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DISTRIBUTION OF RADIOACTIVE  
JACKRABBIT PELLETS IN THE VICINITY  
OF THE B-C CRIBS, 200 EAST AREA,  
U. S. A. E. C. HANFORD RESERVATION  
T. P. O'Farrell, R. E. Fitzner and R. O. Gilbert



**Battelle**

Pacific Northwest Laboratories  
Richland, Washington 99352

SEPTEMBER 1973

Prepared for the U.S. Atomic Energy  
Commission under Contract AT(45-1):1830

BNWL-1794

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Printed in the United States of America  
Available from  
National Technical Information Service  
U.S. Department of Commerce  
5285 Port Royal Road  
Springfield, Virginia 22151  
Price: Printed Copy \$5.45; Microfiche \$1.45

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U.S.A.E.C. HANFORD RESERVATION\*

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\*Research sponsored by Atlantic Richfield Hanford Company under U.S.A.E.C.  
Contract AT(45-1)-2130.

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## ABSTRACT

During 1972 and 1973 a study was conducted in the B-C Cribs, 200 East Area, to learn the extent to which jackrabbits (Lepus californicus) and their predators had dispersed buried radioactive wastes in their fecal pellets and scats. The specific objective was to gather sufficient data on the pattern of dispersal so that statistically valid sampling strategies could be developed in future programs, depending upon management planning objectives for the area. A secondary objective was to relate these data with parameters, such as topography, wind direction, vegetation types, animal behavior, that might help explain the pattern of dispersal. In 1972, 2625 circular sampling sites were surveyed along 30 transects radiating out 2.4 to 3.2 km from the B-C Cribs. Radioactive contaminated feces, urine, soil and vegetation were distributed in all directions from the cribs, but the area to the south and southwest was more densely and uniformly contaminated. Of the ultimate sampling units surveyed, 278 or 10.6% had activity in excess of 10,000 counts per minute (cpm) measured with a Geiger-Mueller counter. Of these 278 circular areas, 179 or 64% were found within 0.5 km of the cribs, 23.4% were between 0.5 and 1.0 km, and the remaining 12.2% were further than 1 km from the central point. Although most droppings with a count rate greater than 20,000 cpm were found within 400 meters of the crib, pellets registering in excess of 100,000 cpm were found up to 1.6 km from the cribs. The pellets appeared to be distributed into the prevailing wind directions and contrary to the immediate contours: the only correlation seemed to be with increased vegetation density to the south and southwest, vegetation that is prime jackrabbit habitat. In May-June, 1973, 48 additional transects were run: 7 were parallel to lines established in the B-C Crib Area during 1972; 18 radiated from an abandoned gun battery site 3.2 km east of the cribs; and 23 were run from power lines 5 km south to southwest of the cribs back towards the source of contamination. No contaminated jackrabbit pellets were found at these distances, but one contaminated coyote scat was found near the gun battery site. During 1972 and 1973 field crews walked 106.7 km along 78 radii and recorded observations on 6671 ultimate sampling units of approximately  $1.4 \text{ m}^2$ .

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INTRODUCTION

Terrestrial animals can pose problems in large waste management areas, and they can serve as an efficient biological transport mechanism for radio-nuclides which are thought to be safely buried. Resident animals use burial sites for cover and food. They can become contaminated in at least three major ways: by surface contamination due to dust bathing in contaminated soils; by ingestion of radioactive food items or water; or by inhalation of contaminated particles. Since most animals in the area are fossorial, that is they live beneath the soil to escape the rigors of the environment, they can also present problems by burrowing into unprotected underground burial pits and excavating contaminated soils or other materials to the surface where it is susceptible to resuspension and possible incorporation into the biologically active vegetative component of the ecosystem.

When animals ingest contaminated food items such as vegetative parts, they incorporate a portion of the material into their tissues. Aside from the potential effects in the host, the more important question is, "What is the ultimate fate of these nuclides?" Animals such as deer, rabbits, and game birds are the most likely route through which some of the contamination might reach man, since they are all consumed by hunters and their families. Game species have been sampled over the years as part of the Hanford radiation monitoring program. The rodents and other mammals are of little interest to most people and are certainly not a common diet item. They can be more important, however, because they are the most abundant mammals and could potentially transfer quantities of contaminants from the vegetation and soil to other locations. The small animals are an important

food base for the higher consumers. Individually they may not be contaminated to an alarming degree, but it has been observed that some radionuclides are concentrated as they are transferred from prey to predator (Reichle, et al., 1970). The predators tend to be larger, more mobile species which could transport contaminants many miles until such time as the effective half-life has reduced the initial levels of activity.

Herbivores and predators that have come in contact with contaminated food will also serve to disperse the material in their fecal pellets or scats, urine, or regurgitated pellets. Animals' scats can be deposited many kilometers from a source of contamination, and, although they seldom contain high levels of activity, they can pose special problems when they are deposited in areas of human habitation or occupation. The transport of buried radioactive wastes by black-tailed jackrabbits, Lepus californicus, inhabiting the B-C Cribs Area south of the 200 East Area on the Hanford Reservation is a classic example of how an abundant native animal can act as an effective biological dispersing agent.

#### BRIEF HISTORY

Between 1952 and 1958 the wastes containing essentially all of the decayed fission products from the obsolete bismuth phosphate separations plants were mined from their underground storage tanks. The uranium was removed from this material and the remaining wastes were scavenged to reduce the cesium and strontium content before the supernatant liquid was released into covered storage trenches then designated as the B-C Cribs. These unlined trenches were dug into loamy sand soil within a 16.2 hectare tract. A specific volume of scavenged waste liquid which could be retained by the soil was piped to the bottom of the trenches and excavated spoil banks were used as backfill.

Between 1958 and 1960, native mammals, probably badgers or coyotes, burrowed into one of the backfilled trenches exposing the highly desirable but contaminated salt cake. No doubt the area became a focal point for native wildlife since salt licks are rare in the area and some minerals



are thought to be deficient in the local diet of native species. Certainly there is evidence that badger, jackrabbits, coyotes and deer used the lick until it was discovered by radiation monitoring personnel. The burrow was filled and sealed with asphalt in 1964, but by then an unknown quantity of radioactivity had been spread over several square kilometers in the fecal pellets and scats of jackrabbits and their major predators. After a preliminary survey a 10 km<sup>2</sup> controlled access area, designated the B-C Crib Control Zone, was established and marked.

There was no increase in the number of radioactively contaminated droppings after 1964, indicating that the source had been sealed. In the ensuing years, physical decay has reduced the activity of most nuclides and the remaining activity is predominantly <sup>90</sup>Sr and <sup>137</sup>Cs. In 1969 approximately 46,000 cubic meters of gravel were used to cover and stabilize the trenches to more positively isolate the stored material from biological as well as physical means of dispersal.

### OBJECTIVES

The primary objective of our program was to collect data regarding the distribution and general levels of activity in animal droppings in land adjacent to the B-C Crib; to correlate these data with information on patterns of animal behavior, vegetation associations, prevailing wind patterns, soil characteristics, or any other environmental characteristic that might help describe the pattern of deposition; to integrate the information into a series of recommendations for future soil, vegetation and animal studies in the B-C Crib Area that would be expected to yield more information per man/hour of effort than would otherwise be the case. The study was ~~not~~ designed to produce a detailed, quantified description of the areal extent of the contamination, the total amounts and types of contamination (inventory), nor were we charged with determining either the fate of the contaminated pellets in the ecosystem or their potential health hazard. These more specific objectives will be logical extensions of this preliminary statistical sampling survey.

We caution readers against making extrapolations based on this report. Although the data are quite extensive and present some apparent bases for making conclusions regarding the spread of contamination, this was only the preliminary survey required to support more thorough studies.

#### DESCRIPTION OF AREA

The B-C Cribs are located approximately 400 m south of the 200 East Area main gate on a level plain that slopes towards the Columbia River 13 km to the northeast and Cold Creek Valley 8 km to the southwest. Average elevations are 223 m with local vertical rises of less than 15 m. Contours run east to west through the area except for the semi-stabilized sand dunes located 3.2 km south: they are arranged on a west-southwest to east-northeast axis. Soils are mainly Rupert sands and Burbank loamy sands (Hajek, 1966).

Records from the Battelle Atmospheric Sciences Department indicate that the average annual temperature is 53.1°F, with an average annual high of 64.8°F and an average annual low of 41.4°F. Temperatures in excess of 100°F or below 0°F are not uncommon. The average annual precipitation is 15.9 cm (6.25 inches) with the majority of the biologically important precipitation coming between the months of October and April. Prevailing winds are from the northwest, while prevailing high winds are from the southwest (Stone et al., 1972).

The undisturbed vegetation can be classified as the Artemisia/Poa, Sagebrush/Sandberg's Blue Grass, association common to the shrub-steppe of southcentral Washington at elevations less than 300 m (Daubenmire, 1970). Sagebrush, generally 1 m in height or more, forms a contiguous shrub cover in areas of minimal disturbance. Where fire or mechanical disturbances have removed the sagebrush the dominant shrub appears to be rabbitbrush, Chrysothamnus nauseosus and C. viscidiflorus. The ground cover would normally consist of scattered clumps of Sandberg Blue Grass, but alien annuals such as cheatgrass (Bromus tectorum) have become dominant in these disturbed sandy soils. Tumbleweeds, Salsola kali, are also frequent invaders of disturbed sites within the B-C Crib Area.

Mule deer, Odocoileus hemionus, are the most common, conspicuous large mammal; they range in several areas between Gable Mountain and the 200 Areas. At one time large populations of black-tailed jackrabbits were found in the vicinity, but in recent times there has been a sharp decline in densities. The decline in numbers reflects a reduction in populations of jackrabbits over the entire Hanford Reservation. Long-term, high amplitude fluctuations in numbers is a characteristic of this species over much of its range. At present the most abundant mammals are the rodents including pocket mice, Perognathus parvus; deer mice, Peromyscus maniculatus; harvest mice, Reithrodontomys megalotis; and grasshopper mice, Onychomys leucogaster. Coyotes, Canis latrans; bobcat, Lynx rufus; and badger, Taxidea taxus; are the most common predators on small mammals.

Western meadowlarks, Sturnella neglecta, are the most abundant resident bird although there are numerous species of waterfowl and migratory birds using the nearby ponds. More obvious are the raptorial birds such as Swainson's Hawk, Buteo swainsoni; Golden Eagle, Aquila chrysaetos; American Kestrel (Sparrow Hawk), Falco sparverius; Red-tailed Hawk, Buteo jamaicensis; Great-horned Owl, Bubo virginianus; Long-eared Owl, Asio otus; and Burrowing Owl, Speotyto cunicularia.

Representative reptiles include Pacific Northwest rattlesnake, Crotalus viridis oreganus; bull or gopher snake, Pituophis melanoleucus; yellow-bellied racer, Coluber constrictor; the side-blotch lizard, ~~Uta~~ stansburiana; and the pigmy horned lizard, Phrynosoma douglassi.

