SONGS HP INDIVIDUAL TASK ASSIGNMENT (ITA)

A. ORIGINATOR: Complete this Section, individual assigning ITA is to complete Section B.

1) Name (Print) R D Wernack 2) Enter your next ITA number E8A-311

3) Describe Task Confirm conclusions reached in referenced memo, inspect site.

4) Describe what constitutes completion Memo documenting above.

5) List appropriate references Memo from C Hobby → B Graham, (and results of radiation survey).

6) Sign and Date R D Wernack 1-25-84

B. ASSIGNOR(S): Compliance with this Section is indicated by your signature or initials below.

1) All necessary documents are to be referenced and/or readily available and/or attached.

2) Prime assignor and assignee discuss this ITA and agree on Prime Due Date, assignor enters:
PRIME DUE DATE* of 2-24-84 Assigned to J Cooper By RDW On 1-25-84

3) Subsequent assignor and assignee discuss and agree on Sub Due Date, assignor enters:
SUB DUE DATE* of _____ Assigned to _____ By _____ On _____

4) Assignor(s) gives original ITA to assignee and forwards a copy to TAC Coordinator.

*Prime Due Dates should be at least 5 calendar days beyond the date when task first assigned and Sub Due Dates must not be later than Prime Due Dates.

C. DUE DATE EXTENTION REQUEST: This Section is not a substitute for the Prime Due Date in Section B which must be agreed to between assignor/assignee prior to establishment. Required extensions, initiated by assignee, are to be requested as far in advance of the pending due date(s) as possible whenever completion date problems are identified.

1) New SUB DUE DATE of _____ Requested By _____ On _____

2) New PRIME DUE DATE of _____ Requested By _____ On _____

3) Reason why due date cannot be met _____

4) New SUB DUE DATE of _____ Approved By _____ On _____

5) New PRIME DUTE DATE of _____ Approved By _____ On _____

6) Copy of ITA forwarded to TAC Coordinator By _____

D. TASK COMPLETION: To be completed by assignee and forwarded to originator.

1) Statement of completed action COMPLETED THE REQUESTED MEMO

2) Date completed 2-21-84

3) Is a copy of completion document attached ✓ Yes (ACTION IS NOT COMPLETE WITHOUT THIS)

4) Signature of Assignee J Cooper

5) Originator is to forward original ITA and supporting documentation to TAC Coordinator.

To TACC on _____ date, By _____

Distribution: White - Originator Canary & Pink - Assignee Goldenrod - TAC Coordinator

CE 50(111) 107 REV. 04/01/82

MEMORANDUM FOR FILE

February 17, 1984

SUBJECT: "Old Highway 101 Land Fill"

REFERENCES:
1) Radiation Survey Report, C. Holle to B. Graham, dated April 17, 1981
2) Letter, R. Melgard (EAL Corporation) to B. Graham (SONGS Chemistry), dated April 3, 1981; Subject: "Soil Sample Results"

On January 12, 1984, a telephone conversation occurred between Mr. B. Graham, SONGS Environmental Monitoring, and Mr. G. Yuhas, USNRC-Region V. Mr. Yuhas inquired about the results of a Station investigation regarding the possible presence of plant-generated radioactivity in the "Old Highway 101 Land Fill." He recommended that Station review the results of radiation surveys and isotopic analyses of soil samples obtained at the land fill to determine the need for a 10 CFR 20.302 submittal.

The purpose of this Memorandum is to document Station's evaluation of all available radiological data relating to the land fill site and to close the issue.

BACKGROUND:

During the March 1980 - June 1981 Unit 1 outage, TMI retrofit projects required the removal of soil from radiologically controlled areas. Isotopic analyses of samples of the excavated material revealed the presence of low level radioactive contamination.

As a result of those findings, Station investigated disposal methods for previous excavations at SONGS Unit 1 to determine whether or not contaminated soil had been inadvertently released.

It was determined that the only significant excavation which had previously been experienced at Unit 1 was performed during the October 1976 - March 1977 outage when a significant amount of substrate was removed to allow construction of the Diesel Generator and Biological Shield structures. Through interviews with individuals who worked on those projects, the location of the disposal site for the excavated material was also determined.

SURVEYS AND ANALYSES:

Reference 1 describes an extensive radiation survey conducted of the "land fill" area in March 1981. Exposure rates between 5 µR/hr and 15 µR/hr were measured by Ludlum Model 19 Micro-R-Meters. Those readings were well within the normal range for natural background radiation. The surveyor concluded that there was no evidence of radioactive contamination. That conclusion is substantiated by the results of isotopic analyses performed by EAL Corporation, a contract laboratory, on three soil samples obtained from the land fill. Reference 2 reports those results, and indicates only naturally occurring radon and thoron daughter products. No radioactive activation or fission products were identified.

DISCUSSION:

Though all exposure rate measurements were within the range of natural background radiation, the radiation survey map, contained in Reference 1, seemed to indicate a localized area with slightly elevated readings (14-15 µR/hr). To evaluate that anomaly, the land fill site was visited.

The "old land fill" is located approximately 1 1/2 miles south of the new Edison Training and Education Center. The land fill is accessible by the frontage road that parallels Interstate 5 on its east side. The site consists of two ravines which run from the frontage road, join near Interstate 5, and terminate in a culvert which continues under the Interstate. The area is heavily overgrown with foilage, although dirt mounds and broken concrete are visible.

Exposure rates of 5 µR/hr to 10 µR/hr were observed in and around the ravine using an Eberline PRM-7 Micro-R-Meter. The readings were not increased by placing the meter in contact with the material that had obviously been off-loaded there. Special attention was paid to the area which showed the highest readings during the referenced survey. The points which showed elevated readings during the 1981 survey were located and exposure rate measurements were made. The exposure rate observed on the shoulder of the road was 8 µR/hr to 10 µR/hr. The exposure rate measured on the surface of the concrete road was 14 µR/hr to 16 µR/hr. Similar measurements were obtained along the road in the vicinity of the ravine with identical results. An analogous set of measurements made at a location approximately 1/4 mile north of the land fill demonstrated comparable results.

It is obvious that the elevated exposure rates are the result of natural radioactivity in the concrete of the road.

