soil Samples.** There was no soil sample taken at this site.

7. <u>Site 56, TA 39</u>: Survey data and information

a. Diagram of Site 56.



b. Background Radiation Levels. The general outside radiation background levels in this area is ≈ 0.1 mR/hr at 30 cm from the soil..

c. Location of D38 at Site 56, TA-39.

(1) There is a elevated radiation level at the ant mound. The radiation measurement at the surface of the soil is ≈ 2,000 cpm with a 0.5 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "a" on the Site 56 diagram)

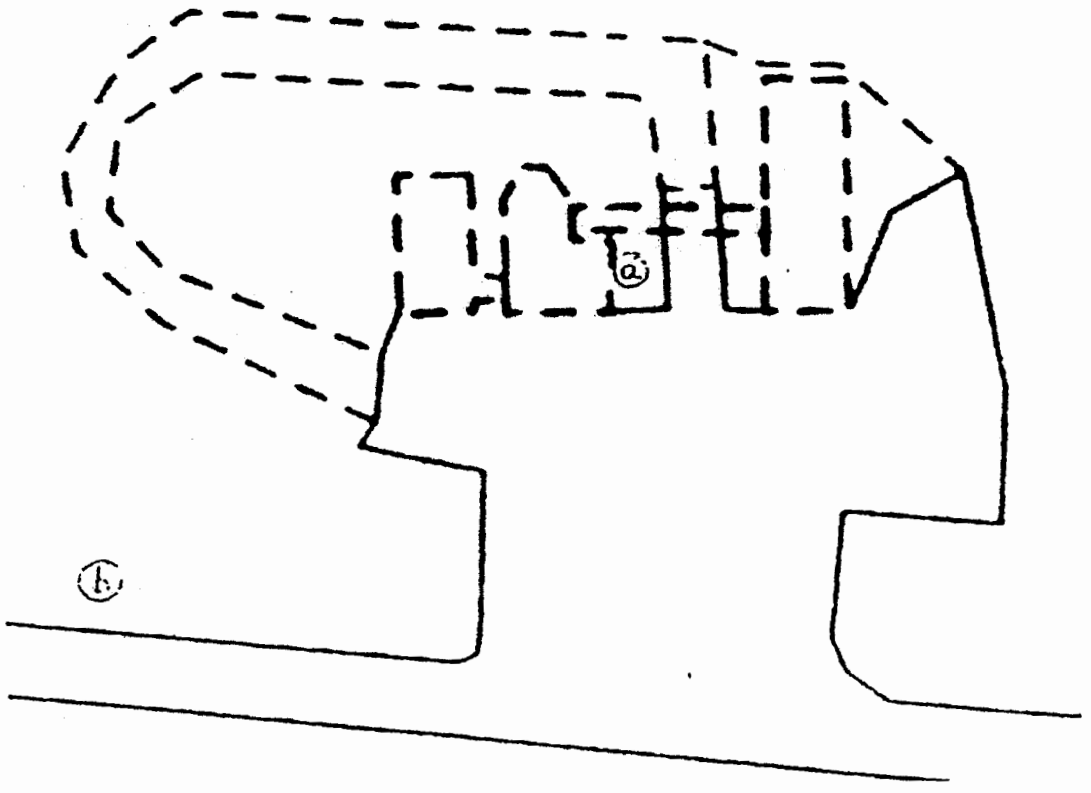
(2) There are numerous small pieces of D38 along the edge of the hill side. The highest radiation measurement at the surface of the soil is ≈ 40,000 cpm with a 3 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "b" on the Site 56 diagram)

(3) There is a small piece contaminated metal in a hole on the side of the impact cliff. The radiation measurement at the surface of the soil is ≈ 20,000 cpm with a 0.4 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "c" on the Site 56 diagram)

d. Soil Samples. There was no soil sample taken at this site.

8. Site 88, TA 39: Survey data and information

a. Diagram of Site 88.



b. Background Radiation Levels. The general outside radiation background levels in this area is ≈ 0.1 mR/hr at 30 cm from the soil.

c. Location of D38 at Site 88, TA-39.