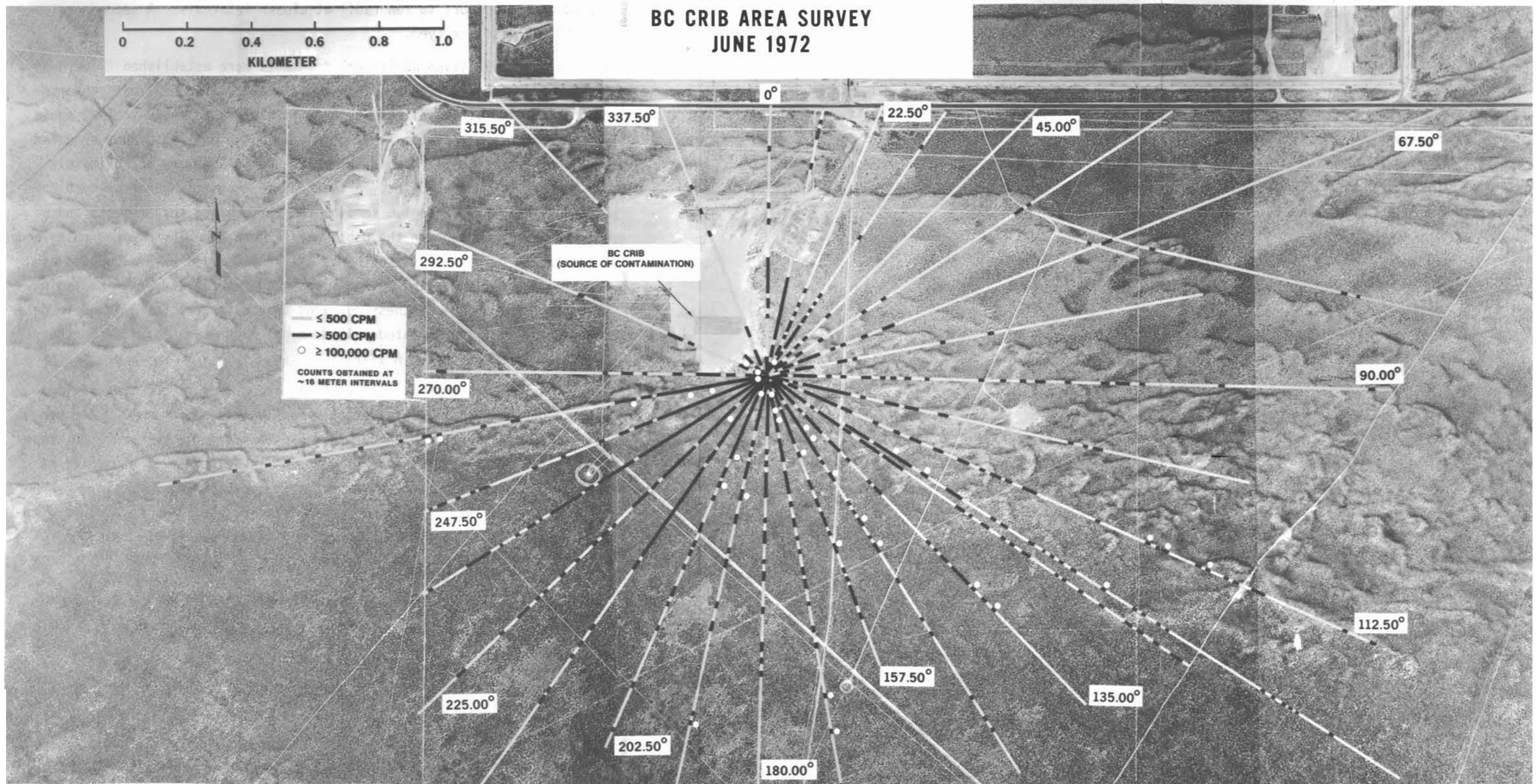
## METHODS

From 1 January to 1 May 1972 several meetings were held with ARHCO and BW personnel to gather as much information as possible concerning what was previously known about the dispersion of the contaminated pellets. The B-C Crib Area was visited several times to allow us to familiarize ourselves with the terrain so that various sampling procedures could be evaluated for their applicability. Personnel also learned the correct radiation safety procedures that applied during the study.

Crews consisting of between one to five Battelle staff ecologists conducted the field studies during June, 1972 and May-June, 1973. A large, conspicuous sagebrush, located approximately 100 m southeast of the southeast corner of the B-C Crib Area, was marked with fluorescent surveyor's flagging and designated as the Center Point (CP). This Center Point was chosen as a convenient, readily observable reference point for the field crew, and it has no direct relation to the focus of exposed contaminated salts.

Each man was provided with a hand-held compass, a Geiger-Mueller (GM) counter, and a note pad for recording primary data. After some preliminary trials in the field on the first day of the study, the following procedure was adopted: (1) starting from the CP, the ecologist would take 20 steps along an assigned heading; (2) on the 20th step he would measure the levels of radioactivity (y) within the circular area of ground that could be reached from a stooped position, recording the following information: (i) level of background activity in counts per minute (cpm); (ii) the number of point sources in excess of background levels and the readings in cpm for each; (iii) cognate information of biological significance to be used in later interpretation of the data. Such information might include notations on whether the activity was associated with fecal pellets, what animal produced the fecal material, presence of contaminated urine, contaminated soil, proximity to specific vegetation types such as Artemisia, Bromus, Salsola, general topography, soil type, and presence of man-made structures such as roads, power lines, and buildings. When roads were crossed, the location of the crossing was marked with red surveyor's flagging to aid in finding the outlying segments of certain radii for future field studies.

A total of 29 radii were surveyed from CP during June, 1972 (Figure 1). The radii were regularly placed every  $11.25^\circ$  in a clockwise direction starting at  $0^\circ$  (North). The only exception occurred in the 4th quadrat ( $270^\circ$  to  $360^\circ$ ) where radii at 22.5" intervals were established. This quadrat included



**FIGURE 1.** Ecological Survey Transects Superimposed on an Aerial Photograph Mosaic of the B-C Cribs, 200 East Area. Measurements of activity are presented in counts per minute (cpm): white areas on radii indicate background levels; black areas indicate measurements in excess of 500 cpm; white circles represent activity in excess of 100,000 cpm.

much of the asphalt-covered portion of the B-C Cribs and did not warrant the additional effort to run radii at closer intervals. A second radius at 135° was also surveyed.

In May, 1973 seven additional transects were established from CP in the B-C Cribs parallel to headings used in 1972. The duplicate observations were made so that lines which still yielded activity in 1972 could be extended out beyond the limit of contaminated pellets. Another reference post was established near the abandoned gun battery approximately 3.2 km east of the B-C Cribs. A total of 18 transects were surveyed for distances of from 0.8 to 1.6 km from the battery and measurements and observations were made in the usual way (Figure 2). Three power poles and a substation 5 km south to southwest of the B-C Cribs were also used as focal points for surveying 23 radii back towards the source of contamination (Figure 2). All of these outlying transects were established to determine whether any contaminated pellets might have been deposited farther than the 2.4 km surveyed in 1972.

It is well to keep in mind that the proportion of the area of land lying along a radii that was actually sampled was quite small. A rough estimate of this area can be obtained by considering a rectangle 20 steps long with a width equal to the diameter of the circular area sampled at each 20-step interval. The average distance covered with 20 steps by the field ecologists was found to be approximately 16 m, and the average diameter of the circle sampled at each 16 m interval was 1.4 m. Hence,

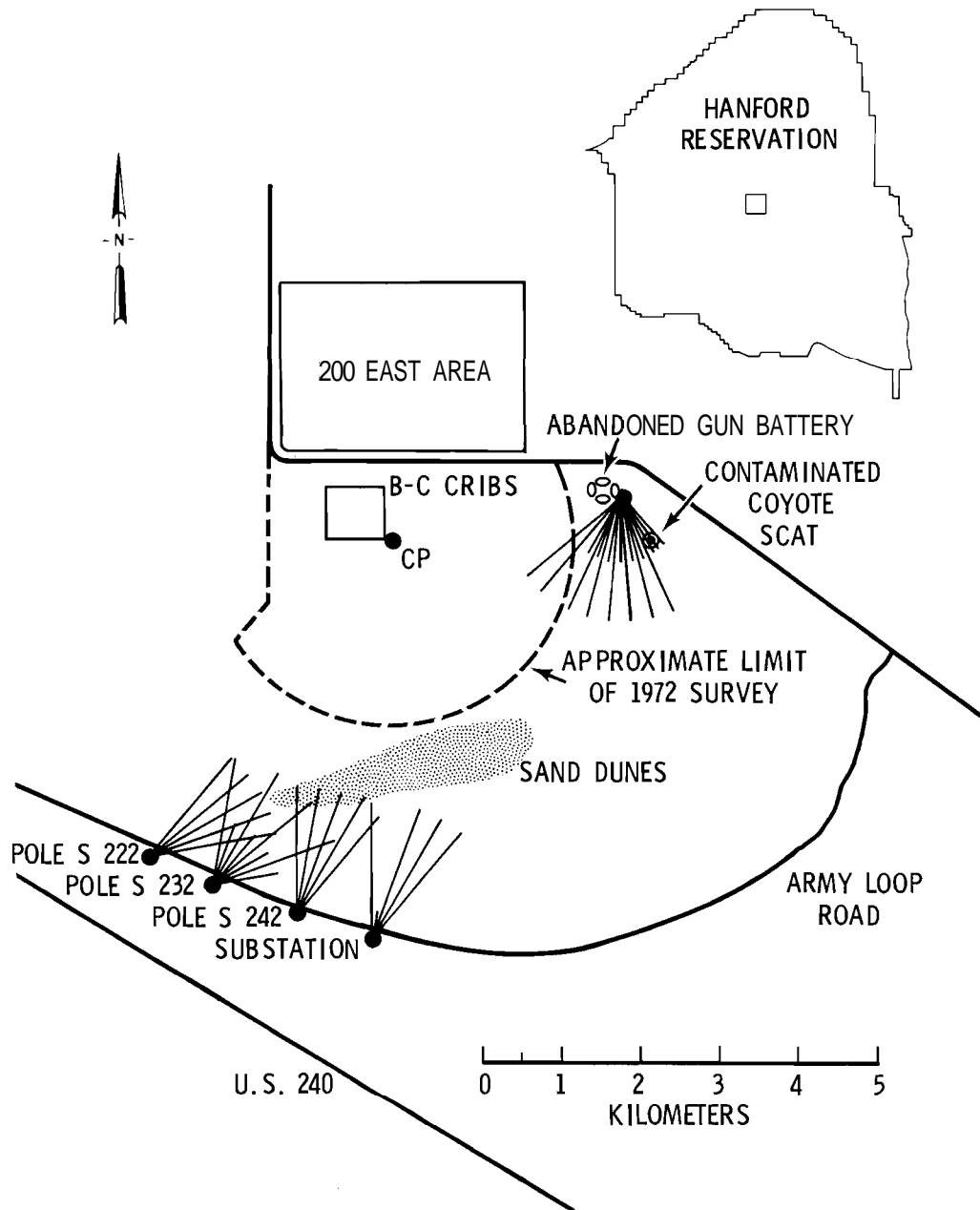
$$\text{Area of rectangle} = 16 \text{ m} \times 1.4 \text{ m} = 22.4 \text{ m}^2$$

$$\text{Area of circle surveyed} = \pi r^2 = (3.14)(0.70)\text{m}^2 = 1.54 \text{ m}^2$$

$$\text{Percentage of radii rectangle surveyed} = \frac{1.54}{22.4 \text{ m}^2} (100) = 7\%$$

## RESULTS AND DISCUSSION

The results of the 1972 field study are given in Appendix 1 and Figure 1. Appendix 1 lists the maximum and minimum activity observed at each 20-step interval along radii sampled. The date, GM counter



**FIGURE 2.** Ecological Survey Transects Established in 1973 to Determine Maximum Dispersal of Contaminated Jackrabbit Pellets. The approximate extent of the 1972 B-C Crib survey is included for reference. The location of a contaminated coyote scat found in 1973 is indicated.

identification, and the worker are identified for each radii. No attempt was made to determine the efficiencies of the GM counters used since the objectives of the study did not demand that we solve the problems, especially geometry, necessary for converting field measured count rates to disintegrations per minute.