CONCLUSION:

Based on the results of GeLi analyses performed by the contract environmental laboratory, the extensive radiation survey performed in 1981, and the recent verification of the results of that survey, the soil disposed of in the "Old Highway 101 Land Fill" did not contain licensed material. A 10 CFR 20.302 submittal is not required.

T Cooper

TERRY COOPER
Health Physics Engineer

TC:2027I:jms

cc: P. J. Knapp
R. V. Warnock
G. Gibson
B. Graham
CDM files

January 12, 1984

P. KNAPP

SUBJECT: Radiological Environmental Survey
of Old Hwy 101 Landfill

Attached for your information and review are:

1) Telephone note from Jan. 12, 1984 conversation between B. Graham (SCE-SONGS) and Gregory Yuhas (NRC).

2) EAL Corporation results of laboratory analyses of soil samples collected from the subject landfill.

3) Report from C. Holle to B. Graham concerning Environmental Survey of subject landfill.

Please let me know if you need additional help or information.

B. GRAHAM

BDG:li
Attachments

cc: L. D. Brevig
R. Warnock
P. Croy
D. Duran
R. Rosenblum
Chemistry File
CDM

TELEPHONE NOTES

BY B. Graham OF SCE-SONGS Env.

WITH G. Yuhas OF USNRC-R5bI

DATE January 12, 1984, 0745

SUBJECT Radiological Survey of "Old Hwy 101 Landfill"

DISTRIBUTION

L. Brevig
P. Knapp
R. Warnock
P. Croy
D. Durham
R. Rosenblum

ACTION REQUIRED

Review results of Radiological Field Surveys and laboratory results of samples collected from the "Old Hwy 101 Landfill" to determine need for 10 CFR 20.302 submittal.

DISCUSSION HIGHLIGHTS AND AGREEMENTS REACHED

Mr. Yuhas was interested to know the final determination regarding the presence of Station generated radioactivity in the Old Hwy 101 Landfill. Mr. Yuhas stated that if the findings were positive, (activity levels above background or isotopes of fission origin), then SCE would be well advised to address this situation by means of a 10 CFR 20.302 submittal.

EAL CORPORATION
2030 Wright Avenue
Richmond, California 94804
(415) 235-2633
(TWX) 910-382-8132

3 April 1981

Ref: EAL 2301

Mr. Barry Graham
San Onofre Nuclear
Generating Station
P.O. Box 128
San Clemente, CA 92672

Dear Mr. Graham:

The results of the soil samples we received on March 2, 1981, have been completed and are shown on Attachment 1.

We appreciate this opportunity to be of service.

Very truly yours,

Marvin P. Hunt
Senior Environmental Chemist

Rodney Melgard, Manager
Nuclear Science Department

MPH/RM/cm

Attachment 1

cc: D. F. Pilmer

ATTACHMENT 1 SOIL RESULTS

Collection Site and Date	Ge(Li) Scan nCi/kg ± 2 σ (dry wt. basis)	Isotope	Radiochemical nCi/kg ± 2 σ (dry wt. basis)
Jap Mesa Dumpsite 1/21/81	0.51 ± 0.03	^{60}Co	---
	0.63 ± 0.03	^{137}Cs	---
	0.70 ± 0.04	^{226}Ra decay chain (1)	---
	0.36 ± 0.07	^{232}Th decay chain (2)	---
		^{90}Sr	0.09 ± 0.02
SONGS I Security Bldg. 1/21/81	0.07 ± 0.01	^{60}Co	---
	0.04 ± 0.01	^{137}Cs	---
	0.47 ± 0.02	^{226}Ra decay chain (1)	---
	0.28 ± 0.04	^{232}Th decay chain (2)	---
		^{90}Sr	0.02 ± 0.01
E. side of Sphere Near Door 16 2/19/81	0.05 ± 0.02	^{60}Co	---
	0.12 ± 0.02	^{137}Cs	---
	1.05 ± 0.05	^{226}Ra decay chain (1)	---
	0.33 ± 0.06	^{232}Th decay chain (2)	---
		^{90}Sr	0 ± 0.01
Location No. 33 Old Hwy. 101 2/19/81	0 ± 0.01	^{60}Co	---
	0 ± 0.01	^{137}Cs	---
	0.33 ± 0.03	^{226}Ra decay chain (1)	---
	0.29 ± 0.05	^{232}Th decay chain (2)	---
		^{90}Sr	0 ± 0.01
Location No. 28 Old Hwy. 101 2/19/81	0 ± 0.01	^{60}Co	---
	0 ± 0.01	^{137}Cs	---
	0.29 ± 0.03	^{226}Ra decay chain (1)	---
	0.26 ± 0.05	^{232}Th decay chain (2)	---
		^{90}Sr	0.04 ± 0.01
Location No. 24 Old Hwy 101 2/19/81	0 ± 0.01	^{60}Co	---
	0 ± 0.01	^{137}Cs	---
	0.42 ± 0.03	^{226}Ra decay chain (1)	---
	0.35 ± 0.06	^{232}Th decay chain (2)	---
		^{90}Sr	0.02 ± 0.01

(1) The naturally occurring ^{226}Ra decay chain reported is calculated on the ^{214}Bi photopeak at 0.609 MeV. Other photopeaks detected in this chain are ^{226}Ra, ^{214}Pb, ^{210}Bi and ^{210}Tl.

(2) The naturally occurring ^{232}Th decay chain reported is calculated on the ^{228}Ac photopeak at 0.910 MeV. Other photopeaks detected in this chain are ^{228}Th, ^{212}Pb, ^{212}Bi and ^{208}Tl.

SAN ONOFRE NUCLEAR GENERATING STATION

MEMORANDA FOR FILE

APRIL 17, 1981

TO: B. GRAHAM

FROM: C. HOLLE

SUBJECT: Environmental Survey of 1976-1977 Land Fill Site approximately 2.5 miles South East East of Jap Mesa

PURPOSE: During the construction of Unit One Sphere Containment in 1976 and 1977 a large amount of soil was removed and disposed of at a site approximately 2.5 miles South East East of Jap Mesa.

During the disposal operation there was evidentially no reason to be concerned with the possibility of this resultant land fill being contaminated with radioactive materials resultant from the past operation of Unit One. With in the recent past a careful study has been made of the events surrounding the exavation and subsequent disposal of soil associated with Unit One Sphere. The results of this study pointed for a need to survey the land fill site to asertain once and for all the degree of radioactive contamination, if any, present at the site.

