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DEVELOPMENT OF THE COUNTY DATABASE: ESTIMATES OF EXPOSURE RATES AND TIMES OF ARRIVAL OF FALLOUT IN THE ORERP PHASE-II AREA

Comparison with Cumulative Deposition-Density Estimates Based on Analyses of Retrospective and Historical Soil Samples

By
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DECEMBER 1991

UNITED STATES DEPARTMENT OF ENERGY
NEVADA FIELD OFFICE

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ABSTRACT

Estimates of exposure rates and fallout-arrival times have been made for each of 142 counties or county segments for 55 nuclear events producing significant deposition downwind from the Nevada Test Site. All sources of available data were examined to provide the best possible estimates for each event. The cumulative fallout deposited per unit area in each county based on these estimates is compared with estimates of cumulative deposition density based on analyses of contemporary and historical soil samples. The good agreement between the two sets of cumulative deposition estimates gives credence to the individual event estimates and suggests that no major sources of fission-product deposition were overlooked. This county database is being used as primary input data in a number of on-going dose-reconstruction studies.

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DEVELOPMENT OF THE COUNTY DATABASE: ESTIMATES OF EXPOSURE RATES AND TIMES OF ARRIVAL OF FALLOUT IN THE ORERP PHASE-II AREA

Comparison with Cumulative Deposition-Density Estimates Based on Analyses of Retrospective and Historical Soil Samples

1.0 INTRODUCTION

The Offsite Radiation Exposure Review Project (ORERP) was established in 1979 by the U.S. Department of Energy (DOE) to reevaluate the radiation doses to persons living downwind from the Nevada Test Site (NTS) resulting from fallout from weapons testing carried out at the NTS during the 1950s and early 1960s (Church et al., 1990). The original mandate was to estimate the dose via both internal and external pathways. Emphasis was placed on residents living in Clark, Nye, and Lincoln Counties in Nevada and Washington County, Utah, as postshot monitoring data indicated these areas were most impacted by NTS fallout.

The basic source-term data, which were to be used for estimating fallout-deposition density (activity deposited per unit area), and subsequently, dose, were the extensive postshot survey-meter monitoring results. These survey-meter data were used to construct a Town Database (TDB) (Thompson, 1990) which provided an estimate of the exposure rate at 12 hours after each event (H+12) at each community in these four counties as well as Esmeralda County, Nevada, i.e., the ORERP Phase-I region, along with the estimated time of arrival (TOA) of the fallout at that site. Measured and calculated relationships among exposure rate and relative amounts of each fission and activation product for each NTS event as a function of time after the explosion (Hicks, 1981) were then used to estimate the deposition density of each radionuclide. These deposition-density estimates were used as input to environmental transport models in order to estimate doses to individuals and populations from all important pathways.

An early concern of the scientists in the ORERP, however, was that there might have been significant exposure from NTS fallout in areas outside this Phase-I region, and even perhaps in regions at appreciable distances from the NTS. Because the monitoring network in the early period of testing had only minimal coverage at distances beyond a few hundred kilometers from the NTS, there was no body of survey-meter data that could be used for estimating deposition density for dose reconstruction in a manner similar to that envisioned for the Phase-I region.

However, in 1979, scientists at the Environmental Measurements Laboratory (EML), formerly the Atomic Energy Commission (AEC) Health and Safety Laboratory (HASL), demonstrated that the analysis of contemporary soil samples for total cesium-137 (hereafter termed Cs), total plutonium-239 plus plutonium-240 (hereafter termed Pu), and the ratio of ^{239}Pu to ^{240}Pu could be used to deduce the amount of Cs in the sample that came from NTS fallout (Krey and Beck, 1981). (This distinction is possible as most of the Cs in a typical sample came from global fallout due to testing of high-yield fission and thermonuclear devices in the Pacific or in the Soviet Union.) This Cs estimate could then be used to estimate the deposition density of all other important fallout radionuclides in a manner similar to that used in inferring deposition density from exposure rate.