In Figure 1 we have superimposed the radii on an aerial photograph mosaic of the B-C Crib Area. Black areas along radii indicate those sampling sites where the activity recorded was in excess of a background level of approximately 500 cpm. White zones represent sites where activity was at background levels. Circular points show the position of samples registering greater than 100,000 cpm on the GM counters used. Figure 1 may give the impression that the entire area along the radii was sampled, however, as we explained above, this was not the case.

Contamination occurs in all directions from CP. However, it appears that the quadrat southwest of CP (south and southwest of the crib area) is contaminated more uniformly with activity in excess of background levels. There appears to be a smaller frequency of contamination in the northeast and northwest quadrats relative to that found to the south and southwest. An examination of the data in Appendix 1 enables one to get a feel for the general levels of contamination found along the radii and to roughly compare these levels between radii.

We observe, for example, that measurements greater than 20,000 cpm are almost always found within 25 survey points of CP (approximately 400 m) on all radii sampled. In general, the levels of activity are higher and more frequent on those radii in the 2nd and 3rd quadrats ( $90^\circ$  through  $270^\circ$ ) than those in the 1st and 4th quadrats ( $270^\circ$  through  $90^\circ$ ). However, high readings were obtained in all directions from the cribs.

Figure 1 also shows that samples with activity in excess of 100,000 cpm are found considerable distances from CP. These very high readings were found on radii from  $112^\circ$  through  $292^\circ$ , i.e., in the southeast, south, southwest, and west directions. Some of the high readings were made up to 1.6 km from the cribs. Using the preliminary calculations obtained in the previous



section to estimate the proportion of land along each radii actually surveyed, we conclude that by sampling at 20-step intervals only about 7% of the pellets with activity in excess of 100,000 cpm were actually found (assuming these radioactive pellets are randomly distributed along the radii). We estimate that if each radii would have been sampled in its entirety, rather than at 16-m intervals, a total of  $560 \pm 85$  (total  $\pm$  standard deviation) pellets in excess of 100,000 cpm would have been recorded. Of the 2625 circular areas sampled in 1972, 278 or 10.6% had readings in excess of 10,000 cpm. Of these 278 circular areas, 179 or 64% were found within 0.5 km of the CP, 23.4% were between 0.5 and 1.0 km, and the remaining 12.2% were farther than 1 km from the center.

Data gathered on the seven additional radii measured during 1973 did not alter the results obtained in 1972, rather they complemented the observations made during the more intensive survey (Appendix 1). Measurements made along the transects radiating from the abandoned gun battery (Table 1) and the power lines (Table 2) yielded negative data with one exception: a contaminated coyote scat was found near the gun battery (Figure 2). The negative data are useful, however, since they support our previous observations that most of the contaminated jackrabbit pellets are found within 2.4 km of the cribs.

Keeping in mind the caveat at the end of the INTRODUCTION, we have resisted the temptation to use the count data in Appendix 1 to compute some quantitative estimate of the amount or inventory of contamination in the surveyed area. The data were collected for the purpose of estimating the general distribution of contaminated samples over the surveyed area and not to obtain accurate measures of the amount of contamination present. If the objective had been to estimate the total amount of contamination in the area then a sampling scheme much different than that actually used would have been required. The important point here is that the objective of the study determines the sampling plan used, and that a single sampling plan will, in most cases, not yield data that can be used to adequately fulfill more than one objective.

TABLE 1. Summary of Measurements Made Along Transects Radiating from Abandoned Gun Placement, 200 East Area, 1973

<u>Date</u>	<u>Heading (°)</u>	<u>Radius Length (m)</u>	<u>Number of Stations</u>	<u>Results</u>
6/25/73	140	800	50	Background levels
6/29/73	145	800	50	Coyote scat > 100,000 cpm, 560 m out
6/25/73	150	800	50	Background levels
6/29/73	155	1600	100	Background levels
6/25/73	160	800	50	Background levels
6/29/73	165	1600	100	Background levels
6/25/73	170	800	50	Background levels
6/29/73	175	1600	100	Background levels
6/25/73	180	800	50	Background levels
6/29/73	185	1600	100	Background levels
6/25/73	190	800	50	Background levels
6/29/73	195	1600	100	Background levels
6/25/73	200	800	50	Background levels
6/29/73	205	1600	100	Background levels
6/25/73	210	800	50	Background levels
6/29/73	215	1600	100	Background levels
6/29/73	220	1600	100	Background levels
6/29/73	230	1600	100	Background levels
TOTAL	18	21,600	1350	1 coyote scat above background

TABLE 2. Summary of Measurements Made Along Transects Radiating from Power Line Poles into B-C Crib Area, 1973.

<u>Location</u>	<u>Date</u>	<u>Heading (°)</u>	<u>Radius Length (m)</u>	<u>Number of Stations</u>	<u>Results</u>
Pole S 232	6/26/73	10	1600	100	Background levels
		20	800	50	Background levels
		30	1600	100	Background levels
		40	800	50	Background levels
		50	1760	110	Background levels
		60	800	50	Background levels
		70	1600	100	Background levels
		80	<u>800</u>	<u>50</u>	Background levels
			9760	610	
Pole S 242	6/27/73	0	1600	100	Background levels
		10	1600	100	Background levels
		20	1600	100	Background levels
		30	1728	108	Background levels
		40	<u>1600</u>	<u>100</u>	Background levels
			8128	508	
Substation	6/27/73	0	1600	100	Background levels
		10	320	20	Background levels
		20	1600	100	Background levels
		30	1600	100	Background levels
		40	<u>1600</u>	<u>100</u>	Background levels
			6720	420	
Continued					

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TABLE 2. (contd)

<u>Location</u>	<u>Date</u>	<u>Heading (°)</u>	<u>Radius Length (m)</u>	<u>Number of Stations</u>	<u>Results</u>
Pole S 222	6/28/73	40	1600	100	Background levels
		50	1600	100	Background levels
		60	1600	100	Background levels
		70	1600	100	Background levels
		80	<u>1600</u>	<u>100</u>	Background levels
			8000	500	
TOTAL		23	32608	2038	Background levels

We can make some preliminary observations concerning the apparent distribution of the contamination and some of the environmental parameters mentioned in the INTRODUCTION. First, the prevailing winds are from the northwest and the prevailing high winds are from the southwest. The distribution pattern of activity measured appears to radiate from the cribs into rather than away from the prevailing winds. **I**t is obvious that winds close to the ground have sorted and moved the pellets, but **i**t appears that much of the movement has been from the relatively bare areas between shrubs, "desert pavement," into the nearby vegetation and debris under the shrubs. **I**t also appears that the contaminated pellets are distributed contrary to rather than parallel with the land contours.

During the field trips **i**t was noted that the vegetation associations to the south were more dense, had taller more healthy sagebrush, and appeared to be less disturbed. Examination of the aerial photographs confirmed these observations. In Figure 1 you can see the increased density of shrubs particularly between headings 112.5" and 259°, radii that also contained much of the contamination recorded.

Certain behavioral characteristics of the black-tailed jackrabbit lead us to believe that the presence of most of the contaminated pellets in denser vegetation is more than coincidental. Jackrabbits prefer shrub-covered habitats. On the Hanford Reservation few jackrabbits are observed in large, open areas devoid of shrubs: they even appear to be totally absent from the lush, perennial grasslands that have few shrubs. Since jackrabbits, like all hares, do not build burrows, they use shrubs for shelter to avoid detection by predators, to help maintain their body heat in a very rigorous environment, and as a source of food when more desirable forbs and grasses are absent (Dalquest, 1948; Ingles, 1965). Hansen and Flinders (1969) reported that black-tailed jackrabbits feed in the open vegetation adjacent to denser communities. During daylight hours they rest under shrubs, the denser the better. **I**t would be reasonable to believe that jackrabbits removing contaminated salts from the B-C Cribs generally returned to the denser stands of vegetation to the south for feeding and resting.

The large area that was finally contaminated no doubt included the home ranges of many individual hares. Jackrabbits are thought to confine their life activities to an area of roughly 8-16 hectares. One would expect to find most of the contamination centered near the source of exposure, which is where it is found.

The leverets, or juvenile hares, do emigrate from their natal form or nest. They would have body burdens including activity transferred from their dam as well as activity from the salt lick. Emigrating subadults and displaced adults would account for the activity dispersed over the 10 km<sup>2</sup> area. Movements of 1.5-3 km are not unusual for jackrabbits; some hares move up to 19 km. It would appear that the active dunes south of the cribs acted as a natural barrier to displacement since we have found no contaminated hare pellets on the far side of the dunes.

Because the source of contamination was localized, you would expect that the density of contaminated pellets would decline rapidly as you moved away from the source. It would appear that the maximum distance involved in the spread is a function of the distance moved by an unknown proportion of the migrating population that had been exposed either prenatally or at the salt lick. Since we found contamination at least 2.4 km from the B-C Crib, we must assume that there is a finite, albeit very low, probability that other pellets could be found at greater distances from the source.

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APPENDIX

Measurements of Radioactivity (counts per minute)  
Recorded at 16-Meter Intervals Along Transects  
from the B-C Cribs, 200 East Area



Direction: 0° (North)

Date: June 12, 1972

Operator: Dick Gies

Machine No.: 1150

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	250	550	27	200	400
2	2,000	10,000	28	200	200
3	400	1,000	29	200	3,000
4	300	400	30	200	300
5	250	350	31	200	300
6	200	250	32	400	2,000
7	200	250	33	200	200
8	200	250	34	200	300
9	200	450	35	200	200
10	200	300	36	200	200
11	400	600	37	200	250
12	200	450	38	200	350
13	400	550	39	200	250
14	500	800	40	200	200
15	250	450	41	100	200
16	400	2,000	42	100	200
17	400	600	43	200	800
18	2,000	6,000	44	100	200
19	200	550	45	100	200
20	250	600	46	250	250
21	200	600	47	150	200
22	400	1,000	48	200	400
23	150	250	49	100	300
24	200	250	50	100	200
25	200	300	51	200	500
26	200	400	52	150	200

Direction: 11.25°  
Date: June 21, 1972

Operator: Gowen Moore  
Machine No.: 1529

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	150	200	23	100	300
2	200	2,000	24	110	400
3	200	1,000	25	110	200
4	150	200	26-40	Skip over-Fenced Area	
5	200	600	41	100	200
6	200	12,000	42	100	100
7	200	800	43	100	300
8	200	400	44	100	200
9	300	32,000	45	100	200
10	200	900	46	100	8,500
11	200	16,000	47	100	200
12	200	2,000	48	100	100
13	200	1,000	49	100	400
14	200	20,000	50	100	200
15	200	25,000	51	100	200
16	200	600	52	100	600
17	200	4,000	53	100	4,000
18	200	8,000	54	100	200
19	200	800	55	100	4,000
20	200	800	56	100	110
21	150	600	57	100	100
22	110	400			

Direction: 22.5°  
Date: June 12, 1972

Operator: Dick Gies  
Machine No.: 1150

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	200	400	30	200	250
2	200	500	31	200	300
3	200	900	32	200	200
4	400	400	33	100	250
5	400	5,500	34	200	300
6	600	10,000	35	100	250
7	200	500	36	200	300
8	300	2,000	37	150	250
9	250	500	38	100	200
10	200	700	39	100	200
11	250	600	40	200	200
12	200	200	41	200	200
13	400	9,000	42	200	200
14	200	500	43	100	150
15	400	2,500	44	100	200
16	200	300	45	100	150
17	200	300	46	100	100
18	200	18,000 (TW)	47	100	150
19	200	300	48	100	200
20	250	250	49	150	150
21	200	200	50	150	250
22	200	300	51	100	150
23	200	300	52	100	200
24	200	200	53	100	200
25	200	300	54	150	150
26	200	200	55	150	200
27	200	200	56	100	200
28	200	250	57	100	200
29	150	450			

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(TW) - Tumble weeds.

