Hanford Reservation Area Worker Census

**A Research Report for the
Rockwell Hanford Operations**

by
Keith E. Yandon

July 1977

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and Development Administration
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HANFORD RESERVATION AREA WORKER CENSUS

HIGHLIGHTS

- Nearly 15,000 workers are in or immediately adjacent to the Hanford Reservation Area.
- There are 21 employers operating in the Hanford Reservation Area.
- Measured from the Purex Plant, 80% of the total work force is located east-southeast and southeast.
- Again centered at Purex Plant, 7% of the work force is within 2 miles; 20% within 10 miles; and 55% within 12 miles.
- The largest single concentration of Hanford Area workers, 38%, is found 17 to 19 miles from the Purex Plant center.
- Informed sources estimate that another 10% could be added to the work force total traveling in the Area on Hanford-related business.
- Worker counts are only correct for a specific time. Their fluctuations depend on construction schedules.
- Construction worker counts can vary from 600 to 3500 over a project time period.

AREA WORKERS BY WORK CENTERS

A June 1977 census of Hanford Reservation employers shows that nearly 15,000 workers could be accounted for daily either within or immediately adjacent to the Reservation Area. Employers comments indicated that an additional 10%, or 1500 people, could be on the Reservation during a typical day to deliver materials, visit, consultant or inspect, or to work as engineering specialists, ERDA supervisors, etc. (Federal Building employees were not covered by this census.) Figure 1 presents worker counts at recognizable Hanford sites by separate employer and shift status. Employers are identified by a coded legend which is included on the figure.

Table 1 presents a summary total of all workers for all employers at major Reservation locations such as the 100 Area, 200 Area, the FFTF site, etc. As the table indicates, the greatest number of workers (3,345) are credited to the Battelle-WPPSS-Exxon-etc. Area followed by the 300 Area with 3,110 and the WPPSS construction areas with 2,905.

HANFORD RESERVATION AREA EMPLOYMENT BY PLACE OF WORK, EMPLOYER AND WORK SHIFT

FIGURE # 1

TABLE 1. Concentration of Hanford Reservation Workers
by Site

<u>Site</u>	<u>Number of Workers</u>	<u>Percent of Total</u>
100	760	5
200 E&W	2,355	16
WPPSS #1,2,&4	2,905	20
FFTF	2,420	16
300	3,110	21
Battelle, et al.	3,345	22
TOTAL	<u>14,895</u>	<u>100</u>

While the worker counts being reported by Reservation employers are usually shown concentrated around a designated site, in reality a substantial portion of these workers are likely to be distributed over the surrounding area. For convenience, however, they are credited to such particular sites as 200 East, 200 West, WPPSS 1, 2, & 4, etc.

Identification of shift workers posed some reporting difficulties since some firms run four shifts while most of the others conduct their operations in three. The 100 Area was a special problem since these workers operate over a wide area. Regardless, all workers have been accounted for in this census although some of the shift counts may be approximate.

DISTRIBUTION OF WORKERS BY RADII AND COMPASS DIRECTION

Figure 2 maps the distribution of Hanford Reservation workers by work shift over intervals of one-mile radii and 16 compass directions centered at the Purex Plant. These same worker distributions are repeated in Figure 3 without the mapped Reservation Area as a background. As a tabulating convenience, sector parcel counts have been rounded to units of 5 and 10, but were adjusted to the total count for the separate companies. (Because of confidentiality, worker counts for the separate companies are not being presented here.) For better readability, sector counts within the first two mile radii from the Purex Plant center are presented separately at the bottom of the figure. Table 2 presents work distribution in detail including a cumulative count of workers and percent of total as distance and direction from the Purex Plant center increases.

DISTRIBUTION OF HANFORD RESERVATION WORKERS
BY RADII AND COMPASS SECTIONS

FIGURE # 2

DISTRIBUTION OF HANFORD RESERVATION WORKERS
BY RADII AND COMPASS SECTIONS

FIGURE # 3

	Compass Direction																TOTAL	Cumulative Total	Cumulative Percent	
	Radii	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW				NNW
0-1	110	110	105	5	45	5	5	5	5	5	5	5	5	390	5	5	110	920	920	6.2
1-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	120	1,040	7.0
2-3	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	35	1,075	7.2
3-4	0	0	0	0	0	0	0	0	0	0	0	0	0	185	0	0	0	185	1,260	8.5
4-5	0	0	0	0	0	0	0	0	0	0	0	0	0	600	125	0	35	760	2,020	13.6
5-6	0	0	0	0	0	0	0	0	0	0	0	0	0	125	0	0	160	285	2,305	15.5
6-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	535	535	2,840	19.1
7-8	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	2,865	19.2
8-9	0	0	0	0	0	0	15	0	0	0	0	0	0	0	15	0	0	30	2,895	19.4
9-10	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	2,915	19.6
10-11	0	0	0	0	0	1,950	0	0	0	0	0	0	0	0	0	0	0	1,950	4,865	32.7
11-12	0	0	0	0	0	945	2,425	0	0	20	0	0	0	0	0	0	0	3,390	8,255	55.4
12-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,255	55.4
13-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,255	55.4
14-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,255	55.4
15-16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,255	55.4
16-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,255	55.4
17-18	0	0	0	0	0	0	3,845	0	0	0	0	0	0	0	0	0	0	3,845	12,100	81.2
18-19	0	0	0	0	0	0	1,820	0	0	0	0	0	0	0	0	0	0	1,820	13,920	93.5
19-20	0	0	0	0	0	0	920	0	0	0	0	0	0	0	0	0	0	920	14,840	99.6
20-21	0	0	0	0	0	0	55	0	0	0	0	0	0	0	0	0	0	55	14,895	100.0
TOTAL	130	135	105	5	45	2,900	9,085	5	25	5	5	5	5	1,335	145	125	840	14,895		
Cumulative Total	130	765	320	375	420	3,320	12,405	12,410	12,431	12,440	12,441	12,450	1,378	13,930	14,055	14,895	14,895	14,895		