Unfortunately, the EML method alone was not sufficiently sensitive to estimate precisely the NTS Cs deposition density in the areas where the NTS Cs deposition was very small relative to global fallout. Furthermore, the EML method could not identify which NTS events produced the fallout. Because ORERP scientists wanted to calculate doses from ingestion as well as from external exposure, it was necessary to know the time of year when major deposition events occurred. In addition, knowledge of the particular event producing the Pu detected in the soil sample is of particular significance at sites closer to the NTS (in contrast to the situation for the sites studied by EML in Utah). This is because some events that produced unusual isotopic Pu ratios at these close-in sites strongly influenced the Pu atom ratio. Also, the lack of knowledge of the exact Pu-atom ratio expected for NTS fallout Pu at these close-in sites affects the accuracy of the partitioning between NTS and global fallout Cs.

Another development by EML scientists during this period, however, promised to provide additional information with which to attribute the total NTS deposition at a given site to particular events and to estimate approximate times of arrival. This was the reevaluation of data collected by HASL at a number of sites in the western United States that were part of a worldwide network of gummed-film collectors. Originally these gummed-film data, collected daily, were considered useful only as an indicator of whether fallout had occurred at a site rather than how much. The EML reevaluation, however, which included a better estimate of the collection efficiency of the film, demonstrated that reliable and fairly precise quantitative estimates of the deposition density of individual radionuclides could be made. The initial results of this analysis were published in 1984 (Beck, 1984) and an updated version was presented at the special symposium of the Health Physics Society in Salt Lake City in 1987 (Beck et al., 1990).

Thus, in spite of the problems in interpreting contemporary soil data, the combination of the soil-analysis method and the availability of some gummed-film data was sufficiently

promising that the ORERP's Dose Assessment Advisory Group (DAAG) recommended that a major expansion of the project be made to assess doses at distances beyond the Phase-I area, in regions subsequently termed the ORERP Phase-II region.

In order to facilitate the dose assessment in this Phase-II region, it appeared that some analogue of the ORERP TDB would be most useful. Thus, it was decided to construct a County Database (CDB) that would serve the same function as does the TDB in providing a set of exposure-rate and time-of-arrival estimates in a standard format that could be used as input into environmental transport models. The intent was to obtain a population-weighted best estimate of Cs deposition density for each of the 142 counties and county segments of interest (see Section 2.0) for each NTS event depositing significant fallout in that county. These Cs deposition-density estimates would then be converted to equivalent H+12 hour exposure rates so that subsequent analyses of doses for these areas could proceed using the methods already in place for the ORERP Phase-I region.

The major starting point in constructing the CDB was the revised EML gummed-film data. Although the amount of data was limited, the available data were interpolated to provide an initial estimate of deposition density for each event known to have resulted in measurable fallout in the Phase-II region. Additional sources of data, described in detail in this report, were then used to refine these interpolations. Finally, the cumulative Cs deposited per unit area in each county (or in a few cases parts of a county) inferred from this analysis was compared to that estimated from the analyses of soil at sites in that and nearby counties. If the agreement was not satisfactory, the interpolation for that county was reviewed and adjustments were made. This iterative process was continued until a final best set of deposition density and corresponding H+12 hour exposure-rate estimates (the present CDB) was obtained. These estimates, combined with the corresponding TOA estimates, will be the primary input data for dose reconstruction in the Phase-II area. They also are used as the starting point in a number of other major on-going programs related to NTS fallout in this area.

This report describes the method and information used to construct the CDB and compares the cumulative deposition-density estimates for each county or county segment with the results from the analysis of the soil data. Data from soil samples collected by EML scientists, both in support of this study as well as in earlier studies, are also utilized along with those collected by ORERP scientists. The results of the analyses and interpretation of all these soil samples, for sites in the Phase-II study region as well as for sites in the Phase-I (close-in) and Phase-III (distant) regions, are also included in this report.

2.0 ORERP STUDY REGIONS

In order to obtain the Cs deposition-density estimates necessary to support reliable dose estimates outside the Phase-I region, a major effort to collect soil samples was begun in 1982 in areas in the western United States, i.e., the ORERP Phase-II study region. This region originally included northern Arizona, northwestern New Mexico, western Colorado, southwestern Wyoming, southern Idaho, southeastern Oregon, all of Nevada outside the original Phase-I study region, southeastern California, and the entire state of Utah (except for Washington County, which is in the Phase-I region). Subsequently, the region was extended to include all counties in Arizona and New Mexico.