Direction: 33.75°  
Date: June 21, 1972

Operator: Gowen Moore  
Machine No.: 1529

<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	100	500	38	100	500
2	200	600	39	100	100
3	200	600	40	100	1,500
4	1,000	100,000+	41	100	300
5	200	1,500	42	100	400
6	200	2,000	43	100	200
7	200	2,000	44	100	200
8	200	400	45	100	200
9	400	40,000	46	100	200
10	100	600	47	100	200
11	200	7,000	48	100	200
12	200	10,000	49	100	200
13	200	1,000	50	100	200
14	200	4,000	51	100	100
15	100	200	52	100	100
16	100	800	53	100	100
17	400	80,000	54	100	100
18	100	200	55	100	100
19	100	600	56	100	100
20	100	400	57	100	100
21	200	3,000	58	100	200
22	100	200	59	100	100
23	100	600	60	100	200
24	100	100	61	100	100
25	100	300	62	100	100
26	100	300	63	100	100
27	100	100	64	100	100
28	100	150	65	400	100
29	100	400	66	100	5,000
30	100	200	67	100	100
31	100	500	68	100	100
32	100	200	69	100	100
33	100	300	70	100	100
34	100	200	71	100	100
35	100	200	72	100	100
36	100	200	73	100	100
37	100	200	74	100	100

Direction: 45° (NE)

Date: June 12, 1972

Operator: Gowen Moore

Machine No.: 1529

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	200	550	35	100	200
2	200	200	36	100	100
3	200	200	37	50	50
4	400	3,500	38	50	150
5	400	800	39	100	200
6	200	450	40	50	150
7	250	20,000	41	50	150
8	200	300	42	100	200
9	200	1,500	43	50	250
10	200	400	44	100	200
11	300	3,000	45	100	250
12	100	100	46	100	250
13	200	250	47	50	150
14	100	200	48	100	200
15	100	300	49	100	200
16	100	250	50	50	150
17	150	800	51	100	250
18	100	250	52	100	200
19	100	250	53	100	225
20	100	100	54	50	200
21	100	100	55	50	150
22	100	200	56	50	50
23	100	200	57	50	250
24	100	200	58	100	200
25	100	300	59	50	200
26	100	100	60	100	225
27	100	200	61	100	250
28	100	350	62	100	200
29	100	150	63	50	175
30	100	100	64	50	157
31	100	150	65	50	225
32	100	150	66	100	225
33	100	100	67	50	200
34	100	200	68	50	175

Direction: 56.25"

Operator: Dick Fitzner

Date: June 20, 1972

Machine No.: 1392

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	200	350	41	100	200
2	200	400	42	100	200
3	200	500	43	100	200
4	200	15,000	44	100	200
5	200	850	45	100	200
6	800	75,000	46	100	200
7	200	350	47	100	200
8	200	400	48	100	200
9	200	1,500	49	100	200
10	200	25,000	50	100	200
11	50	150	51	100	200
12	50	200	52	100	200
13	100	250	53	100	200
14	100	200	54	100	200
15	100	5,500	55	100	200
16	100	400	56	100	200
17	100	200	57	100	200
18	100	150	58	100	200
19	100	200	59	100	200
20	100	400	60	100	200
21	100	300	61	100	200
22	100	150	62	100	200
23	100	200	63	100	200
24	100	200	64	100	200
25	100	200	65	100	8,000
26	100	20,000	66	100	4,000
27	100	200	67	100	200
28	100	200	68	100	4,000
29	100	150	69	100	200
30	100	200	70	100	250
31	100	15,000	71	100	200
32	100	150	72	100	200
33	100	200	73	100	200
34	100	200	74	100	200
35	100	250	75	100	200
36	100	150	76	100	250
37	100	200	77	100	200
38	100	200	78	100	200
39	100	200	79	100	200
40	100	250	80	100	200

Direction: 56.25° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	100	200	93	100	200
82	100	250	94	100	200
83	100	200	95	100	200
84	100	200	96	100	200
85	100	200	97	100	200
86	100	200	98	100	200
87	100	150	99	100	200
88	100	150	100	100	200
89	100	200	101	100	200
90	100	200	102	100	200
91	100	200	103	100	200
92	100	150	104	100	200

Direction: 67.5°  
Date: June 12, 1972

Operator: Gowen Moore  
Machine No.: 1529

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	200	400
2	200	500
3	200	550
4	200	425
5	250	1,000
6	400	10,000
7	100	500
8	200	1,000
9	200	950
10	150	550
11	250	1,500
12	100	400
13	100	500
14	150	1,500
15	100	200
16	200	1,500
17	100	250
18	100	200
19	200	500
20	150	1,500
21	100	300
22	100	200
23	100	200
24	100	950
25	150	550
26	100	250
27	100	200
28	100	250
29	50	150
30	100	100
31	100	300
32	100	250
33	50	175
34	50	100
35	50	100
36	100	100
37	100	100
38	50	50
39	100	100
40	100	100

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
41	100	200
42	100	200
43	100	150
44	100	200
45	100	200
46	100	150
47	100	200
48	100	150
49	100	200
50	100	200
51	100	200
52	100	200
53	100	100
54	100	100
55	100	100
56	100	150
57	100	150
58	100	200
59	100	100
60	100	100
61	100	150
62	100	200
63	100	100
64	100	200
65	100	200
66	100	800
67	200	2,000
68	100	100
69	100	200
70	100	200
71	100	100
72	100	150
73	100	200
74	100	200
75	100	250
76	100	100
77	100	200
78	100	100
79	100	100
80	100	100



Direction: 67.5° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	100	100	106	50	100
82	100	100	107	100	100
83	100	100	108	50	250
84	100	100	109	50	200
85	100	100	110	50	100
86	100	100	111	50	50
87	100	150	112	50	50
88	100	100	113	50	100
89	100	200	114	50	100
90	100	200	115	50	100
91	100	100	116	50	150
92	100	200	117	50	150
93	100	200	118	50	150
94	100	150	119	50	200
95	100	200	120	100	250
96	100	200	121	100	150
97	100	100	122	100	100
98	100	200	123	100	100
99	100	150	124	100	100
100	100	100	125	100	100
101	100	100	126	100	100
102	100	200	127	100	100
103	100	200	128	100	100
104	50	100	129	100	100
105	50	200	130	100	100

Direction: 78.75°  
Date: June 20, 1972

Operator: Dick Fitzner  
Machine No. : 1392

<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	200	350	46	150	250
2	200	400	47	150	5,500
3	100	150	48	150	200
4	300	40,000	49	150	200
5	250	2,500	50	150	200
6	250	400	51	150	200
7	300	35,000	52	150	200
8	250	15,000	53	100	200
9	150	4,000	54	150	200
10	150	4,000	55	150	200
11	150	200	56	150	200
12	150	200	57	150	200
13	150	250	58	150	200
14	100	250	59	150	200
15	100	250	60	150	200
16	100	3,000	61	150	200
17	250	30,000	62	150	200
18	100	150	63	150	200
19	100	6,000	64	150	200
20	100	150	65	150	200
21	50	150	66	150	200
22	50	150	67	150	200
23	100	150	68	150	200
24	50	150	69	150	200
25	50	150	70	150	200
26	50	150	71	150	200
27	50	150	72	150	200
28	50	150	73	150	200
29	50	150	74	150	200
30	50	250	75	150	200
31	50	300	76	150	200
32	50	150	77	150	200
33	50	150	78	150	200
34	50	150	79	150	200
35	50	150	80	150	200
36	50	150	81	150	200
37	50	1,500	82	150	200
38	50	150	83	150	200
39	50	150	84	150	200
40	50	150	85	150	200
41	50	150	86	120	200
42	150	200	87	100	200
43	150	200	88	100	200
44	150	200	89	100	200
45	150	250	90	100	200

Direction: 90° (East)

Operator: John Hedlund

Date: June 9, 1972

Machine No.: 1504

<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	600	5,000	46	200	200
2	500	6,000	47	200	2,000
3	300	750	48	200	200
4	2,500	9,000	49	250	250
5	250	250	50	250	250
6	500	6,000	51	250	4,500
7	300	25,000	52	200	200
8	250	800	53	200	200
9	300	2,500	54	250	30,000
10	500	1,500	55	250	20,000
11	250	250	56	250	250
12	500	500	57	200	200
13	300	650	58	200	200
14	300	300	59	250	250
15	250	250	60	200	3,000
16	250	2,500	61	250	250
17	200	200	62	250	250
18	250	250	63	250	250
19	250	250	64	250	250
20	250	800	65	250	250
21	250	1,000	66	250	250
22	250	250	67	250	95,000
23	250	250	68	250	750
24	500	750	69	250	250
25	250	250	70	250	40,000
26	700	700	71	250	15,000
27	250	250	72	250	6,000
28	200	200	73	200	200
29	250	2,000	74	250	250
30	250	250	75	250	15,000
31	250	250	76	200	200
32	250	250	77	250	250
33	600	20,000	78	250	250
34	250	250	79	250	250
35	200	200	80	250	250
36	200	200	81	250	250
37	250	250	82	250	250
38	200	200	83	250	250
39	200	200	84	250	250
40	200	200	85	250	250
41	200	200	86	250	250
42	250	250	87	250	250
43	250	50,000	88	250	250
44	250	250	89	200	200
45	250	250	90	250	250

Direction: 90° (East) (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
91	250	250	109	250	250
92	200	200	110	250	250
93	250	250	111	200	200
94	200	200	112	250	250
95	250	250	113	250	250
96	250	250	114	250	250
97	250	250	115	250	250
98	250	250	116	250	250
99	250	250	117	250	250
100	250	250	118	250	250
101	250	250	119	250	250
102	250	250	120	250	500
103	200	200	121	250	1,500
104	250	250	122	250	250
105	200	200	123	250	250
106	250	250	124	250	250
107	200	200	125	250	250
108	250	250			