On February 4, 1981 through February 7, 1981 a radiation survey was conducted by Moore, McClung, Southerland, Naylor and Antonelli. Although this represented an extensive survey of the area a number of questions were raised during the analysis of the survey results. These questions were mostly based on two criteria. First, there was extreme difficulty in matching the data gleened from the two different Ludlum Model 19 Micro-Roentegen Meters used for the survey and the low range calibration of these instruments were also in question. Secondly, data showed a wide variance in reading obtained in adjacent locations. For example data from a survey of the drainage tunnel under Interstate 5 showed a variance from 10 to 150 micro-roentegen/hour. It was also noted that the survey did not include information from areas of the ravines were the angle of incline approached and many times exceeded 30 degrees.

Because of the foregoing reasons on March 12, 1981 the decision was made to conduct an exhaustive and hopefully reproduceable survey again to asertain once and for all whether or not the activities associated with the 1976-1977 Unit One Sphere construction had led to any radioactive contamination of the land fill.

DISCUSSION: During initial planning for the survey every attempt was made to devise procedures that would standardize each survey measurement and make it possible to locate at a later date each survey point for later resurvey or soil sampling. After careful research it was decided that all survey measurements would be taken at a distance of one meter from the surface of the soil. This hopefully would allow a comparison of results with other environmental surveys performed recently throughout the Health Physics profession.

DISCUSSION (Continued): To eliminate any unexplainable data varience two other techniques were devised to both enhance reproducability and detect source position and/or any interference caused by buildup of naturally occuring airborne radioactivity resultant from atmospheric inversion at the survey points.

First, careful study of the manufacturers literature yielded a detailed understanding of the Ludlum Model 19 Micro-Roentegen Meter. This instrument has a one inch by one inch Sodium Iodine (Thallium activated) crystal located at the front and bottom of the instrument. Hence all survey measurements were taken with the face of the instrument dial and thusly the centerline of the crystal parrellel to the soil surface being measured. This technique was relatively easy to perform on gentle inclines and somewhat more difficult when dealing with inclines which in some cases exceed 30 degrees. Further study of the manufacturers literature gave helpful information about the response characteristics of the Ludlum Model 19 Micro-Roentegen Meter. As all measurements were theorized to be readable on the lowest scale, 0 to 25 Micro-Roentegen/Hour, all data was taken with the instrument in the Slow Response or Slow Reaction mode. This technique resulted in a period of response as per above mentioned manufacturers literature of approximately 11 seconds for each measurement. Actual field experience indicated reproduceable response time of approximately 5 seconds to as long as 30 seconds. For this reason, at each survey point the instrument was held in the above discussed geometry for a period of 15 to 30 seconds to insure that the instrument had indeed given a stable and reproducable measurement.

Second, extensive past field experience with the measurement of low level radiation levels had indicated as much as a 30 percent variation in readings observed when the individual holding the instrument positioned the instrument so as his body was between the source of radiation and the detector as opposed to having an unobstructed field of measurement in relation to the known source.

Detailed study of professional papers submitted throughout the Health Physics profession indicated that the potential for interference in data resultant from the accumulation of naturally occuring airborne radioactivity during atmospheric inversions. In worst cases measurements could be caused to vary as much as 85%. It was noted that these accumulations of airborne radioactivity when encountered during atmospheric inversion almost exclusively represented cloud-like concentrations in which a given reading with in the cloud varied at least 15% with a change in air movement, survey instrument position, and time. This characteristic of natural airborne radioactivity appeared reproduceable in all instances except those dealing with a partially enclosed areas such as the drainage tunnel under Interstate Highway 5 where measurements were much more uniform due to lack of air movement within center portions of the tunnel.

Due to the foregoing considerations at each survey point four seperate measurements were taken. Using a relatively inexpensive compass with no magnetic corrections applied measurements were taken at each point with the instrument and the individual holding the instrument facing in the North, then East, South, and West compass directions in that order.

DISCUSSION (Continued): Comparison of the four measurements at each point made it possible to distinguish as to whether the data for each particular point was indeed valid and reproduceable. Measurements when later compared with other measurenents at the same point would be expected to vary one from another by less than 15% unless some other influence such as close proximety to a point source or build up of naturally occuring airborne radioactivity during atmospheric inversions. Actual field experience showed that only 10 survey locations out of the over 130 locations surveyed showed a variance of greater than 15%. Variance was calculated by selecting the highest and lowest of the four readings taken at a given point. The difference between these two values was then divided by the lowest reading giving a decimal that could be converted to percent variance. Later resurvey of these 10 locations showed that earlier reading were definitely being effected by the build up of naturally occuring airborne radioactivity during atmospheric inversion. For example one survey location when first measured showed readings between 11.5 and 15 micro-Roentegen per hour. Initital examination of this data showed a varience of over 30% between the four readings taken at that location. After comparison with other surrounding survey points it appeared evident that this varience was not being caused by a point source. As field experience grew it became readilly clear when the survey point was under the influence of an atmospheric inversion. For example on one Sunday morning a general background of 19 micro-Roentegen per hour was observed where earler data showed readings of 8 to 10 micro-Roentegen per hour and when the locations in which variences of greater than 15% were observed were resurveyed the highest reading observed was greater than 15% lower than that initially observed and agreement between points was well within $\pm$ 15%.

As the desired goal was to obtain enough information from survey of both landfill areas and the nearby areas to distinguish any possible differences between the two several techniques were developed to this end. Due to the large area to be surveyed in was deemed that the initial survey points would be approximately 10 meters apart. Later examination of the data would show whether a more detailed area survey was required, but hopefully, and as field experience proved this degree of detail was both expediate and substitive enough to reach the desired goal. It should be noted that out of the approximately 3000 square meters surveyed only approximately 900 square meters showed distinct evidence as being of landfill origin.

In order that the data presented would be an accurate reproduction of the trends in radiation levels observed in one area versus another the sequence and techniques used in taking the measurements became most important. Due to the ruggedness of the terrain line of site approximations of perpendicual or parallel angles became impossible. To solve this problem a compasss was purchased which, although not corrected for magnetic error, made it possible for adjacent survey points to be layed out in a NORTH-SOUTH, EAST-WEST GRID somewhat like that observed on a road map where the upper left corner is North-West and has the designation A-1.