In 1983, additional sites were sampled in a number of other cities across the western United States as part of a limited Phase-III effort. The purpose of sampling soils in these cities much further downwind was to demonstrate that (1) NTS fallout is virtually undetectable in contemporary soil samples at distances far downwind of the NTS, and (2) the Cs/Pu and Pu atom ratios in these samples are consistent with the values expected from global fallout alone. No specific dose estimates are planned for the populations of Phase-III sites. Phase-I and Phase-II regions, as well as the Phase-III sites, are shown in Figure 1.

3.0 SOURCES USED IN CONSTRUCTING THE COUNTY DATABASE

A varied and extensive set of available information was utilized in making the estimates of H+12 hour exposure rate (or corresponding deposition density) and corresponding TOA referred to as the County Database.

3.1 Specific Information Used.

3.1.1 Revised Gummed-Film Data. This constitutes the most extensive set of actual data on fallout deposition on an event-by-event basis and was generally the starting point for our estimation procedure. The gummed-film-based estimates of Cs deposition density for sites in the ORERP study region were originally published in EML-433 (Beck, 1984). Those results have been revised to account for new information on the collection efficiency of the film for debris deposited during precipitation (Beck et al., 1990). The 20 percent collection efficiency (the fraction of the total beta activity deposited on the ground that was retained by the gummed film) used in Beck (1984) for dry deposition was not changed. However, some dry deposition data published in EML-433 were changed to correct arithmetic and transcription errors in the original analysis. The revised daily