Direction: 101.25°  
Date: June 20, 1972

Operator: Gowen Moore  
Machine No.: 1529

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	400	6,000	41	100	200
2	100	1,000	42	100	200
3	150	2,000	43	100	200
4	900	30,000	44	100	200
5	200	800	45	100	200
6	200	400	46	400	15,000
7	200	600	47	100	200
8	100	300	48	100	200
9	200	2,000	49	100	200
10	200	6,000	50	100	200
11	200	600	51	100	200
12	400	20,000	52	100	200
13	200	600	53	100	300
14	200	600	54	100	200
15	200	20,000	55	100	200
16	200	4,000	56	100	200
17	200	6,000	57	100	200
18	100	2,000	58	100	200
19	100	200	59	100	200
20	100	200	60	100	70,000
21	100	600	61	100	200
22	100	200	62	100	200
23	200	400	63	100	1,000
24	200	500	64	100	200
25	200	200	65	200	800
26	400	45,000	66	200	5,000
27	200	4,500	67	100	200
28	400	15,000	68	100	200
29	100	200	69	100	200
30	100	6,500	70	100	200
31	100	4,000	71	100	200
32	200	7,000	72	100	200
33	100	200	73	100	200
34	100	200	74	100	200
35	100	200	75	100	200
36	100	100	76	100	200
37	100	3,000	77	100	200
38	200	3,000	78	100	250
39	100	200	79	100	200
40	100	200	80	100	200

Direction: 101.25° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	100	100	91	100	100
82	100	100	92	100	100
83	100	100	93	100	100
84	100	200	94	100	300
85	100	200	95	100	300
86	100	100	96	100	100
87	100	200	97	100	100
88	100	200	98	100	200
89	100	200	99	100	100
90	100	200	100	100	200

Direction: 112.5"  
Date: June 13, 1972

Dick Gies and  
Operator: Dick Fitzner  
Machine No.: 1150

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	300	400	41	200	3,000
2	400	1,000	42	200	200
3	400	2,000	43	200	20,000
4	200	400	44	200	2,500
5	400	2,000	45	200	200
6	200	2,000	46	200	11,000
7	200	500	47	200	200
8	1,000	2,000	48	200	200
9	1,000	20,000	49	200	34,000
10	600	8,000	50	200	8,000
11	1,000	2,000	51	200	35,000
12	1,000	3,000	52	200	200
13	400	2,000	53	200	200
14	250	250	54	200	500
15	1,000	10,000	55	200	200
16	600	3,000	56	200	200
17	200	500	57	200	200
18	200	500	58	200	200
19	200	200	59	200	200
20	200	200	60	200	200
21	1,000	27,000	61	200	200
22	200	200	62	200	200
23	200	200	63	200	200
24	200	400	64	200	200
25	200	800	65	200	21,000
26	200	200	66	200	400
27	200	450	67	200	200
28	200	8,000	68	200	200
29	200	400	69	200	200
30	200	200	70	200	200
31	200	200	71	200	200
32	200	600	72	200	200
33	200	8,000	73	200	200
34	200	200	74	200	200
35	200	200	75*	100	400
36	200	200	76	100	500
37	200	200	77	100	100,000+
38	200	200	78	100	300
39	200	200	79	100	18,000
40	200	200	80	100	12,000

\* Counts from stations 75-126 obtained by Dick Fitzner.

Direction: 112.5° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	400	100,000+	104	100	150
82	100	500	105	100	150
83	100	200	106	100	200
84	100	250	107	100	200
85	100	200	108	100	200
86	100	200	109	100	200
87	100	200	110	100	200
88	100	800	111	100	200
89	100	200	112	100	150
90	100	100,000+	113	100	150
91	100	200	114	100	150
92	100	200	115	100	150
93	100	200	116	100	200
94	100	10,000	117	100	200
95	100	200	118	100	200
96	100	2,000	119	100	3,000
97	100	200	120	100	200
98	100	200	121	100	200
99	100	200	122	100	200
100	100	5,000	123	100	200
101	100	1,500	124	100	200
102	100	15,000	125	100	200
103	100	200	126	100	8,000



Direction: 120°  
Date: June 28, 1972

Operator: Dick Fitzner  
Machine No.:

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	Skipped		46	100	400
2	Skipped		47	100	200
3	Skipped		48	100	300
4	Skipped		49	100	200
5	Skipped		50	100	300
6	Skipped		51	100	200
7	Skipped		52	100	4,000
8	Skipped		53	100	200
9	Skipped		54	100	3,000
10	Skipped		55	100	1,000
11	Skipped		56	100	200
12	Skipped		57	100	200
13	Skipped		58	100	200
14	Skipped		59	100	200
15	100	200	60	100	150
16	500	25,000	61	100	20,000
17	400	4,500	62	100	500
18	300	25,000	63	100	200
19	300	5,000	64	100	5,000
20	200	55,000	65	100	200
21	100	4,500	66	100	20,000
22	200	400	67	100	200
23	100	2,500	68	100	2,000
24	100	15,000	69	100	200
25	100	1,500	70	100	200
26	150	100,000+	71	100	3,500
27	100	4,500	72	100	200
28	100	600	73	100	200
29	100	7,000	74	100	200
30	100	6,000	75	100	200
31	100	4,500	76	100	200
32	100	400	77	100	200
33	100	300	78	100	100,000+
34	100	100,000+	79	100	200
35	100	6,000	80	100	200
36	100	200	81	100	200
37	100	200	82	100	200
38	100	200	83	100	200
39	100	200	84	100	200
40	100	300	85	100	200
41	100	25,000	86	100	15,000
42	100	1,000	87	100	200
43	100	65,000	88	100	8,000
44	100	2,000	89	100	200
45	100	500	90	100	200

Direction: 120° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
91	100	200	124	100	200
92	100	9,000	125	100	150
93	100	200	126	100	2,000
94	100	4,000	127	100	200
95	100	200	128	100	25,000
96	100	200	129	100	200
97	100	200	130	100	20,000
98	100	200	131	100	200
99	100	200	132	100	200
100	100	200	133	100	200
101	100	200	134	100	200
102	100	200	135	100	200
103	100	200	136	100	200
104	100	200	137	100	200
105	100	200	138	100	200
106	100	200	139	100	5,000
107	100	200	140	100	200
108	100	200	141	100	200
109	100	200	142	100	200
110	100	200	143	100	200
111	100	200	144	100	200
112	100	200	145	100	200
113	100	200	146	100	200
114	100	200	147	100	200
115	100	200	148	100	200
116	100	200	149	100	200
117	100	200	150	100	200
118	100	200	151	100	200
119	100	200	152	100	200
120	100	20,000	153	100	200
121	100	150	154	100	200
122	100	200	155	100	200
123	100	25,000	156	100	200

Direction: 123.75"  
Date: June 20, 1972

Operator: Gowen Moore  
Machine No. : 1529

<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	200	900	41	150	400
2	600	2,000	42	100	300
3	600	40,000	43	100	100
4	700	6,000	44	100	100
5	400	4,000	45	100	300
6	400	6,000	46	100	300
7	300	1,500	47	200	6,000
8	200	1,000	48	200	4,500
9	200	6,000	49	100	100
10	200	400	50	100	600
11	200	5,000	51	100	200
12	200	400	52	100	200
13	200	2,500	53	100	2,000
14	200	1,200	54	100	800
15	600	15,000	55	100	200
16	200	1,500	56	100	200
17	200	7,000	57	100	200
18	200	200	58	140	1,000
19	200	15,000	59	100	200
20	200	800	60	100	900
21	200	200	61	100	400
22	200	500	62	100	200
23	150	800	63	200	4,000
24	200	5,500	64	100	600
25	200	4,000	65	100	200
26	150	1,500	66	100	300
27	200	800	67	100	300
28	100	300	68	100	300
29	200	15,000	69	100	350
30	200	800	70	100	200
31	200	800	71	200	4,000
32	200	1,000	72	100	100
33	200	7,000	73	200	1,000
34	200	500	74	100	100
35	100	100	75	100	300
36	100	200	76	100	100
37	100	350	77	100	3,500
38	100	200	78	100	300
39	100	200	79	100	100
40	100	400	80	100	200

Direction: 123.75° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	100	100	91	100	700
82	100	5,000	92	100	250
83	100	100	93	100	100
84	100	200	94	100	800
85	100	100	95	100	110
86	100	100	96	100	100
87	100	100	97	100	2,000
88	100	1,000	98	100	600
89	100	1,000	99	100	100
90	100	300			

Direction: 135° (Southeast)

Operator: Tom O'Farrell

Date: June 9, 1972

Machine No.: 1150

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	200	200	36	200	200
2	300	300	37	150	150
3	200	20,000	38	200	200
4	200	200	39	200	15,000
5	300	30,000	40	200	4,000
6	300	6,000	41	200	200
7	300	30,000	42	200	55,000
8	300	15,000	43	200	6,500
9	300	10,000	44	200	200
10	300	4,000	45	200	5,000
11	300	50,000	46	200	15,000
12	300	2,000	47	200	250
13	300	100,000+	48	200	200
14	300	1,000	49	200	100,000+
15	300	10,000	50	200	200
16	300	50,000	51	200	40,000
17	300	100,000+	52	200	1,500
18	300	1,500	53	200	200
19	300	60,000	54	200	20,000
20	200	200	55	200	4,000
21	200	6,000	56	200	4,000
22	200	65,000	57	200	200
23	200	250	58	200	200
24	200	200	59	200	200
25	200	10,000	60	200	200
26	200	200	61	200	200
27	200	6,000	62	200	200
28	200	200	63	200	200
29	200	5,000	64	200	200
30	200	20,000	65	200	100,000+
31	200	10,000	66	200	200
32	200	6,000	67	200	200
33	200	250	68	200	200
34	200	3,000	69	200	200
35	200	200	70	200	200

Direction: 135° (Southeast)

Operator: Dick Fitzner

Date: June 21, 1972

Machine No.: 1392

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	100	30,000	47	100	6,000
2	700	6,000	48	50	150
3	250	10,000	49	100	10,000
4	400	8,000	50	100	250
5	400	1,500	51	100	6,000
6	600	10,000	52	100	15,000
7	600	5,000	53	100	250
8	400	2,000	54	100	25,000
9	200	300	55	100	1,500
10	200	6,000	56	100	30,000
11	150	400	57	100	6,000
12	300	85,000	58	100	700
13	300	2,500	59	100	200
14	250	2,000	60	100	100,000+
15	400	3,500	61	100	200
16	400	600	62	100	250
17	250	300	63	100	800
18	200	500	64	100	250
19	250	25,000	65	100	250
20	350	2,000	66	100	100,000+
21	200	1,500	67	100	200
22	200	250	68	100	250
23	250	500	69	100	200
24	100	1,500	70	100	200
25	100	250	71	100	200
26	100	150	72	100	200
27	100	250	73	100	200
28	100	200	74	100	200
29	100	250	75	100	200
30	100	15,000	76	100	200
31	100	300	77	100	250
32	100	5,000	78	100	200
33	100	800	79	100	200
34	100	200	80	100	200
35	100	150	81	100	200
36	100	250	82	100	200
37	100	250	83	100	300
38	100	200	84	100	250
39	100	250	85	100	250
40	100	250	86	100	200
41	100	250	87	100	200
42	100	150	88	100	200
43	100	300	89	100	300
44	100	200	90	100	250
45	100	200	91	100	150
46	100	200	92	100	200