DISCUSSION (Continued): The sequence in which the survey data was taken was designed to most effectively place survey locations approximately 10 meters apart without the time consuming use of surveyors equipment. Starting in the North-West Corner of the survey area a sequence of survey points was taken in an arc starting at 90 degrees and proceeding to 180 degrees at which time a return to 90 degrees was affected. This process was repeated until the area of interest was surveyed at the prescribed 10 meter intervals.

It should be noted that at each survey point topographical data was gathered for purposes of both survey map making and later analysis of survey results. The map obtained can only be considered an accurate depiction of the area if it is realized the measured 10 meter increments cause the illustration to reflect the area as if all the depressions eg. ravines and gullies, were raised to the same level as the upper most elevations of the area.

Figure 1A and 1B show the measurement data recorded for each survey point. As stated all readings are in micro-Roentegen/Hour reading the 0-25 micro-Roentegen/hour Scale of Ludlum Model 19 Micro-Roentegen Meter Serial Number 12906. Readings recorded are the highest observed at that point from the four readings taken. From previous discussion it should be noted again final survey results reflected at least ± 15% agreement between measurements.

Figure 2 shows the soil classification given to each survey point. From reasearching recent studies made in the field of Environmental Health Physics it was learned that retention of radioactive materials in soil was inversly proportional to soil particle size. This data was also helpful in defininging the areas which showed evidence of being actual land fill. Landfill soil was known to be almost entirely beach sand with a relatively low soil particle size and thusly in most cases a characteristically higher natural background reading potential.

Finally, Figure 3 depicts the area as to the incline of the soil surface incline encountered at each survey point. Initially this dat was collected to yield a possible understanding of the potential transport mechanism of any radioactive material found at the survey site. This information was also most helpful in making the contours shown as accurate as possible in light of the obviously rude direction and measurement techniques used to select the survey points.

It should be noted in the summation of this discussion that no soil classification or elevation data is shown for the survey data collected in the drainage tunnel under Interstate Highway 5 as this was a concrete tunnel with a slope of less than 15%.

CONCLUSION AND RECOMMENDATIONS: After carefully examining the results presented on the attached Figures 1 through 3 it ~~should be~~ evident that no conclusive evidence what so ever was obtained that would show any of the landfill area was contaminated by radioactive materials originating from the construction of the Unit One Containment Sphere.

As expected the survey data indicated the desired varience between data collected at widely varing soil classification areas, confirming earlier studies that showed the highest background readings in areas were the soil has a relately small particle size eg. less than .2 mm.

The readings obtained in the drainage tunnel under Interstate Highway 5 can be explained as the reading are significantly higher in the center than at either end. This leads one to believe the readings obtained in the center of the tunnel are influenced by the the buildup of naturally occurring airborne radioactivity due to lack of venelation in the center of the tunnel and a consistant source represented by the concrete.

In summation it should be stated that the purpose of this survey simply was to compare two adjacent areas for radiation levels knowing one area was suspect and the other was not. The instrumentation and techniques used are considered adequate to accomplish this effort. It should be noted that the Ludlum Model 19 Micro-Roentegen meter is calibrated on the 0-25 Micro-Roentegen Scale by pulse signal only because of presumed background radiation interference negating the possibility of source calibration. The records of the current calibration on the subject scale was unavailable from the Instrument and Calibration department but linearity checks to known ranges confirmed a roughly accurate calibration. Each survey point was marked with a white tape marked with the grid location and sequence number for later reference or resurvey. Resurvey, if attempted, would hopefully use an instrument with much larger crystal size and be shielded from atmospheric interference using significantly longer data aquisition times at each survey point. From the results of this initial extensive survey there appears very little need to attempt such a resurvey.