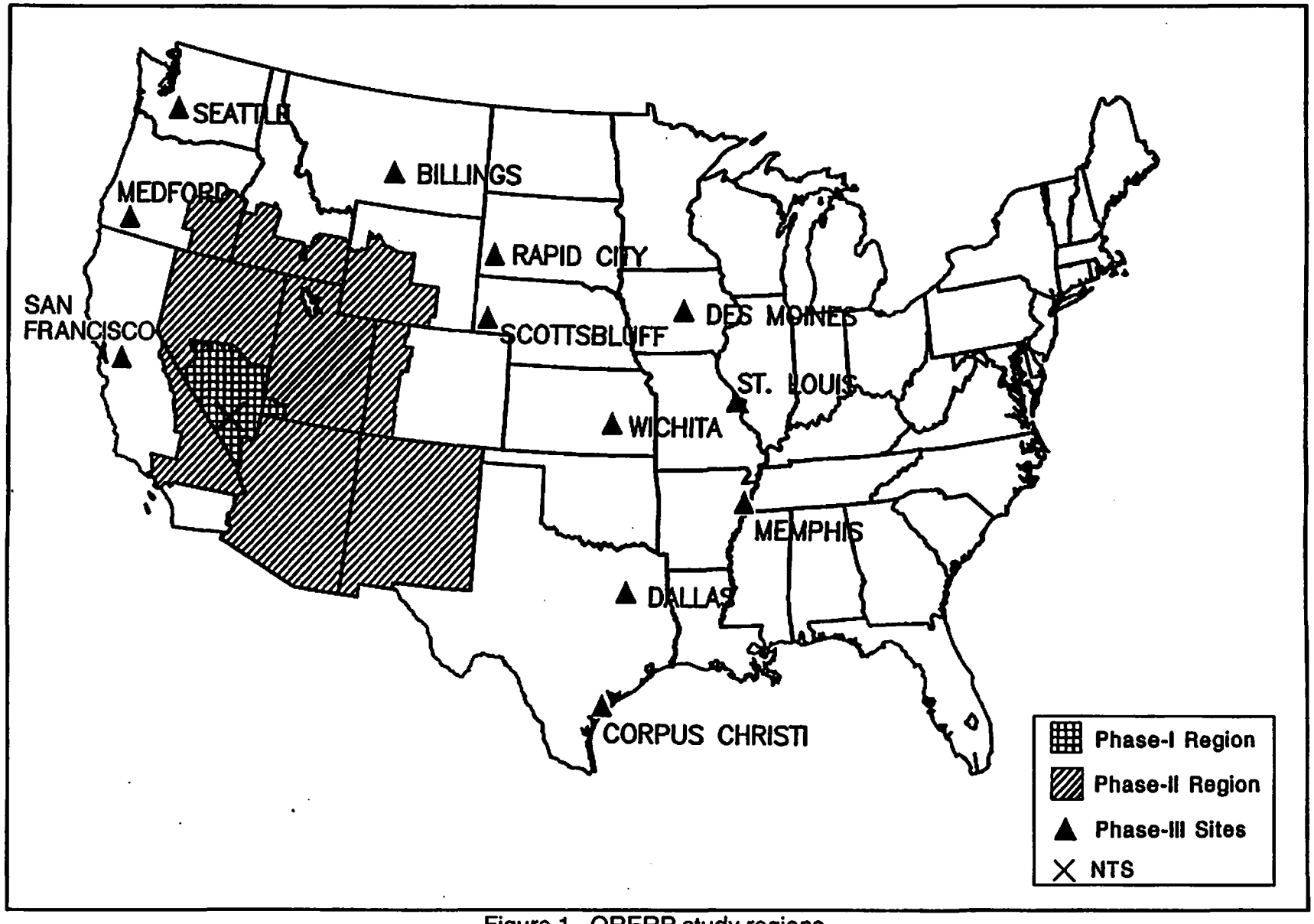

Figure 1. ORERP study regions.

gummed-film results are available as a computer file, containing data for all continental U.S. sites, which will eventually be made available to the Coordination and Information Center (CIC) in Las Vegas, Nevada. This facility, operated by Reynolds Electrical & Engineering Company, Inc. (REECo) for the DOE Nevada Field Office (DOE/NV), was established by ORERP scientists to collect and archive NTS fallout information and data (Church et al., 1990). These gummed-film data consist of day-by-day estimates of Cs deposition density. The total uncertainty in each estimate is on the order of ±50% for dry fallout to as much as a factor of two for fallout occurring during heavy rain.

The amount of gummed-film data available for sites in the Phase-II region varied with test series. Generally, data from about 15 to 20 sites were available for use in interpolating cumulative deposition density within the Phase-II region for events in the Tumbler-Snapper, Upshot-Knothole, and Teapot test series. However, data were available for fewer than ten sites in this region for the Buster-Jangle, Plumbbob, and Hardtack II test series.

3.1.2 H+12 Hour Exposure-Rate Measurements. The gummed-film deposition data were supplemented by estimates of H+12 hour exposure rate and time of arrival from the TDB. These TDB sites were generally in the Phase-I region or in the counties bordering the Phase-I region. The most up-to-date TDB revisions were used for this purpose (Thompson, 1990). Ground level exposure-rate estimates based on aerial monitoring were also considered when appropriate. Burson (1987) has reviewed all available aerial monitoring results for the period of NTS testing.

3.1.3 Fallout Patterns. The National Oceanic and Aeronautics Administration (NOAA) Weather Service Nuclear Support Office (WSNSO) reevaluated the monitoring data and meteorological data for a number of the events producing significant fallout in the ORERP Phase-I area and produced revised fallout patterns including H+12 hour contours and TOA contours (Quinn et al., 1981, 1982, 1984, 1986; Quinn, 1986a, 1986b, 1987, 1990; Steadman et al., 1983a, 1983b, 1984a, 1984b; Steadman, 1988). These WSNSO patterns were used to aid in estimating deposition densities and TOAs in counties within these patterns. For events not reanalyzed by WSNSO, the original fallout patterns published by the U.S. Weather Bureau or the University of California, Los Angeles (UCLA) during the 1950s for events producing significant offsite fallout were used (Nagler and Telegadas, 1956; Telegadas and Nagler, 1960; Larsen et al., 1966). The events for which these original and revised patterns are available are listed in Table 1.

3.1.4 HASL Mobile Team Data. During the 1951, 1952 and 1953 test series, HASL mobile teams exposed gummed film, collected air samples, and measured exposure rates

at a few selected sites downwind and under the fallout clouds (List, 1953, 1954; New York Operations Office, 1952, 1954). The number and locations of these sites differed from event to event. These data were used when available (see Table 1) to supplement the permanent gummed-film sites and thus fill in gaps in the deposition patterns. These data were reviewed in EML-433 (Beck, 1984).

3.1.5 Air-Sampling Data. HASL sampled air at a number of the gummed-film sites as well as at a number of additional sites during the 1951, 1952 and 1953 test series (List, 1953, 1954; New York Operations Office, 1952, 1954). These air-sampling results were also used to help define the areas that received fallout from a given event. Because the relationship between ground-level air concentration and deposition (deposition velocity) varied tremendously from event to event, and even from site to site for a given event, it was not always possible to estimate deposition density reliably from these data. Thus, the air data were often used only in a qualitative manner to indicate areas that probably received some fallout. The actual fallout estimate was based primarily on the patterns and/or interpolation of other data. These data are also included in the EML gummed-film database and discussed in EML-433 (Beck, 1984).