TABLE 2. Hanford Workers by One Mile Radii Intervals and Compass Direction Centered at Purex Plant

Table 2 shows that most workers (80%) are located southeast and east-southeast. A second, but smaller, concentration of workers (16%) occurs in the west-north-northwest quadrant. The remaining 4% are spread over the other compass direction.

Except for the modest concentration of workers within the first 2 miles of the Purex Plant (about 7%) and a substantial increase in the 4 to 7 mile sector, less than 20% of the total work force is located within 7 miles. Beyond 7 miles, there appears to be no significant additions in worker counts until the 10 to 11 mile range where another 13% of the total worker counts occurs. Twenty-three percent of the total work forces is in the 11 to 12 mile range. After this range, there are no workers until the 17 to 18 mile radius, within which another 26% of the total work force is located. In the 18 to 19 mile range is another substantial increase of about 12%. All 14,895 workers are accounted for within 21 miles of the Purex Plant center.

In summary, about a third of the total work force is accounted for within 11 miles. The proportion jumps to more than half (55%) over the next mile. Continuing outward, there appears to be low worker counts until the 17 mile radius where the proportion of total workers jumps to 81%. The 18 to 19 mile range notes a lesser, but equally impressive, increase (12%) to account for 93% of the total with almost all Reservation workers (99.6%) accounted for within 20 miles.

The fact that no workers are shown for some parcels does not preclude the presence of some workers at some time. This report can only identify estimated counts of workers on the basis of building and payroll information plus informed knowledge of general worker distribution. For example, there is bound to be worker movement between areas throughout the 200 East and 200 West regions which, because of our reporting limitations, can only be charged to a building somewhere within those two areas. The same movement exists in the 100 Area since it covers dozens of compass-radii sectors. Usually it is only when a work center falls completely within a sector that the worker count can be expected to be reasonably firm. Worker counts, therefore, need to be interpreted on that basis but with the assurance that this first-time inventory is reasonably accurate in total and the worker counts can be spread over no more than three or four sector parcels.

CENSUS METHODOLOGY AND ASSUMPTIONS

Worker information was supplied by each of the 21 separate employers. Usually, we initiated the contact by telephone, following which the employers gave us official tabulations and reports. These employers are identified in Figure 1. In many cases, computer tabulations and facility use reports were made available. These materials range from "landlord reports", payrolls, and counts of checks being delivered to distributing centers to special estimates provided by company personnel officers.

The reported counts of workers were entered at "work centers" on a specially designed Reservation Area map (Figure 1) which identified sites and known work areas. A grid consisting of the 16 compass sectors and radii intervals of one mile out to 21 miles was laid over the Reservation Area map (Figure 2) and judgment estimates made for worker distribution. To the extent possible and where information was available, building employee counts were utilized to determine worker distributions between adjoining sectors of the grid and when the reported work area covered more than one grid parcel. In cases where building counts were not available or such detail was unnecessary, the percent share of that parcel to the total central working area was assumed to be equally representative of work force distribution. Basic to this methodology was the assumption that workers were uniformly distributed over the working area.

Some problems arose in connection with shift-worker schedules, but all workers were distributed and accounted for. In any event, the total count of workers reported is reasonable and accurate and one which is becoming available for the first time.

This same methodology could be applied to any point within the Reservation Area simply by recentering the radii-compass diagram. The same estimating procedures were carried out but were based on a center at the meteorological tower. The resulting counts were completely different, which is a strong indication that worker distribution at any one point in the Reservation is not likely to be representative of any other place unless the center points are

within a one mile range. The difference in worker counts between center points will become less as the radius is extended, but even for the more district fringe and 300 Areas, worker counts from any center are not likely to be completely comparable with those of the Purex Center distribution.

Obviously, this inventory is a one time count which may or may not be completely accurate a week hence. Any worker count will vary with the payroll period being reported and construction underway throughout the Reservation. For example, one major construction employer in the area has worker counts which range from 650 to 1300 workers over a year. Such variance would alter worker counts substantially depending upon the time period. Furthermore, WPPSS and FFTF construction employment could be major contributors to worker count differences depending upon timing. As a second example, WPPSS 1 and 4 employment is now estimated to be in the neighborhood of 700 craft persons and expected to increase by 3500 workers by the middle of 1980. Other companies, too, could be moving workers around or adding to present staff. Certainly more new employers are moving into facilities on the outer fringe of the Reservation Area.

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