CJH/cjh

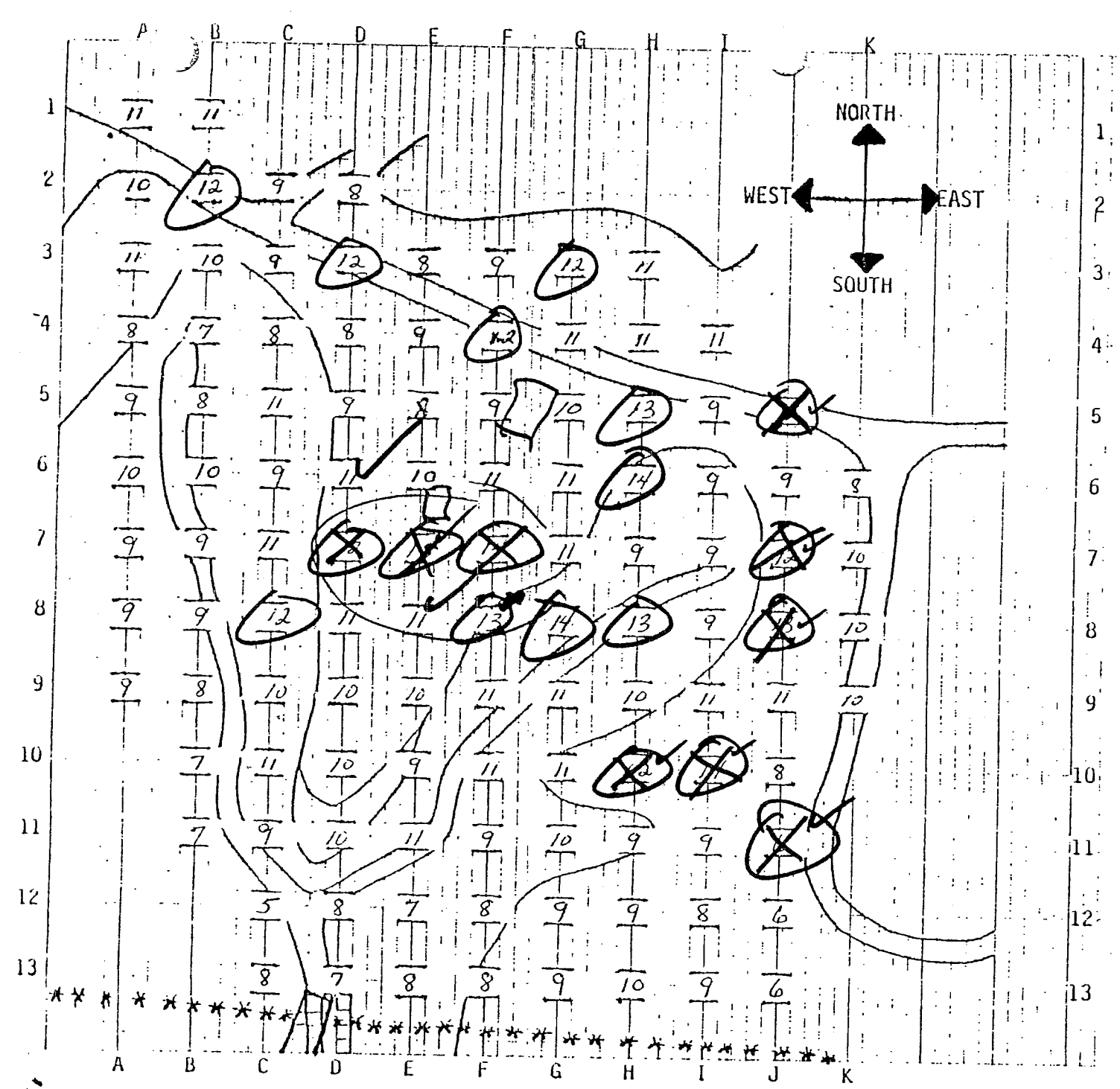


Figure 1H

All Readings in uR/hr

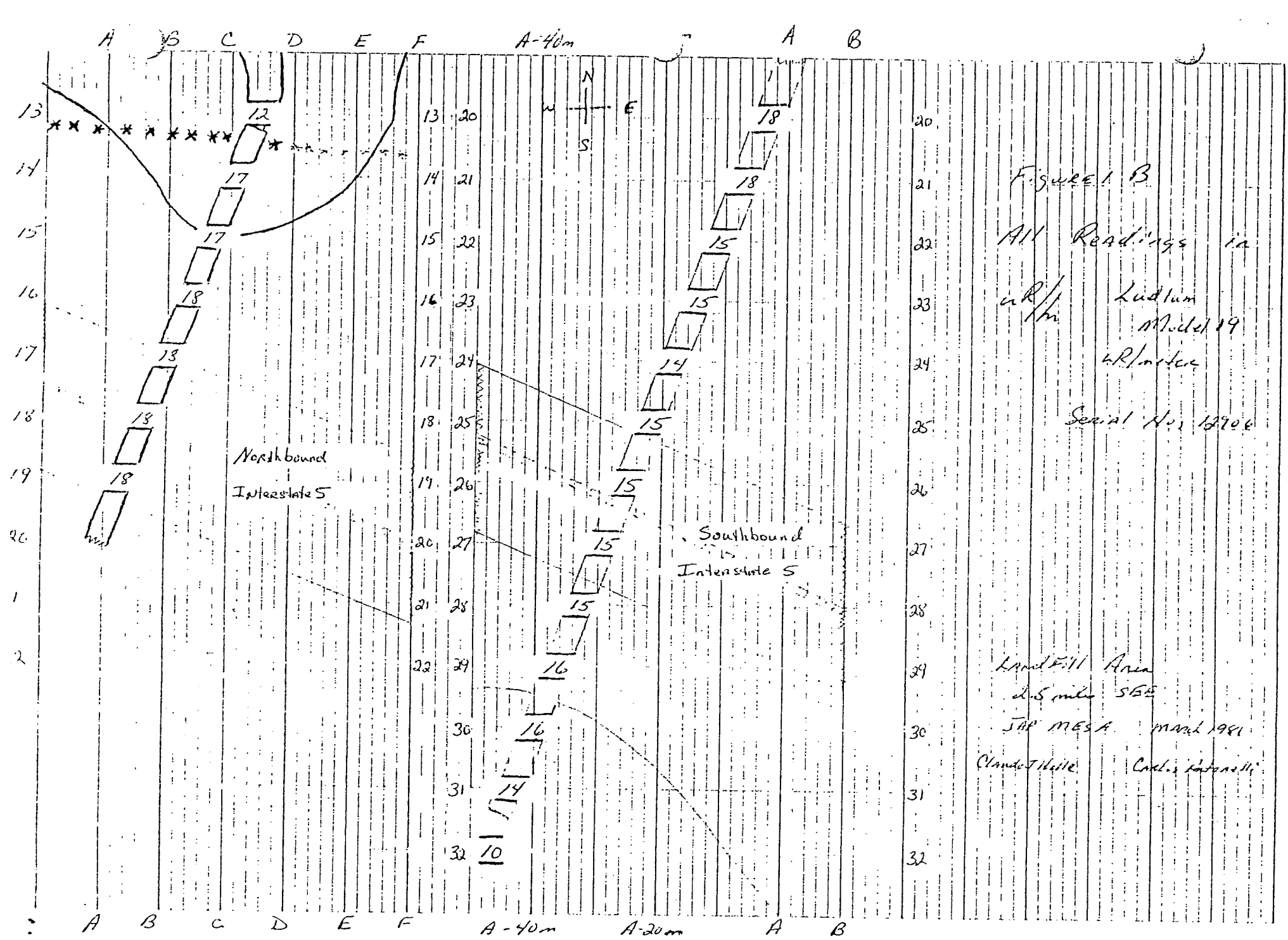
Ludlum model 19 uR meter Serial No: 12906

Landfill Area 2. SWSEE of JAP MESA

MARCH 1981

Claude J Holle

Carlos Antonelli


A B C D E F A-40m A B
N
W E
S
Northbound
Interstate 5
Southbound
Interstate 5
A B C D E F A-40m A-20m A B
Figure 1 B
All Readings in
uR/hr
Ludlum
Model 19
uR/meter
Serial No. 18906
Landfill Area
2.5 miles SSE
TAP MESA
March 1981
Claude Thiele
Carl Antonelli