3.1.6 Air-Mass Trajectories. The U.S. Weather Bureau had calculated air-mass trajectories for each event at a number of altitudes spanning the cloud base and cloud top (List, 1953, 1954, 1956; New York Operations Office, 1951, 1952, 1954). Beck (1984) summarizes these data for events through 1957. Hoecker (1990) provided trajectories for the 1958 Hardtack II series. These trajectories, which extend downwind across the entire United States, allowed us to estimate in which counties outside the published patterns (Telegadas and Nagler, 1960) fallout could have occurred as well as the likely TOAs. This information was used in conjunction with available deposition data to interpolate between sites with measured fallout. NOAA scientists have reviewed most of these trajectory calculations during the past several years and revised some of the earlier published data (Hoecker, 1990; Hoecker and Machta, 1990). In addition, NOAA scientists have reviewed the trajectory data for events where the gummed-film data indicated significant fallout at sites well removed from the areas beneath the original calculated trajectories (Hoecker and Machta, 1990). In many cases they were able to calculate back trajectories from particular measurement sites in order to demonstrate that suspicious gummed-film data did indeed likely represent fallout from that event, often resulting from low-level trajectories not included in the original analyses. In other cases the fallout was determined to be real, but to have resulted from an earlier event. An example of this is the fallout that occurred in Arizona and New Mexico several weeks after the HOOD event (July 5, 1957) and which was originally attributed to the DIABLO event (July 15, 1957). Some gummed-film results were determined to be invalid, perhaps

as a result of mislabeling, as it was determined that it was physically unlikely for that particular site to have received fallout from the event in question.

3.1.7 Meteorological Transport Calculations. Cederwall and Peterson (1990) modeled the fallout deposition for 12 of the events producing the heaviest fallout in the ORERP Phase-II region (see Table 1). Their calculated fallout patterns extend out to distances beyond those covered in the WSNSO and NOAA patterns (which generally only cover areas close to the NTS where exposure-rate monitoring was carried out or where aerial monitoring data were available). The meteorological model results provided estimates of both deposition and TOA. Where these estimates correlated well with actual data, the model results were used directly, allowing us to provide more reliable deposition-density estimates for counties where no actual data were available. In many cases, we concluded that the model adequately represented the true geographical variation in deposition, even though the actual numerical estimates were apparently biased due to the inherent limitations of the model and the input data. In these cases, the quantitative model results were not accepted directly, but were used as a guide for interpolation of the gummed-film data.

3.1.8 Interpolated Gummed-Film Data. In connection with another on-going NTS fallout reconstruction study (Bouville et al., 1990), EML scientists have interpolated the daily gummed-film data for major events using a mathematical technique called kriging. This technique was applied in such a manner as to account for the known dependence of the amount of fallout on precipitation. For areas and events where the kriging was based on a sufficient amount of data to be credible, the kriged estimates were also used as a guide in making our "best scientific judgment" interpolations. In general, kriging did not provide credible estimates close to the NTS where the pattern of deposition was too variable to be well described by the limited amount of data (sites) available.

3.1.9 24-Hour Precipitation Estimates. NOAA scientists have assembled, for use in this and other on-going reconstruction efforts, a database of average daily precipitation in all U.S. counties for the period of testing at the NTS (Hoecker and Machta, 1990). As the deposition of fallout when the cloud is overhead has been found to be highly correlated with rainfall intensity (Beck et al., 1990), these data were used as a guide in adjusting our interpolations between actual data points to account for probable rainout of debris.

3.1.10 Public Health Service (PHS) Air and Precipitation Data. The Public Health Service (PHS, 1957, 1958) sampled air on a daily basis at sites around the United States during the 1957 and 1958 test series. Daily precipitation samples were also collected at some of these sites. A number of these sites were within or close enough to the Phase-I and

Phase-II regions to provide additional information regarding either the actual deposition or at least the pattern and boundaries of the deposition. These data are included in the EML gummed-film database.

3.1.11 HASL Pot-Sampler Data. HASL collected precipitation on a monthly basis in stainless-steel pots at Salt Lake City in 1957 as part of its worldwide global fallout-collection program (Toonkel, 1977). These samples, analyzed only for strontium-90, also provided additional confirmation of our more precise gummed-film and soil-sample-based Cs deposition-density estimates.