(1) There is a small piece of D38 in the drainage ditch. The radiation measurement at the surface of the soil is ≈ 70,000 cpm with

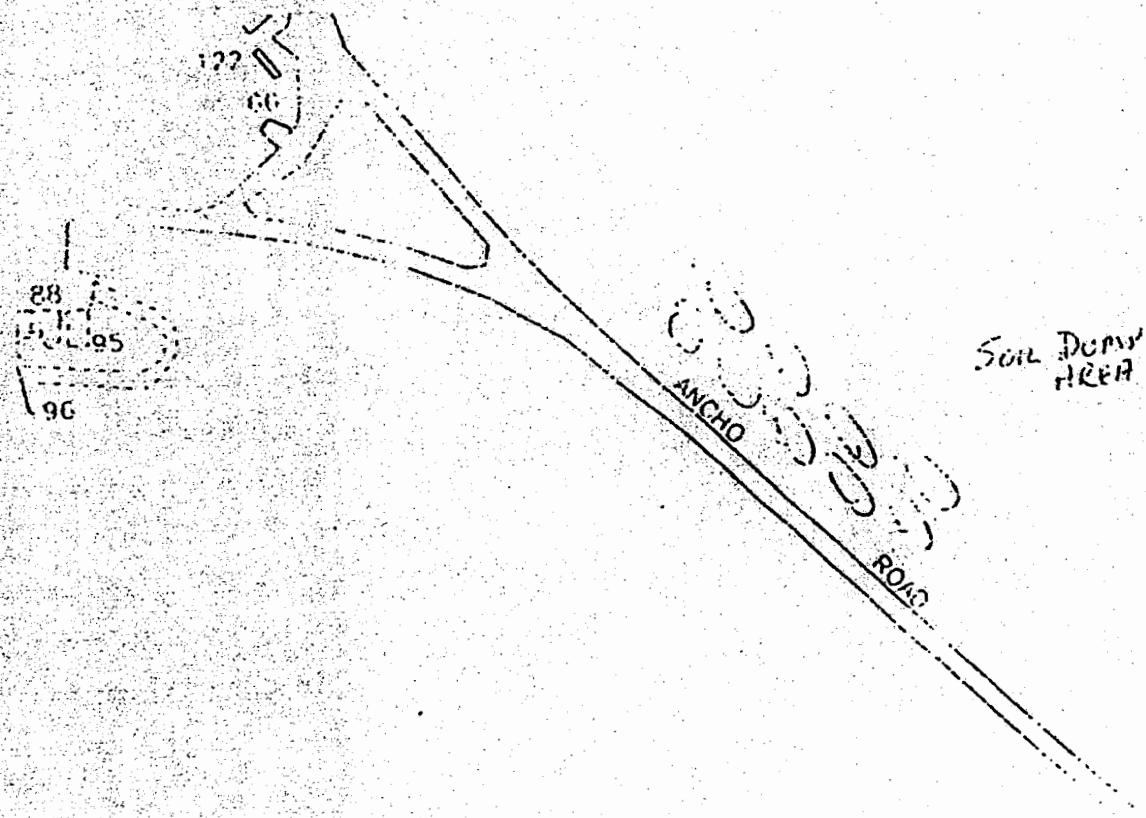
a 4 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm fro… the soil surface. (See location "a" on the Site 88 diagram)

(2) The is a pitted piece of metal, 1½ by 2½ feet, that is contaminated with D38. The highest radiation measurement at the surface of the metal plate is ≈ 20,000 cpm with a 1.5 mR/hr exposure rate. The exposure rate is 0.1 mR/hr at 30 cm from the soil surface. (See location "b" on the Site 88 diagram)

d. Soil Samples. There was no soil sample taken at this site.

9. Soil Dump Site Along Ancho Road, TA 39: Survey data and information

a. Diagram of Soil Dump Site.



b. Background Radiation Levels. The general outside radiation background levels in this area is ≈ 0.1 mR/hr at 30 cm from the soil.

c. Location of D38 at Soil Dump Site, TA-39.

(1) The background radiation levels were between 500 to 2,000 cpm with a 0.1 mR/hr exposure rate in the entire area.

(2) There was some concrete with a threaded metal rod that was contaminated. The radiation measurement at the surface of the soil is ≈ 2,000 cpm with a 0.1 mR/hr exposure rate. The exposure rate is 0.1

mR/hr at 30 cm from the soil surface. (See location "a" on the Soil Dump Site diagram)

d. Soil Samples. There was no soil sample taken at this site.