Direction: 146.25°  
Date: June 20, 1972

Operator: Dick Fitzner  
Machine No.: 1436

<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	150	400	48	50	150
2	600	6,000	49	50	2,000
3	200	25,000	50	50	150
4	200	15,000	51	50	100
5	200	45,000	52	50	150
6	500	9,500	53	50	150
7	250	400	54	50	150
8	500	70,000	55	50	150
9	400	1,000	56	50	150
10	600	6,000	57	50	150
11	400	1,000	58	50	3,000
12	1,000,	20,000	59	50	150
13	250	45,000	60	50	150
14	600	100,000+	61	50	150
15	150	2,500	62	50	40,000
16	150	100,000+	63	50	150
17	250	1,500	64	50	150
18	250	5,500	65	50	150
19	200	3,000	66	50	150
20	150	200	67	50	150
21	800	2,500	68	50	200
22	150	300	69	50	150
23	150	100,000+	70	50	150
24	500	1,500	71	50	100
25	100	3,000	72	50	100
26	100	250	73	50	150
27	150	300	74	50	150
28	150	200	75	100	200
29	150	300	76	50	150
30	150	250	77	50	40,000
31	150	15,000	78	50	150
32	150	200	79	50	150
33	150	1,000	80	50	150
34	150	200	81	50	150
35	250	100,000+	82	50	2,500
36	150	600	83	50	150
37	150	200	84	50	150
38	100	150	85	50	35,000
39	150	750	86	50	200
40	100	200	87	50	150
41	300	100,000+	88	50	150
42	100	1,500	89	50	150
43	100	200	90	50	150
44	100	200	91	50	150
45	50	100	92	50	150
46	50	150	93	50	150
47	50	150	94	50	150

Direction: 157.5"

Operator: Dick Gies

Date: June 13, 1972

Machine No.: 1150

<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	600	40,000	31	400	10,000
2	600	1,500	32	400	950
3	600	600	33	400	400
4	600	600	34	400	9,500
5	600	14,000	35	400	400
6	600	600	36	400	400
7	400	400	37	400	100,000+
8	400	60,000	38	400	800
9	400	15,000	39	400	400
10	400	30,000	40	400	400
11	400	700	41	400	400
12	400	20,000	42	400	9,000
13	400	1,500	43	400	400
14	400	8,000	44	400	1,800
15	400	500	45	400	400
16	400	400	46	400	60,000
17	400	100,000+	47	400	3,000
18	400	400	48	400	1,000
19	400	500	49	400	8,000
20	400	400	50	400	400
21	400	400	51	400	400
22	400	400	52	400	23,000
23	400	2,000	53	400	400
24	400	30,000	54	400	400
25	400	400	55	400	400
26	400	400	56	400	400
27	400	11,000	57	400	400
28	400	1,000	58	400	400
29	400	400	59	400	400
30	400	4,000	60	400	400



Direction: 168.75"  
Date: June 19, 1972

Operator: Dick Fitzner  
Machine No. : 1436

<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	500	2,500	48	100	400
2	600	10,000	49	100	200
3	400	30,000	50	100	350
4	500	100,000+	51	200	7,000
5	450	10,000	52	100	200
6	600	6,000	53	100	200
7	800	100,000+	54	100	200
8	1,500	80,000	55	100	200
9	600	100,000+	56	100	200
10	400	4,500	57	100	5,000
11	600	7,000	58	100	200
12	250	600	59	100	150
13	150	250	60	100	200
14	150	1,500	61	100	70,000
15	250	1,500	62	100	200
16	250	1,000	63	100	200
17	250	900	64	100	200
18	400	800	65	100	200
19	250	300	66	100	200
20	200	400	67	100	200
21	150	600	68	100	250
22	200	900	69	100	200
23	250	1,500	70	100	200
24	250	75,000	71	100	100,000+
25	200	4,500	72	100	200
26	100	250	73	100	200
27	100	500	74	100	300
28	100	1,250	75	100	200
29	100	250	76	100	200
30	100	200	77	100	200
31	200	450	78	100	100,000+
32	500	5,500	79	100	200
33	250	800	80	100	200
34	100	250	81	100	200
35	200	300	82	100	200
36	200	2,500	83	100	200
37	100	200	84	100	150
38	100	200	85	100	200
39	250	7,000	86	100	150
40	100	200	87	100	200
41	100	200	88	100	200
42	100	250	89	100	30,000
43	100	15,000	90	100	200
44	100	4,000	91	100	150
45	100	200	92	100	150
46	100	60,000	93	100	150
47	100	600	94	100	150
			95	100	150

Direction: 180° (South)

Operator: Dick Fitzner

Date: June 8, 1972

Machine No.: 1436

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	450	800	46	250	700
2	1,000	2,000	47	100	250
3	600	1,000	48	250	300
4	250	400	49	250	3,500
5	800	1,500	50	250	1,500
6	1,000	2,500	51	100	250
7	2,000	5,000	52	100	250
8	700	4,000	53	100	250
9	1,000	6,000	54	100	250
10	800	6,000	55	100	250
11	700	1,000	56	100	250
12	600	1,500	57	250	5,000
13	1,000	15,000	58	100	250
14	700	1,500	59	100	250
15	250	250	60	100	250
16	200	250	61	100	250
17	100	250	62	100	250
18	250	700	63	100	250
19	200	400	64	250	1,000
20	250	450	65	250	500
21	250	800	66	250	6,000
22	250	500	67	100	250
23	250	1,500	68	100	250
24	200	250	69	250	900
25	250	3,000	70	100	250
26	250	20,000	71	100	250
27	200	1,500	72	100	250
28	250	6,000	73	100	250
29	250	600	74	100	250
30	250	400	75	100	250
31	100	250	76	100	250
32	250	350	77	100	250
33	100	250	78	100	250
34	100	250	79	100	250
35	100	250	80	100	250
36	250	2,000	81	100	250
37	100	250	82	100	250
38	200	250	83	100	250
39	250	850	84	100	250
40	250	1,500	85	100	250
41	250	1,000	86	100	250
42	100	250	87	100	250
43	100	250	88	100	250
44	100	250	89	100	250
45	100	250	90	100	250

Direction: 180° (South) (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
91	100	250	103	100	250
92	100	250	104	100	250
93	100	250	105	100	250
94	100	250	106	100	250
95	100	250	107	100	250
96	100	250	108	100	250
97	100	250	109	100	250
98	100	250	110	100	250
99	100	250	111	100	250
100	100	250	112	100	250
101	100	250	113	100	250
102	100	250	114	100	250

Direction: 191.25°  
Date: June 19, 1972

Operator: Dick Fitzner  
Machine No. : 1436

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	250	1,000	46	100	300
2	400	600	47	100	150
3	400	3,000	48	100	8,000
4	1,000	35,000	49	100	200
5	1,000	35,000	50	100	250
6	1,000	3,000	51	100	300
7	1,000	2,000	52	100	15,000
8	700	20,000	53	100	20,000
9	800	70,000	54	100	150
10	250	1,500	55	100	150
11	600	2,000	56	100	150
12	300	60,000	57	100	150
13	100	350	58	100	250
14	100	300	59	100	150
15	400	6,500	60	100	150
16	200	500	61	100	100
17	200	900	62	100	200
18	300	500	63	100	300
19	200	3,500	64	100	150
20	400	800	65	100	150
21	250	65,000	66	100	150
22	100	25,000	67	100	150
23	100	300	68	100	150
24	100	200	69	100	150
25	100	4,000	70	100	150
26	250	100,000+	71	100	700
27	100	250	72	100	200
28	150	300	73	100	100,000+
29	100	200	74	100	150
30	200	75,000	75	100	150
31	200	4,500	76	100	150
32	100	250	77	100	150
33	100	200	78	100	150
34	100	350	79	100	150
35	100	250	80	100	150
36	100	250	81	100	150
37	100	45,000	82	100	150
38	100	400	83	100	150
39	250	3,000	84	100	150
40	250	15,000	85	100	150
41	100	150	86	100	150
42	100	150	87	100	150
43	100	150	88	100	150
44	100	150	89	100	150
45	100	150			

Direction: 202.5°  
Date: June 13, 1972

Operator: Dick Fitzner  
Machine No.: 1436

20-Step Intervals	MIN.	MAX.	20-Step Intervals	MIN.	MAX.
1	500	10,000	41	100	250
2	200	500	42	250	25,000
3	300	45,000	43	150	350
4	20,000	100,000+	44	100	250
5	1,500	20,000	45	250	350
6	900	1,500	46	100	200
7	1,000	20,000	47	150	15,000
8	500	30,000	48	150	6,000
9	250	7,000	49	100	250
10	350	1,500	50	200	15,000
11	400	700	51	150	250
12	400	20,000	52	100	200
13	300	2,000	53	100	200
14	400	6,000	54	100	200
15	600	6,000	55	100	4,000
16	700	45,000	56	100	150
17	250	3,000	57	100	250
18	250	100,000+	58	100	200
19	100	200	59	100	200
20	100	200	60	100	200
21	2,000	60,000	61	100	250
22	150	2,000	62	100	200
23	150	300	63	100	200
24	250	100,000+	64	100	200
25	100	300	65	100	200
26	100	200	66	100	250
27	250	1,500	67	100	10,000
28	200	300	68	100	200
29	150	400	69	100	200
30	100	200	70	100	200
31	100	250	71	100	200
32	250	2,000	72	100	350
33	250	800	73	100	250
34	600	1,500	74	100	250
35	100	250	75	100	250
36	100	250	76	100	250
37	250	40,000	77	100	2,500
38	100	300	78	100	250
39	250	3,500	79	100	250
40	250	500	80	100	250

Direction: 213.75°

Operator: Gowen Moore

Date: June 19, 1972

Machine No. : 1529

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	500	6,000	41	150	2,000
2	200	1,000	42	150	1,000
3	500	40,000	43	200	600
4	500	20,000	44	200	2,000
5	400	2,000	45	150	15,000
6	300	7,000	46	100	500
7	200	1,500	47	200	1,000
8	150	600	48	200	900
9	150	900	49	150	400
10	400	90,000	50	150	400
11	200	15,000	51	100	300
12	600	15,000	52	100	300
13	300	9,000	53	100	250
14	300	25,000	54	100	300
15	400	3,000	55	100	400
16	500	30,000	56	100	300
17	400	30,000	57	100	300
18	200	1,000	58	100	250
19	200	400	59	100	200
20	300	2,500	60	100	200
21	200	1,500	61	200	400
22	200	800	62	100	400
23	100	400	63	200	1,000
24	250	10,000	64	100	300
25	200	10,000	65	100	300
26	200	1,000	66	100	300
27	200	600	67	100	1,500
28	200	600	68	100	200
29	200	30,000	69	100	200
30	200	800	70	100	1,000
31	200	600	71	100	300
32	200	1,500	72	100	200
33	200	600	73	100	400
34	200	2,000	74	100	400
35	200	7,000	75	100	400
36	200	20,000	76	100	200
37	200	20,000	77	100	200
38	200	20,000	78	100	800
39	600	80,000	79	100	200
40	200	7,000	80	200	9,000

Direction: 213.75° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	200	9,500	91	100	200
82	100	200	92	100	200
83	100	200	93	100	150
84	100	200	94	100	200
85	100	200	95	100	100
86	100	250	96	100	100
87	100	100	97	100	200
88	100	200	98	100	100
89	100	200	99	100	150
90	100	100	100	100	150

Direction: 225° (Southwest)