3.1.12 Basic Source Data. Data on event yields, cloud tops and bottoms, and type of event were also used as guidance in confirming and/or guiding our interpolations of actual data. These data for tests between 1951 and 1957 were summarized by Beck (1984). Data for other events were presented in ARRP (1964) and Nevada Operations Office (1991). For example, air bursts were known to have deposited little fallout close to the NTS as opposed to tower events. Source data on each event from Hicks (1981) were used to convert H+12 hour exposure-rate measurements to deposition density and vice versa.

3.1.13 NTS Radiological Safety and Related Reports. Offsite radiological safety reports were often consulted to check on data in the TDB or to provide additional insight on the best interpolations for counties close to the NTS. Additional offsite monitoring data not included in the TDB were examined. In particular, data for events in the 1960s, such as SEDAN (Placak, 1963) and SCHOONER (EPA, 1971; NOAA, 1989) were studied. Additional data for Project SCHOONER were taken from the Far-Out Fallout Collection Project (Tami et al., 1971), for which special tarps were placed to collect fallout. For the BANEBERRY venting, the primary source of data was the radiological safety report (EPA, 1972). Pendleton and Lloyd (1970) published external exposure-rate measurements for several locations in Utah after the PIN STRIPE venting. These values were also used in our analysis.

3.1.14 Thermoluminescent Dosimetry (TLD) Measurements of Quartz in Bricks. University of Utah scientists (Wrenn, 1985) had also estimated doses from external radiation due to NTS fallout in several towns in Utah. These relatively imprecise estimates were obtained through the application of an ingenious method of measuring residual thermoluminescence (TL) of the quartz contained in exterior brick walls exposed to radiation. Because of the complexity of the measurement, only a few homes in the ORERP study areas, in Kanab, Duchesne, and St. George, Utah, were measured. These results were also considered in our analysis.

3.1.15 Contemporary Soil-Sample Analysis. Soil samples were collected at over 150 sites throughout the ORERP Study Regions during 1982 and 1983. Data from the analyses of these samples for Cs, Pu, and Pu isotopic atom ratios (McArthur and Miller, 1989) were used to estimate cumulative Cs deposition density from all NTS events, applying the methods developed by EML and described in Section 6.0. Besides the ORERP soil data, data for soil samples collected by EML in 1974, 1979, and 1983 at sites in Utah and Nevada were also used to compare with the cumulative deposition densities calculated from the CDB (Krey and Beck, 1981; Beck, 1987). The complete set of soil data used in this study is discussed in Section 6.0, Soil-Analysis Results.

3.1.16 Historical Soil-Sample Analyses. HASL also collected a number of soil samples during the 1950s at sites both within the ORERP study regions as well as elsewhere. Other samples had been collected by UCLA scientists and later analyzed at HASL. Many of these samples have been reanalyzed at EML for Cs and Pu (Beck et al., 1990; Beck, 1991). (The original analyses were generally only for strontium-90 and some of the earlier results for sites close to the NTS were of doubtful accuracy.) The total Cs in these samples provides upper limits to the deposition from the NTS and allows better estimates of NTS deposition than contemporary soil samples, as the relative amount of global fallout Cs in the samples was much less. The isotopic composition of the Pu in these samples also provides an independent estimate of the $^{240}Pu/^{239}Pu$ atom ratio of NTS Pu at that site for use in interpreting the ORERP data at nearby sites. These data are also discussed in detail in Section 6.0.

Not all of the data discussed above were available for every event. Even when a given type of data was available, the quantity and quality varied considerably from event to event and from test series to test series. Table 1 summarizes the NTS events for which at least some data of a given type were available and used to aid in arriving at the H+12 hour exposure-rate and TOA estimates in the CDB.

Information on the date and yield of each event included in the CDB is given in Table 2. Events which were determined to have deposited little or no fallout in the Phase-II region are not included. Additional information on the characteristics of each NTS event can be found in ARRP (1964), Beck (1984), and Nevada Operations Office (1991).