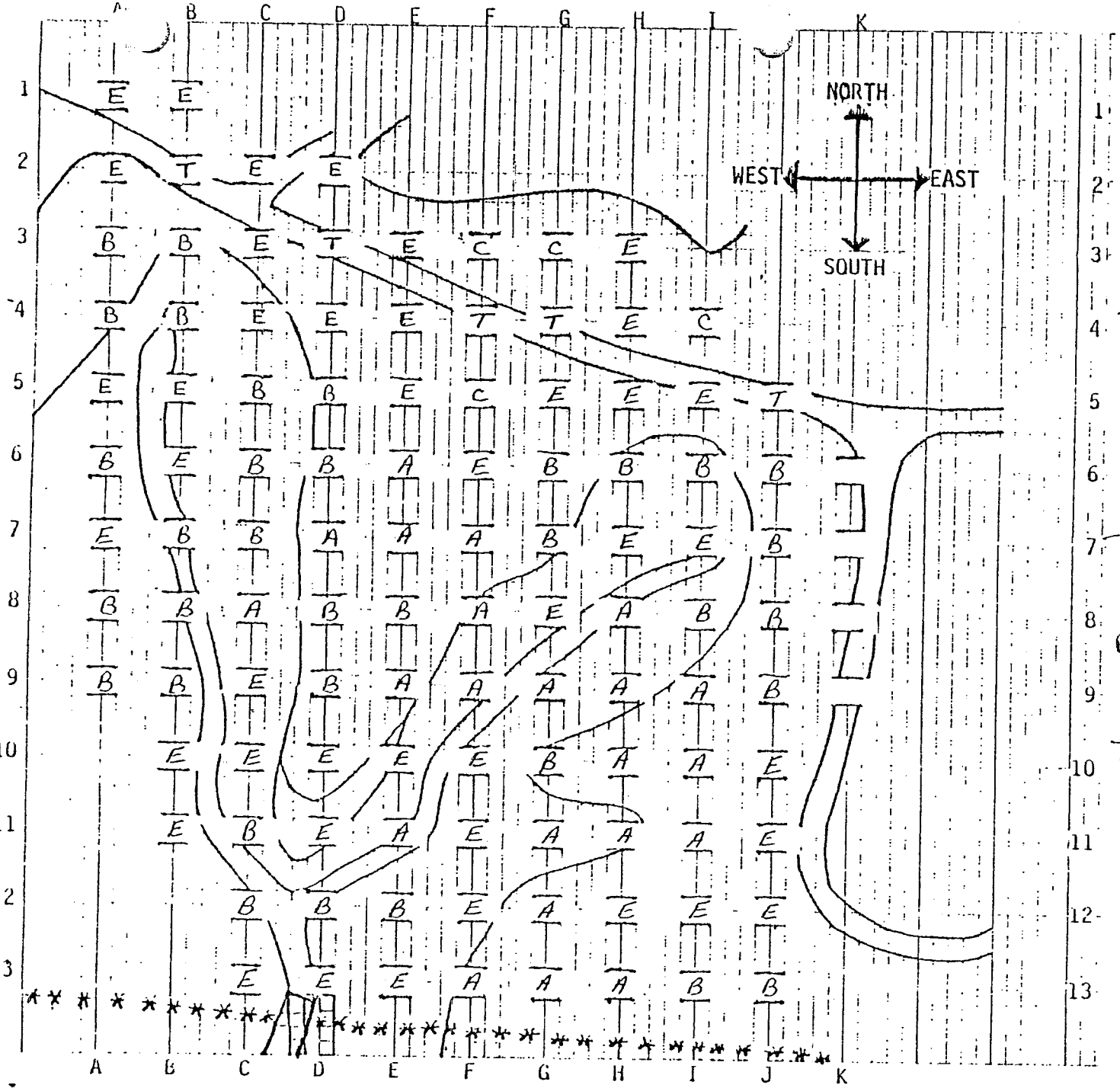


Figure 2

Soil Classification

A - Beach Sand (Landfill) Small Soil Particle Size

B - Vegitation Covered Soil - Soil Particle Size not accurately determined.

C - Mud Soil - Intermediate to Small Soil Particle Size

D - Clay like Soil - Small Soil Particle Size.

E - Rocky - Large Soil Particle Size predominant.