ROUGH DRAFT

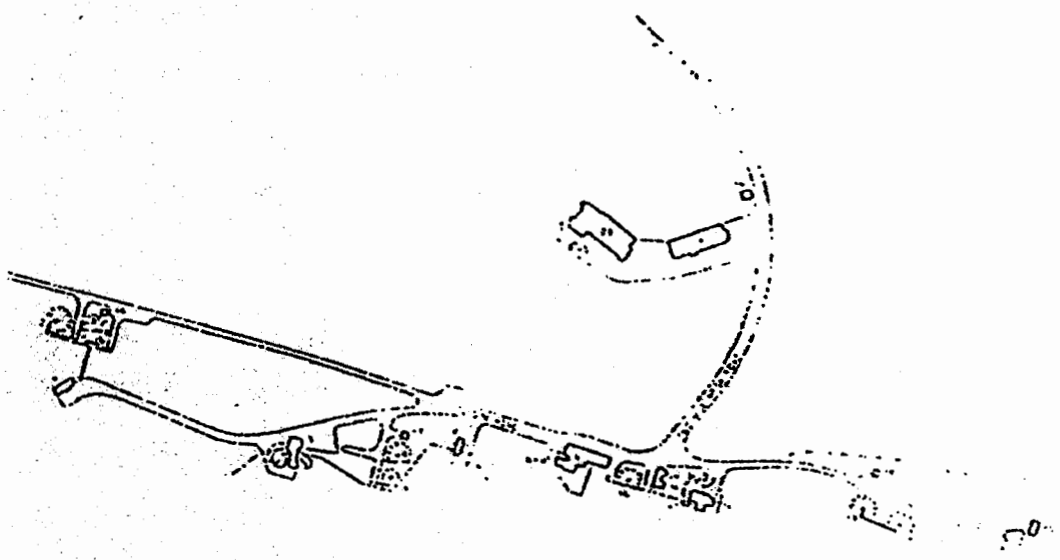
Annex E

Survey Data
TA 40

1. This location was surveyed on 22 July 1991 by Gerald A. Schlapper and James R. Bland, HSE -1. The following area were surveyed:

a. Site 4
b. Site 5
c. Site 8
d. Site 12
e. Site 15

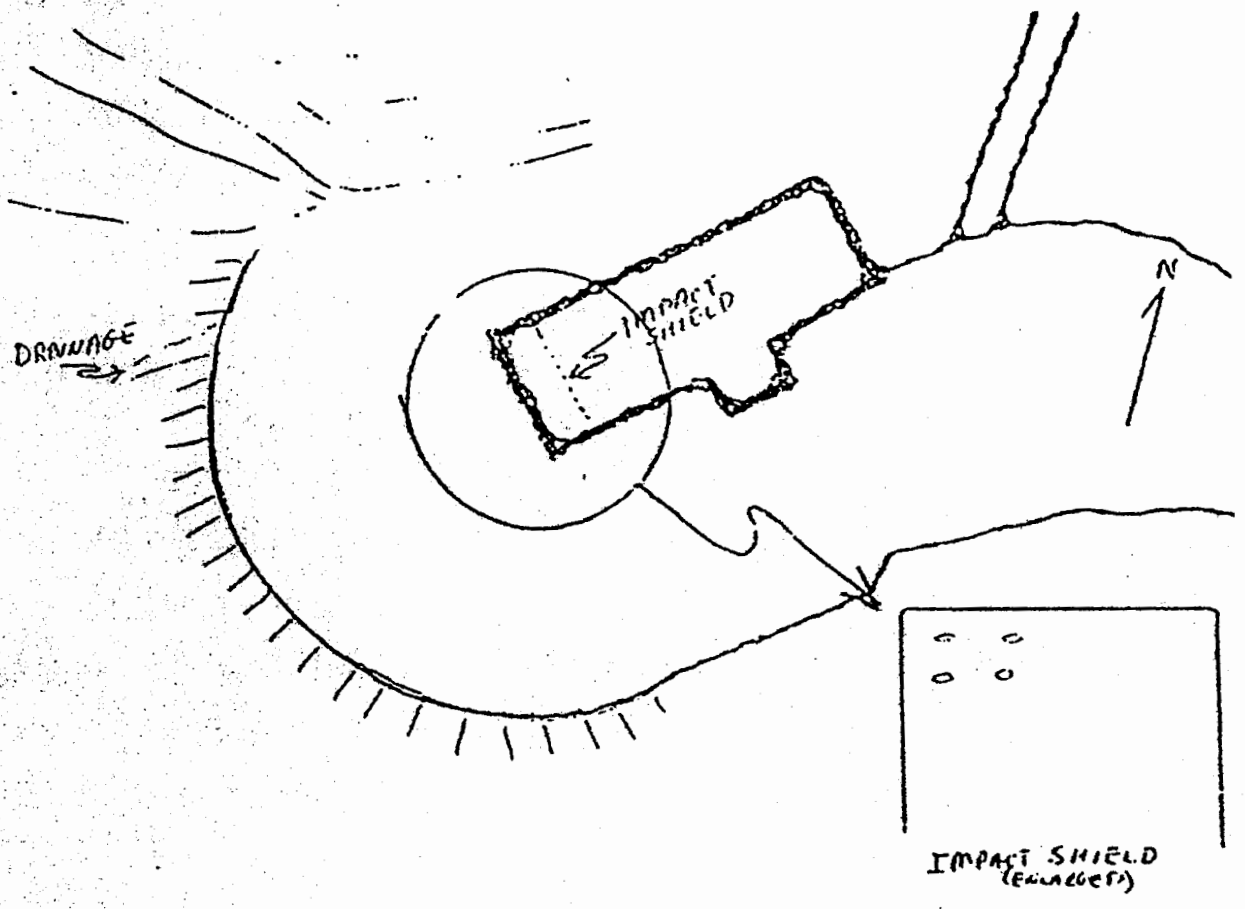
2. Diagram of the Entire TA 40 Site.



3. Instrumentation. The instrumentation used to survey this site are list in paragraph B.1., and B.4..

4. <u>Site 4, TA 40</u>: Survey data and information

a. Diagram of Site 4.



b. Background Radiation Levels. The general outside radiation background levels in this area is ≈ less than 0.1 mR/hr at 30 cm from the soil.

c. Location of D38 at Site 4, TA-40.

(1) There were numerous contaminated pits on the impact metal wall. The radiation measurements at the surface of the metal wall are listed below:

(a) Upper left, location "a" → 20,000 cpm
0.7 mR/hr(contact)
< 0.1 mR/hr(30 cm)

(b) Lower left, location "b" → 15,000 cpm
0.8 mR/hr(contact)
< 0.1 mR/hr(30 cm)

(c) Upper middle, location "c" → 20,000 cpm
1.6 mR/hr(contact)
< 0.1 mR/hr(30 cm)

(d) Lower middle, location "d" → 1,500 cpm
0.1 mR/hr(contact)
< 0.1 mR/hr(30 cm)

(2) There is a small piece of D38 in the drainage ditch. The radiation measurement at the surface of the soil is ≈ 10,000 cpm with a 0.4 mR/hr exposure rate. The exposure rate is less than 0.1 mR/hr at 30 cm from the soil surface. (See location "e" on the Site 4 diagram)

d. Soil Samples. There was no soil sample taken at this site.

5. Site 5, TA 40: Survey data and information

There was no evidence of any D38 contamination at this site. The radiation measurements were 100 to 200 cpm with a 0.1 mR/hr exposure rate, background value. There was no soil sample taken at this site.

6. Site 8, TA 40: Survey data and information

There was no evidence of any D38 contamination at this site. The radiation measurements were 100 to 200 cpm with a 0.1 mR/hr exposure rate, background value. There was no soil sample taken at this site

7. Site 12, TA 40: Survey data and information

There was no evidence of any D38 contamination at this site. The radiation measurements were 100 to 200 cpm with a 0.1 mR/hr exposure rate, background value. There was no soil sample taken at this site.

8. Site 15, TA 40: Survey data and information

There was no evidence of any D38 contamination at this site. The radiation measurements were 100 to 200 cpm with a 0.1 mR/hr exposure rate, background value. There was no soil sample taken at this site.