4.0 METHOD USED TO CONSTRUCT THE CDB

The basic philosophy used in constructing the CDB was to attempt to use the authors' expert judgment to make our best estimate of the median Cs deposition density in each county or county portion for each event based on all available data, along with an estimate of uncertainty. We believed that a single estimate for each county would be workable and acceptable because (1) the available data were sparse, (2) the number of soil samples that could be collected and analyzed for a given county was limited, and (3) fallout dispersion across counties more distant from the NTS tended to be more even than for nearby counties. However, we eventually found it necessary to divide some of the nearer counties with heavier fallout and more than one major population center into two or three subsections due to obviously large differences in deposition density at significant population centers in that county. If a reliable Cs inventory or exposure-rate measurement(s) was available for a site in that county, that value was generally accepted as the best indication of deposition density in that county. Estimates of deposition density for counties with no actual data were obtained by visually interpolating between actual data points, using all the available information described in Section 3.0 as a guide. Topographical features were also taken into account in interpolating actual deposition measurements, as relatively higher fallout was often observed to occur on the lee side of mountain ranges, particularly in the Salt Lake Valley and on the eastern slope of the Rockies in New Mexico. If a calculated or measured fallout pattern was available for that event, it was heavily relied on in interpolating actual data. However, the final estimates presented in the CDB are a consensus (i.e., the best scientific judgment of the authors based on their analysis of all available data for that event, rather than on a particular systematic rigid protocol). A rigid protocol could not be applied as the amount and quality of actual data and calculated patterns varied tremendously from event to event.

After making an initial best estimate of deposition density in each county on an event-by-event basis, along with corresponding estimates of TOA and uncertainty, we used published Pu isotopic ratios for each event (Hicks and Barr, 1984) and unpublished Cs/Pu ratios to estimate the atom ratio, or at least the range of atom ratios, for the particular mixture of NTS Pu expected to be present in a soil sample from that county. We also estimated the expected range of the activity ratio Cs/Pu. We then used these calculated parameters first to partition the total Cs and Pu measured in the contemporary soil samples into global and NTS components, and then to estimate a 1950s deposition density. The methods used for this work are discussed in Section 6.0 where the soil-analysis results are presented and discussed.

If the estimated deposition density inferred from the soil samples collected in a given county agreed reasonably well with the sum of the CDB estimates for all events, taking into consideration the estimated uncertainties in both estimates, we considered our original individual event deposition-density estimates for that particular county to be acceptable. If the agreement was poor for a given county, and particularly if this disagreement extended over a region encompassing several counties or several soil samples in the same county, we reviewed our previous set of estimates for that county for all events and estimated an alternative reasonable set of deposition densities. In most areas, due to the sparseness of actual data and thus the requirement to interpolate crudely, there was generally a range of possible deposition-density estimates that could be made for at least two to three events producing heavy fallout and also that were consistent with available data. We continued this iterative procedure until the cumulative CDB deposition densities were consistent with the soil data (within the estimated uncertainties in both our CDB sum and the soil-based estimate), or until we felt we had no further logical basis for changing the CDB estimates.

After reaching satisfactory agreement between the cumulative deposition-density estimates in the CDB and the Cs deposition densities (nCi/m^2) derived from the soil data, the individual CDB event deposition densities were converted to H+12 hour exposure rates (mR/h), using the data of Hicks (1981). For most events, as shown in Table 2, this conversion is numerically close to unity.

As will be discussed, the calculated values of Pu-atom ratios and Cs/Pu for a given county are very uncertain for a number of reasons, as are the results of any single soil-sample analysis. Thus, the required agreement with any single soil sample or for any single county could not be made too rigid. The general goal was to identify counties or groups of counties where the soil data suggested we had failed to account for, or had overestimated deposition from, one or more events.

Our best estimate of TOA for each event is also given in the CDB. These estimates are sometimes quite crude, particularly if the fallout arrived very late, which often occurred as a result of lateral diffusion of debris away from the main cloud. The uncertainty estimates for the TOA have been chosen to reflect this. We assigned an uncertainty of ±10% to all TOAs corresponding to H+12 hour exposure rates (inferred from deposition densities) of greater than 0.1 mR/h and ±20% for H+12 hour exposure rates less than that. These uncertainty estimates are consistent with those assigned for the TDB. It should be noted that errors in TOA of 10 percent or so when TOA was much greater than a few hours, as is the case for most Phase-II sites, have only a minor effect on the integrated external exposure (Beck and Krey, 1982). Although the deposition of fallout

often continued for many hours and even extended over several days, particularly for wet deposition and locations more remote from the NTS, all of our TOA estimates reflect only the time of initial onset of significant fallout. The H+12 hour exposure-rate estimates are based on the cumulative deposition density from that event. Because the fallout deposition often continued for hours or even days past the initial arrival time, as opposed to the entire deposition occurring exactly at the stated TOA, the exposure rates at the TOA which would be inferred from the reported H+12 hour estimates will thus be conservative, i.e., they will slightly overestimate the actual exposure rate. In practice, since the TOAs at these Phase-II sites were generally greater than 12 hours, most of the shorter-lived radionuclides had already decayed and the exposure rate was no longer decreasing rapidly. Thus, the resulting overestimate will be small compared to the uncertainty in the exposure rate (or deposition density) itself.