T - Asphalt Tar Surface

Land Fill Area
2.5 miles SE
Jap Mesa March 81
Claude J. Holle Carlos Hathcock

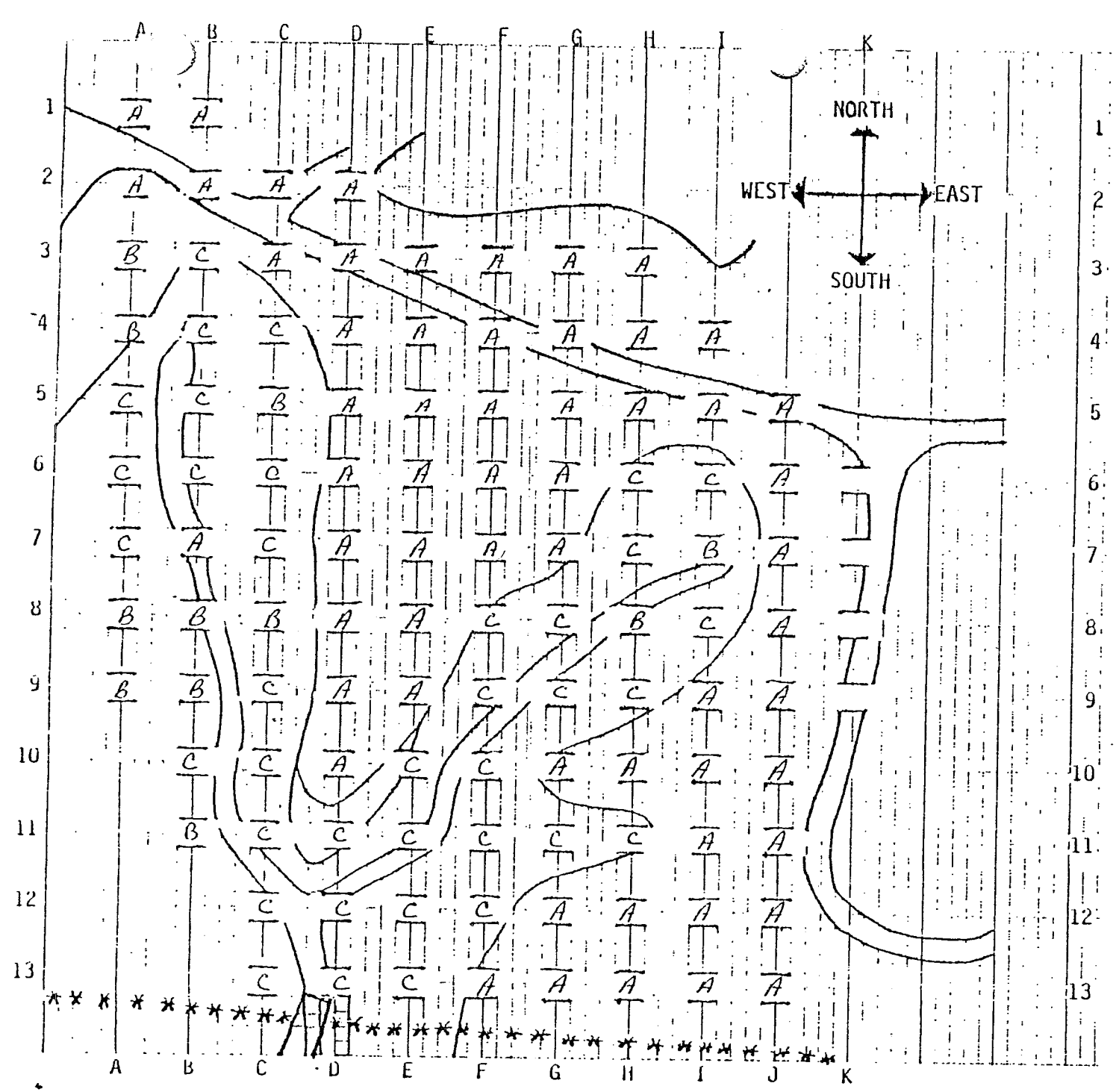


Figure 3

Angle of Incline

A - 0-20°

B - 20-30°

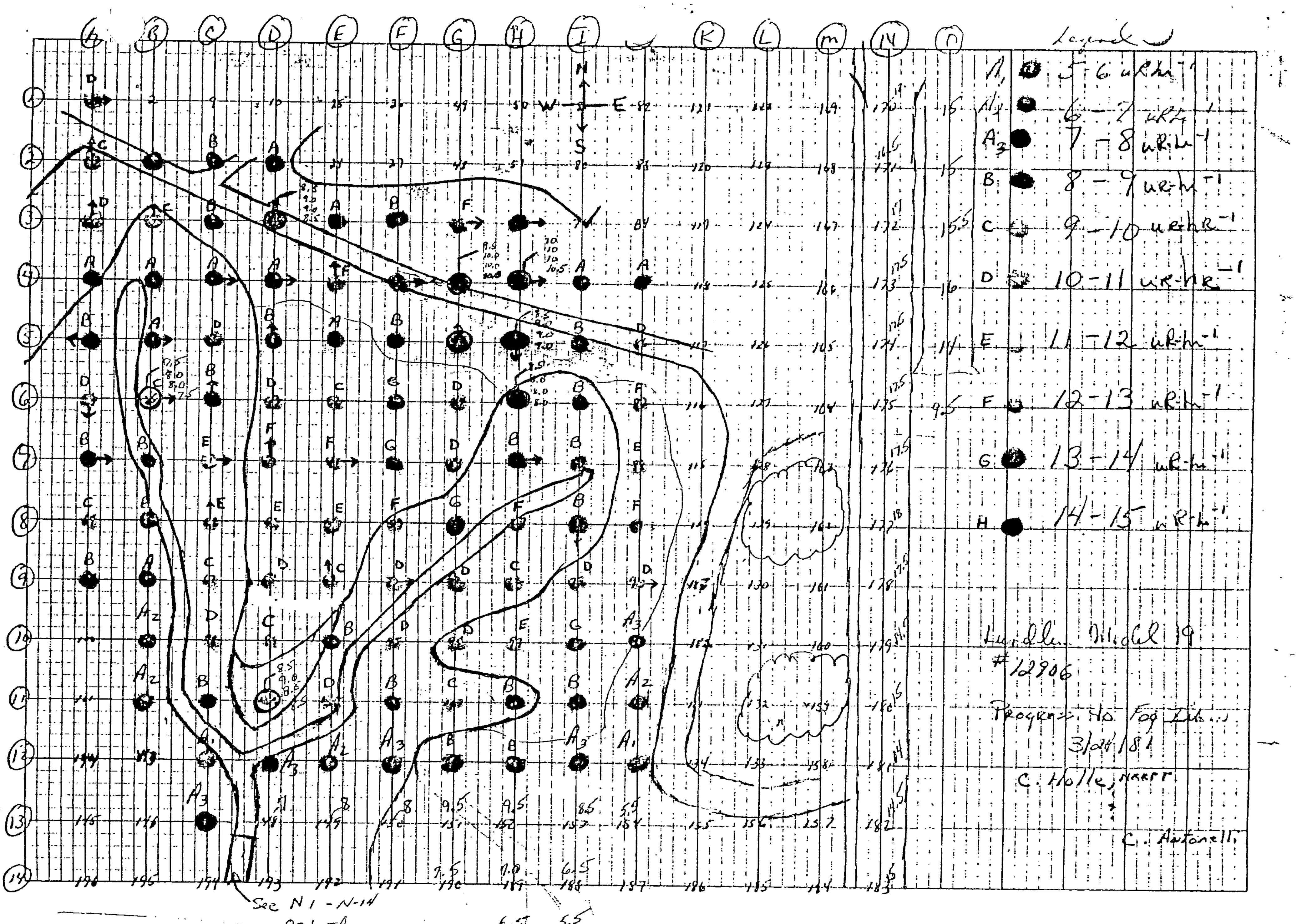
C - > 30°

Landfill Area

2.5 Miles SE

Tap Mesa March 81

Claude T. Holle Carlis Hatwell


Legend
A1 5-6 uR-h⁻¹
A2 6-7 uR-h⁻¹
A3 7-8 uR-h⁻¹
B 8-9 uR-h⁻¹
C 9-10 uR-h⁻¹
D 10-11 uR-h⁻¹
E 11-12 uR-h⁻¹
F 12-13 uR-h⁻¹
G 13-14 uR-h⁻¹
H 14-15 uR-h⁻¹
#12906
Progress: 40 Fog
3/24/81
C. Holley, NRRPT
C. Antonelli
See N1-N-14
-0-1-0
N
W
E
S