Operator: Dick Fitzner

Date: June 12, 13, 1972

Machine No.: 1436

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	200	2,000	41	250	400
2	600	1,500	42	100	250
3	500	6,000	43	100	250
4	500	2,500	44	100	250
5	700	5,500	45	100	250
6	1,000	3,000	46	250	3,000
7	250	2,500	47	250	500
8	250	550	48	250	1,000
9	250	500	49	250	2,250
10	400	3,500	50	250	250
11	800	40,000	51	250	3,000
12	250	700	52	100	250
13	800	100,000+	53	100	250
14	400	2,500	54	100	250
15	500	2,000	55	100	250
16	400	650	56	100	600
17	250	950	57	100	250
18	250	2,000	58	100	200
19	400	2,000	59	100	250
20	400	30,000	60	100	5,500
21	400	4,000	61	100	200
22	250	2,000	62	100	250
23	250	500	63	100	250
24	250	1,500	64	100	250
25	800	4,000	65	100	9,500
26	600	6,000	66	100	250
27	250	5,000	67	100	6,000
28	1,500	9,000	68	100	300
29	250	5,000	69	100	250
30	250	2,000	70	100	3,000
31	250	2,000	71	100	5,500
32	250	1,500	72	100	900
33	100	250	73	100	250
34	250	9,500	74	100	250
35	250	1,500	75	100	250
36	250	400	76	100	250
37	250	35,000	77	100	2,250
38	400	3,000	78	100	250
39	500	800	79	100	250
40	250	10,000	80	100	250



Direction: 225° (Southwest) (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	100	250	91	100	200
82	100	250	92	100	200
83	100	250	93	100	150
84	100	250	94	100	150
85	100	400	95	100	175
86	100	250	96	100	150
87	100	250	97	100	150
88	100	3,000	98	100	250
89	100	600	99	100	175
90	100	250	100	100	150

Direction: 236.25"  
Date: June 13, 1972

Operator: Gowen Moore  
Machine No.: 1529

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	400	9,000
2	400	2,000
3	800	25,000
4	700	15,000
5	500	6,000
6	600	10,000
7	600	17,000
8	300	1,000
9	300	1,000
10	300	5,500
11	600	65,000
12	600	30,000
13	600	10,000
14	600	40,000
15	300	40,000
16	200	1,000
17	400	5,000
18	200	7,500
19	250	6,000
20	400	25,000
21	600	8,000
22	800	65,000
23	800	15,000
24	200	15,000
25	200	10,000
26	200	9,000
27	200	15,000
28	200	4,000
29	100	1,200
30	100	600
31	100	3,500
32	100	1,500
33	100	500
34	100	800
35	200	20,000
36	100	1,200
37	200	6,000
38	200	50,000
39	200	2,000
40	100	600
41	100	1,500
42	100	1,500
43	100	300

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
44	100	1,000
45	100	800
46	100	500
47	100	3,000
48	100	5,000
49	200	25,000
50	100	1,500
51	200	3,500
52	100	2,500
53	100	1,000
54	100	600
55	100	300
56	100	200
57	100	600
58	100	300
59	200	6,500
60	200	45,000
61	100	400
62	100	200
63	100	2,500
64	100	300
65	100	200
66	100	200
67	200	4,500
68	100	400
69	100	200
70	100	900
71	100	600
72	200	30,000
73	100	600
74	100	800
75	100	4,000
76	100	300
77	100	200
78	100	200
79	100	200
80	100	300
81	100	200
82	100	200
83	100	200
84	100	40,000
85	100	200
86	100	200

Direction: 247.5°  
Date: June 13, 1972

Operator: Gowen Moore  
Machine No : 1529

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	1,000	10,500	36	100	200
2	1,500	70,000	37	100	200
3	600	20,000	38	100	450
4	500	6,000	39	100	200
5	600	20,000	40	100	200
6	600	2,500	41	100	200
7	700	20,000	42	100	800
8	500	1,500	43	100	200
9	400	8,000	44	100	450
10	400	3,000	45	100	400
11	800	8,000	46	100	300
12	900	20,000	47	200	4,000
13	800	6,000	48	100	300
14	500	9,500	49	100	400
15	300	5,000	50	100	200
16	200	2,000	51	100	100
17	300	1,500	52	100	100
18	700	40,000	53	100	100
19	700	65,000	54	100	100
20	800	65,000	55	100	200
21	200	1,500	56	100	150
22	200	1,800	57	400	15,000
23	100	500	58	200	6,000
24	200	1,500	59	100	100
25	800	25,000	60	200	8,500
26	300	1,500	61	100	250
27	250	2,500	62	100	250
28	200	450	63	400	45,000
29	200	3,000	64	100	200
30	400	8,000	65	100	100
31	100	200	66	100	4,500
32	100	200	67	100	1,500
33	100	200	68	100	300
34	100	800	69	200	1,500
35	100	200	70	100	100

Direction: 258.75°

Operator: Dick Gilbert  
Dick Fitzner

Date: June 13 &amp; 27, 1972

Machine No.: 1392

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	800	50,000	41	100	200
2	800	100,000+	42	100	200
3	1,200	50,000	43	100	200
4	800	800	44	100	200
5	1,000	80,000	45	100	200
6	1,000	42,000	46	100	200
7	1,000	50,000	47	100	200
8	1,200	100,000+	48	100	350
9	600	10,000	49	100	200
10	800	5,000	50	100	500
11	800	25,000	51	100	200
12	800	100,000+	52	100	600
13	800	30,000	53	100	1,500
14	1,000	60,000	54	100	200
15	400	5,000	55	100	200
16	400	2,500	56	100	250
17	400	5,500	57	100	200
18	800	35,000	58	100	200
19	800	6,000	59	100	2,500
20	500	10,000	60	100	200
21	800	40,000	61	100	200
22	400	20,000	62	100	200
23	600	600	63	100	200
24	400	400	64	100	200
25	300	3,000	65	100	200
26	700	30,000	66	100	200
27	300	300	67	100	200
28	400	100,000+	68	100	100,000+
29	400	62,000	69	100	200
30	600	45,000	70	100	100,000+
31	300	8,000	71	100	1,500
32*	100	350	72	100	200
33	100	200	73	100	200
34	100	200	74	100	200
35	100	200	75	100	200
36	100	200	76	100	25,000
37	100	200	77	100	200
38	100	200	78	100	200
39	100	200	79	100	200
40	100	200	80	100	200

\* Intervals 32 through 125 were obtained by Dick Fitzner

Direction: 258.75° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	100	200	104	100	5,000
82	100	200	105	100	200
83	100	200	106	100	200
84	100	45,000	107	100	200
85	100	200	108	100	200
86	100		109	100	200
87	100	200	110	100	200
88	100	200	111	100	40,000
89	100	200	112	100	200
90	100	200	113	100	200
91	100	200	114	100	200
92	100	200	115	100	200
93	100	20,000	116	100	200
94	100	200	117	100	200
95	100	200	118	100	200
96	100	200	119	100	200
97	100	200	120	100	200
98	100	200	121	100	200
99	100	20,000	122	100	800
100	100	200	123	100	200
101	100	200	124	100	200
102	100	200	125	100	200
103	100	200			

Direction: 270° (West)

Operator: Dick Gilbert

Date: June 9, 1972

Machine No. : 1392, 1592

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	1,500	15,000	36	300	300
2	10,000	22,000	37	250	250
3	1,200	4,500	38	250	250
4	2,000	6,200	39	250	250
5	500	500	40	250	250
6	500	500	41	250	250
7	2,500	10,000	42	250	250
8	700	700	43	200	200
9	500	4,500	44	200	200
10	800	3,000	45	200	200
11	900	900	46	250	250
12	2,000	20,000	47	200	200
13	1,000	1,000	48	200	200
14	800	800	49	200	200
15	500	500	50	200	200
16	500	500	51	200	200
17	300	300	52	200	200
18	900	900	53	200	200
19	800	1,200	54	250	250
20	500	500	55	175	175
21	500	500	56	200	200
22	300	300	57	200	200
23	500	3,000	58	200	200
24	500	500	59	200	200
25	800	800	60	175	175
26	400	800	61	200	200
27	400	400	62	200	200
28	1,200	8,000	63	200	200
29	800	4,000	64	250	250
30	350	350	65	250	250
31	400	400	66	250	1,500
32	300	300	67	250	3,000
33	250	5,000	68	200	200
34	300	300	69	200	200
35	250	250	70	175	175

Direction: 292.5°  
Date: June 13, 1972

Operator: Dick Gilbert  
Machine No.: 1392

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	500	10,000	37	175	175
2	800	100,000+	38	175	175
3	500	2,000	39	200	200
4	500	500	40	400	5,000
5	2,000	100,000+	41	200	200
6	1,000	5,000	42	200	200
7	300	300	43	200	200
8	400	400	44	200	200
9	200	200	45	200	200
10	225	225	46	200	200
11	200	200	47	200	200
12	250	250	48	175	175
13	175	175	49	175	175
14	200	200	50	200	200
15	250	250	51	200	200
16	500	500	52	200	200
17	300	10,000	53	200	200
18	300	300	54	200	200
19	400	1,500	55	200	200
20	300	2,000	56	200	200
21	250	5,000	57	200	200
22	300	300	58	175	175
23	200	200	59	175	175
24	250	250	60	175	175
25	200	200	61	200	200
26	200	200	62	200	200
27	200	200	63	175	175
28	250	250	64	175	175
29	200	200	65	200	200
30	200	200	66	175	175
31	250	250	67	175	175
32	200	200	68	200	200
33	200	200	69	200	200
34	250	250	70	200	200
35	200	200	71	200	200
36	200	200			

Direction: 315°

Operator: Dick Gilbert

Date: June 12, 1972

Machine No.: 1392

<u>20-Step Intervals</u>	<u>MN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	400	400	59	200	200
2	1,000	30,000	60	200	200
3	600	1,000	61	200	200
4	500	500	62	200	200
5	500	20,000	63	200	200
6	450	2,200	64	200	200
7	400	400	65	200	200
8-46	Skip over - crib & gravel		66	200	200
47	250	250	67	175	175
48	200	200	68	175	175
49	200	30,000	69	200	200
50	200	200	70	200	200
51	200	200	71	200	200
52	200	200	72	200	200
53	200	200	73	200	200
54	200	200	74	200	200
55	200	200	75	200	200
56	200	200	76	175	175
57	200	200	77	175	175
58	200	200	78	175	175



Direction: 337.5"  
Date: June 13, 1972

Operator: John Hedlund  
Machine No.: 1504

<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step</u> <u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	300	10,000	32	250	250
2	300	66,000	33	250	100,000 + (TW)
3	300	300	34	200	200
4	250	2,000	35	250	250
5	250	1,500	36	250	250
6	400	5,000	37	200	200
7	250	500	38	250	3,000 (TW)
8	200	200	39	250	250
9	200	200	40	250	250
10	250	750	41	200	200
11	200	750	42	250	250
12	250	250	43	250	15,000 (TW)
13	250	250	44	250	250
14	250	250	45	250	250
15	200	500	46	250	250
16	250	250	47	250	250
17	200	200	48	250	250
18	200	200	49	250	250
19	200	200	50	250	250
20	200	200	51	250	250
21	200	200	52	250	250
22	200	200	53	250	250
23	200	200	54	300	300
24	200	200	55	200	200
25	200	200	56	250	250
26	200	200	57	200	200
27	200	200	58	200	200
28	200	200	59	200	200
29	200	200	60	200	200
30	200	200	61	200	200
31	250	200			

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(TW) - dry tumble weeds

Direction: 135"

Operator: Dwight Carey

Date: May 22, 1973

Machine No. : 1532

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	250	800
2	400	2,500
3	300	2,000
4	300	2,500
5	650	6,000
6	400	20,000
7	250	1,000
8	250	2,000
9	400	60,000
10	250	2,000
11	1,000	70,000
12	1,000	75,000
13	1,000	25,000
14	250	7,000
15	300	350
16	250	1,000
17	1,000	75,000
18	500	7,000
19	300	1,000
20	350	2,000
21	250	1,000
22	2,000	7,000
23	1,000	50,000
24	300	2,500
25	250	2,000
26	300	1,000
27	1,000	3,000
28	1,000	75,000
29	1,000	2,500
30	250	500
31	250	250
32	300	500
33	300	1,000
34	250	1,000
35	300	1,000
36	250	500
37	250	1,500
38	500	2,000
39	250	1,000
40	250	750