I-5

46 0780

12906

point - From Sequence List
from Sequence list and/or Map
"Rh" Reading @ 1 meter Technique Review by Reading Procedures
Difference [Highest Reading - Lowest Reading] (Lowest Reading $^{-1}$)
Soil Data Pick best one, pick two if rigid - Note Presence of Asphalt by 'T'
A - Beach Sand Like (Small Particle Size, Loose, Light Color)
B - Vegitation Covered Soil (Position over Overgrowth)
C - Mud Soil (Moist, Packed Nature, Devoid of Large Soil Particles
D - Clay Like Soil
E - Rocky (Large Soil Particles)

Angle Limits
A 0-20°
B 20-30°
C >30°

Survey Point #	GRID #	"Rh" Reading @ 1m N	W	S	E	% Difference	Soil Data	Angle
1	A-1	10	10.5	10.5	11.0		E	A
2	B-1							
3	B-2	14	14	14	14		T	
4	A-2	9.5	9	8.5	8.5		E	A
5	A-3	10.5	10	10	10		B	
6	B-3	10	9	9	9		B	
7	C-3	9	9	9	8.5		E	A
8	C-2	9	9	8.5	8.5		E	A
9	C-1							
10	D-1							
11	D-2	7.5	8	7.5	7.5		E	A
12	D-3	14	13	12	12		T	
13	D-4	7	7	7.5	80		E	A
14	C-4	7	7	7	7.5		E	C
15	B-4	7	7	7	7		E	C

- From Sequence List
= Sequence List and/or Map
1st Reading @ 1 meter Technique Review by Reading Procedure
Difference [Highest Reading - Lowest Reading] (Lowest Reading -1)
Soils: Pick best one, pick two if rigid - Note Presence of Asphalt by 'T'

A - Beach Sand Like (Small Particle Size, Loose, Light Color)
B - Vegitation Covered Soil (Position over Overgrowth)
C - Mud Soil (Moist, Packed Nature, Devoid of Large Soil Particles
D - Clay Like Soil
E - Rocky (Large Soil Particle Size)

Angle L of Incline
A 0-20°
B 20-30°
C >30°

Survey Point #	GRID #	1st Reading @ 1m N	W	S	E	% Difference	Soil Data	Angle
16	A-4	7.5	7.5	7.5	7.0		B	B
17	A-5	8	9	8	8		E	C
18	B-5	7	7	7	7.5		E	C
19	C-5	10.5	10	10	10.5		B	B
20	D-5	8.5	8	7.5	7.5		B	A
21	E-5	7.5	7.5	7.5	7.5		E	A
22	E-4	12.5	12	11	11		T	A
23	E-3	8	8	8	8		E	A
24	E-2							
25	E-1							
26	F-1							
27	F-2							
28	F-3	9	9	8	8.5		C	A
29	F-4	13	12.5	13	13.5		T	A
30	F-5	8.5	8.5	8.5	8.5		C	A

- From Sequence List
= Sequence List and/or Map
Reading @ 1 mete Technique Review by Reading Procedure
Difference [Highest Reading - Lowest Reading] (Lowest Reading -1)
Soils Pick best one, pick two if rapid - Note Presence of Asphalt by 'T'
A - Beach Sand Like (Small Particle Size, Loose, Light Color)
B - Vegitation Covered Soil (Positive over Overgrowth)
C - Mud Soil (Wet, Packed Nature, Devoid of Large Soil Particles
D - Clay Like Soil
E - Rocky (Large Soil Particle Size)

Survey Point #	GRID #	"R" Reading @ 1m N	W	S	E	% Difference	Soil Data	Angle
31	F-6	13.5	12.5	12.5	13.5		E	A
32	E-6	9.5	9.5	10	10		A	A
33	D-6	10.5	10.5	10.5			B	A
34	C-6	8.5	9	8.5	8.5		B	A
35	B-6	9	8	8.5	10		E	C
36	A-6	9.5	10	10.5	9.5		B	C
37	A-7	8.5	8.5	8.5	9.0		E	C
38	B-7	8.5	9.0	9.0	8.5		B	A
39	C-7	10.5	11	11	11.5		B	C
40	D-7	12.5	12	12	12		A	A
41	E-7	11.5	12	13	12.5		A	A
42	F-7	14.0	13.5	13.5	14.0		A	A
43	G-7	10.5	10	10.5	10		B	A
	G-6	10.5	10.5	10	9.5		B	A
45	G-5	14	13.5	13	11		E	A

Angle L of Inclin
A 0-20°
B 20-30°
C 730°

not - From Sequence List
from Sequence list and/or Map
Lbs' Reading @ 1 meter Technique Review by Reading Procedures
% Difference [(Highest Reading - Lowest Reading) / (Lowest Reading - 1)]
Soils Pick best one, pick two if rapid - Note Presence of Asphalt by 'T'

A - Beach Sand Like (Small Particle Size, Loose, Light Color)
B - Vegitation Covered Soil (Position over Overgrowth)
C - Mud Soil (Moist, Packed Nature, Devoid of Large Soil Particles
D - Clay Like Soil
E - Rocky (Large Soil Particle Size)

Angle L of Incline
A 0-20°
B 20-30°
C >30°

Survey Point #	GRID #	Lbs' Reading @ 1m N	W	S	E	% Difference	Soil Data	Angle
46	G-4	15	15	11.5	11.5		T	A
47	G-3	12	12.5	12	11.5		C	A
48	G-2	[illegible]					[illegible]	[illegible]
49	G-1							
50	H-1							
51	H-2							
52	H-3	10.5	11.5	11	13.5		E	A
53	H-4	13.5	12	13	14.5		E	A
54	H-5	13.5	13.5	14.5	13.5		E	A
55	H-6	14	14	15	15		B	C
56	H-7	8	8.5	8.5	9		E	C
57	H-8							
58	G-8							
59	F-8							
60	E-8							