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
41	250	500
42	250	500
43	300	1,000
44	250	750
45	250	600
46	250	6,000
47	250	750
48	300	750
49	300	300
50	300	300
51	100	400
52	250	250
53	250	250
54	250	750
55	250	250
56	300	400
57	300	1,000
58	250	250
59	250	250
60	150	150
61	100	200
62	200	550
63	250	600
64	200	600
65	150	150
66	150	200
67	100	100
68	250	250
69	250	500
70	250	750
71	100	600
72	100	600
73	100	150
74	100	300
75	100	100
76	100	100
77	100	500
78	400	600
79	200	650
80	100	150

Direction: 135° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	100	100	106	100	100
82	200	200	107	350	350
83	100	500	108	350	400
84	100	100	109	250	250
85	100	150	110	200	200
86	100	100	111	150	250
87	150	200	112	200	500
88	500	1,000	113	100	100
89	150	2,000	114	150	200
90	100	100	115	100	100
91	100	100	116	150	200
92	100	100	117	150	150
93	150	150	118	200	200
94	200	350	119	350	350
95	100	100	120	200	250
96	200	350	121	150	150
97	200	300	122	350	600
98	100	400	123	350	350
99	250	2,000			
100	150	2,000			
101	400	1,500			
102	350	1,500			
103	200	500			
104	250	1,000			
105	200	1,500			

Direction: 146.25"

Operator: Dick Fitzner

Date: May 22, 1973

Machine No. : 1456

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	250	2,500	36	200	200
2	400	20,000	37	200	2,000
3	300	1,500	38	200	200
4	200	200	39	200	7,000
5	200	7,500	40	200	200
6	250	2,000	41	200	3,000
7	300	300	42	200	200
8	350	15,000	43	150	150
9	300	2,000	44	200	200
10	350	30,000	45	150	7,000
11	250	600	46	150	150
12	500	1,500	47	150	150
13	300	300	48	150	150
14	300	300	49	150	150
15	250	250	50	150	150
16	250	700	51	150	150
17	600	100,000+	52	150	150
18	300	300	53	150	150
19	300	35,000	54	150	150
20	300	300	55	150	4,000
21	300	100,000	56	150	150
22	250	2,000	57	150	150
23	300	100,000+	58	150	150
24	250	250	59	150	2,000
25	250	1,000	60	150	10,000
26	300	300	61	150	8,000
27	200	200	62	150	40,000
28	250	250	63	150	150
29	300	20,000	64	150	150
30	200	10,000	65	150	150
31	250	10,000	66	150	150
32	500	6,000	67	150	150
33	250	250	68	150	150
34	250	5,000	69	150	150
35	250	250	70	150	15,000

Direction: 146.25" (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
71	150	150	116	100	100
72	150	150	117	100	100
73	150	150	118	100	100
74	150	150	119	100	100
75	150	150	120	100	100
76	150	150	121	100	100
77	150	150	122	100	100
78	150	10,000	123	100	100
79	150	150	124	100	100
80	150	150	125	100	100
81	150	150	126	100	100
82	150	150	127	100	100
83	100	100	128	100	100
84	150	150	129	100	100
85	150	150	130	100	100
86	150	150	131	100	100
87	150	3,000	132	100	1,000
88	150	150	133	100	100
89	150	150	134	100	100
90	150	150	135	100	100
91	150	150	136	100	100
92	150	150	137	100	100
93	150	150	138	100	100
94	150	150	139	100	100
95	150	150	140	100	100
96	150	70,000	141	100	100
97	100	2,000	142	100	100
98	150	150	143	100	100
99	150	150	144	100	100
100	150	2,000	145	100	100
101	150	150	146	100	100
102	150	150	147	100	100
103	150	150	148	100	100
104	150	150	149	100	100
105	150	150	150	100	100
106	150	150	151	100	100
107	100	100	152	100	100
108	100	100	153	100	100
109	100	100	154	100	100
110	100	100	155	100	100
111	100	100			
112	100	100			
113	100	100			
114	100	100			
115	100	45,000			

Direction: 157.50°

Operator: Ed Jeffs

Date: May 22, 1973

Machine No. : 1439

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	650	1,900	41	100	100
2	400	100,000	42	150	150
3	150	150	43	100	100
4	150	500	44	100	100
5	350	30,000	45	150	750
6	150	2,500	46	100	7,500
7	450	700	47	150	150
8	900	50,000	48	100	100
9	350	950	49	200	200
10	200	3,000	50	150	150
11	200	5,000	51	100	100
12	250	1,450	52	100	700
13	200	200	53	50	50
14	200	35,000	54	100	100
15	325	3,000	55	50	50
16	250	4,500	56	150	150
17	100	100	57	100	100
18	200	500	58	150	600
19	100	100	59	100	500
20	300	750	60	150	800
21	50	50	61	150	150
22	500	7,500	62	100	100
23	100	100	63	150	4,500
24	200	650	64	100	100
25	950	35,000	65	50	50
26	100	600	66	100	100
27	400	2,500	67	150	150
28	150	750	68	150	150
29	400	5,000	69	200	200
30	5,000	60,000	70	100	100
31	150	150	71	150	25,000
32	200	200	72	100	100
33	100	5,000	73	150	150
34	300	85,000	74	100	2,500
35	200	5,500	75	100	100
36	100	100	76	250	3,000
37	200	30,000	77	100	100
38	150	150	78	100	100
39	750	20,000	79	100	100
40	100	100	80	100	100

Direction: 157.50° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	150	150	91	150	150
82	150	1,000	92	100	100
83	250	250	93	200	200
84	150	750	94	100	100
85	100	100	95	150	150
86	100	100	96	150	150
87	150	150	97	100	100
88	100	100	98	100	100
89	150	150	99	150	150
90	100	100	100	100	100

Direction: 168.75°

Operator: Dan Martinez

Date: May 22, 1973

Machine No. : 1414

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	600	1,400	41	200	200
2	700	11,000	42	200	200
3	200	400	43	300	500
4	250	13,000	44	300	600
5	600	12,000	45	250	250
6	500	1,100	46	250	250
7	500	600	47	400	600
8	800	1,300	48	300	500
9	800	1,700	49	300	300
10	1,100	1,600	50	250	250
11	500	50,000	51	200	800
12	750	1,100	52	800	15,000
13	400	1,900	53	200	200
14	400	900	54	600	1,200
15	400	600	55	300	300
16	500	500	56	600	1,200
17	500	1,200	57	200	200
18	300	1,000	58	250	400
19	300	600	59	300	600
20	300	1,100	60	200	200
21	200	600	61	300	300
22	400	850	62	200	200
23	200	600	63	200	200
24	300	700	64	200	200
25	450	1,200	65	100	100
26	300	400	66	200	200
27	300	300	67	100	200
28	300	300	68	150	150
29	200	200	69	100	200
30	300	200	70	100	100
31	250	250	71	200	200
32	300	550	72	150	150
33	400	10,000	73	200	200
34	300	1,300	74	150	150
35	250	250	75	100	100
36	200	200	76	150	150
37	200	800	77	150	150
38	700	1,000	78	100	100
39	200	650	79	100	100
40	100	100	80	200	200



Direction: 168.75° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	150	150	91	100	600
82	200	200	92	100	100
83	150	150	93	150	200
84	200	200	94	100	600
85	200	1,200	95	150	200
86	100	150	96	100	150
87	100	300	97	200	200
88	100	100	98	100	250
89	150	400	99	150	150
90	100	100	100	100	100

Direction: 180°  
Date: May 22, 1973

Operator: Ken Knight  
Machine No. : 1424

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>Max.</u>
1	350	650	41	150	450
2	500	15,000	42	150	350
3	450	50,000	43	200	300
4	850	2,500	44	200	200
5	600	2,200	45	250	500
6	2,000	47,000	46	200	200
7	050	4,500	47	150	200
8	450	35,000	48	250	4,500
9	650	100,000+	49	200	2,500
10	350	2,000	50	150	650
11	1,000	25,000	51	150	650
12	600	2,500	52	150	150
13	400	400	53	100	200
14	300	2,000	54	200	6,500
15	200	200	55	100	250
16	400	400	56	100	250
17	350	800	57	150	300
18	450	55,000	58	250	400
19	300	100,000	59	300	3,500
20	200	250	60	100	200
21	500	2,500	61	150	250
22	150	250	62	150	300
23	300	32,000	63	100	200
24	400	2,500	64	100	200
25	550	700	65	100	200
26	450	55,000	66	100	200
27	200	200	67	150	150
28	600	2,500	68	200	200
29	200	450	69	100	200
30	450	5,000	70	100	200
31	450	450	71	100	250
32	150	2,500	72	200	700
33	150	2,500	73	150	150
34	200	450	74	200	10,000
35	200	750	75	150	150
36	200	200	76	200	400
37	250	500	77	100	200
38	150	200	78	100	100
39	200	200	79	150	250
40	350	2,000	80	100	100

Direction: 180° (contd)

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
81	100	100	94	100	100
82	150	250	95	100	100
83	150	150	96	100	200
84	150	150	97	150	150
85	100	150	98	100	100
86	150	150	99	100	100
87	100	200	100	100	250
88	100	250	101	200	200
89	150	150	102	200	100
90	150	150	103	150	150
91	100	200	104	100	100
92	150	150			
93	200	200			

Direction: 236.25"

Operator: Dick Fitzner

Date: May 22, 1973

Machine No. : 1456

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>	<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	1,000	10,000	23	250	20,000
2	600	80,000	24	300	100,000+
3	500	75,000	25	500	900
4	1,000	20,000	26	250	600
5	1,000	7,000	27	250	1,000
6	1,000	3,000	28	300	4,000
7	300	4,000	29	250	250
8	300	60,000	30	250	700
9	600	3,000	31	250	7,000
10	500	3,000	32	250	600
11	300	7,000	33	200	200
12	500	1,000	34	250	250
13	800	4,000	35	200	1,500
14	600	600	36	200	200
15	600	4,000	37	200	200
16	800	20,000	38	200	200
17	250	800	39	200	200
18	250	1,000	40	200	2,000
19	250	1,000			
20	250	3,000			
21	500	1,500			
22	300	1,500			

Direction: 247.50"

Date: May 22, 1973

Operator: Ed Jeffs

Machine No.: 1439

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
1	500	5,000
2	750	4,000
3	700	3,000
4	400	1,000
5	750	5,000
6	800	25,000
7	600	10,000
8	1,200	40,000
9	1,250	30,000
10	350	750
11	500	7,000
12	900	50,000
13	750	25,000
14	600	4,500
15	400	3,000
16	250	700
17	200	200
18	300	750

<u>20-Step Intervals</u>	<u>MIN.</u>	<u>MAX.</u>
19	500	7,500
20	900	25,000
21	250	850
22	300	1,000
23	350	900
24	600	2,000
25	400	1,300
26	250	500
27	250	500
28	150	900
29	100	1,200
30	250	850
31	300	300
32	250	600
33	150	150
34	150	150
35	150	150
36	150	150

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