We believe our point deposition-density estimates, i.e., interpolated values (or single measurements when available), are estimates of the geometric mean (GM) or median deposition density in the county, assuming deposition density is effectively lognormally distributed. This assumption is consistent with the TDB exposure-rate estimates, which are based on survey-meter data shown to be reasonably well fit by a lognormal distribution (Thompson, 1990). We have estimated the uncertainty, i.e., the geometric standard deviation (GSD) in this GM to be (1) GSD=1.5 when the estimate was supported by an actual measurement, (2) GSD=1.7 when no actual measurement was available but the interpolation was supported by sufficient data to provide a reasonable level of confidence, or (3) GSD=1.9 when our estimate was based only on a best estimate. We decided to restrict ourselves to only three levels of uncertainty, as we did not believe the available information was sufficient to warrant a more precise or individual assignment of uncertainty. Furthermore, we chose not to distinguish between variance due to actual geographical variability within a county and bias in our estimate of geometric mean deposition density throughout the county. We often assigned the same GSD to GMs that vary little throughout a multi-county region for a given event, implying little geographical variance, as we did to GMs which vary significantly between adjacent counties. For most counties in the Phase-II region, the geographical dispersion is probably quite small (i.e., GSD is approximately 1.2-1.4) and most of the assigned uncertainty represents our ignorance of the true median or GM deposition density. We believe the uncertainty estimates in the CDB, although crude, fairly reflect the actual combination of variability and ignorance. A GSD of 1.5 implies a 90 percent confidence level of about a factor of 2, while a GSD of 1.9 corresponds to a 90 percent confidence level of about a factor of 3.

5.0 RESULTS, THE COUNTY DATABASE

The final CDB H+12 hour exposure-rate and TOA estimates are tabulated in Appendix A*. Although the corresponding CDB deposition-density estimates are not explicitly listed, as stated previously, the conversion is close to unity for most events. The exact deposition densities may easily be calculated using the information given in Table 2. Figure 2 maps the cumulative deposition density from all events over the Phase-II region. As has been documented in previous studies (Beck and Krey, 1983), the heaviest fallout occurred in the counties directly to the east and northeast of the NTS. However, the cumulative deposition density was higher in areas of northern Utah and southwestern Wyoming than in many areas of southern and south central Utah much closer to the NTS.

The counties for which estimates have been made are the same counties that existed during the period of NTS atmospheric testing. Since then, some new counties have been created in Arizona (Lopaz) and New Mexico (Cibola). Also, deposition densities for some events occurring within one or two days of each other have been combined when available data made it impossible to distinguish fallout from the separate events. The events in this category are BEE/ESS, APPLE/WASP, BOLTZMANN/FRANKLIN/LASSEN, WHEELER/COULOMB-B and KEPLER/OWENS. In all cases except the last, the first event named was considered to have produced most of the fallout and was used for calculating times of arrival as well as the atom ratios and Cs/Pu ratios described above. In the case of KEPLER/OWENS, all fallout east of Eureka, Nevada, was deemed to have been from OWENS and all west of that site from KEPLER.

Although all NTS events with reported fallout offsite were considered in our analysis, only events for which measurable fallout occurred in the Phase-II region are included in the CDB. It is possible that some events in the Ranger series, for which there are no monitoring data, may have deposited small quantities of fallout in the area. However, it is unlikely that any significant deposition occurred, as the trajectories were generally very narrow and the events were all air bursts (Beck et al., 1990). Entries for portions of counties represent the estimated deposition density at the population center indicated. Exposure rates assigned to intermediate sites in the county should be based on the tabulated estimates for the nearest site.

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*Appendix A, provided by L. R. Anspaugh, has been included exactly as received by the REECo Information Products Section.

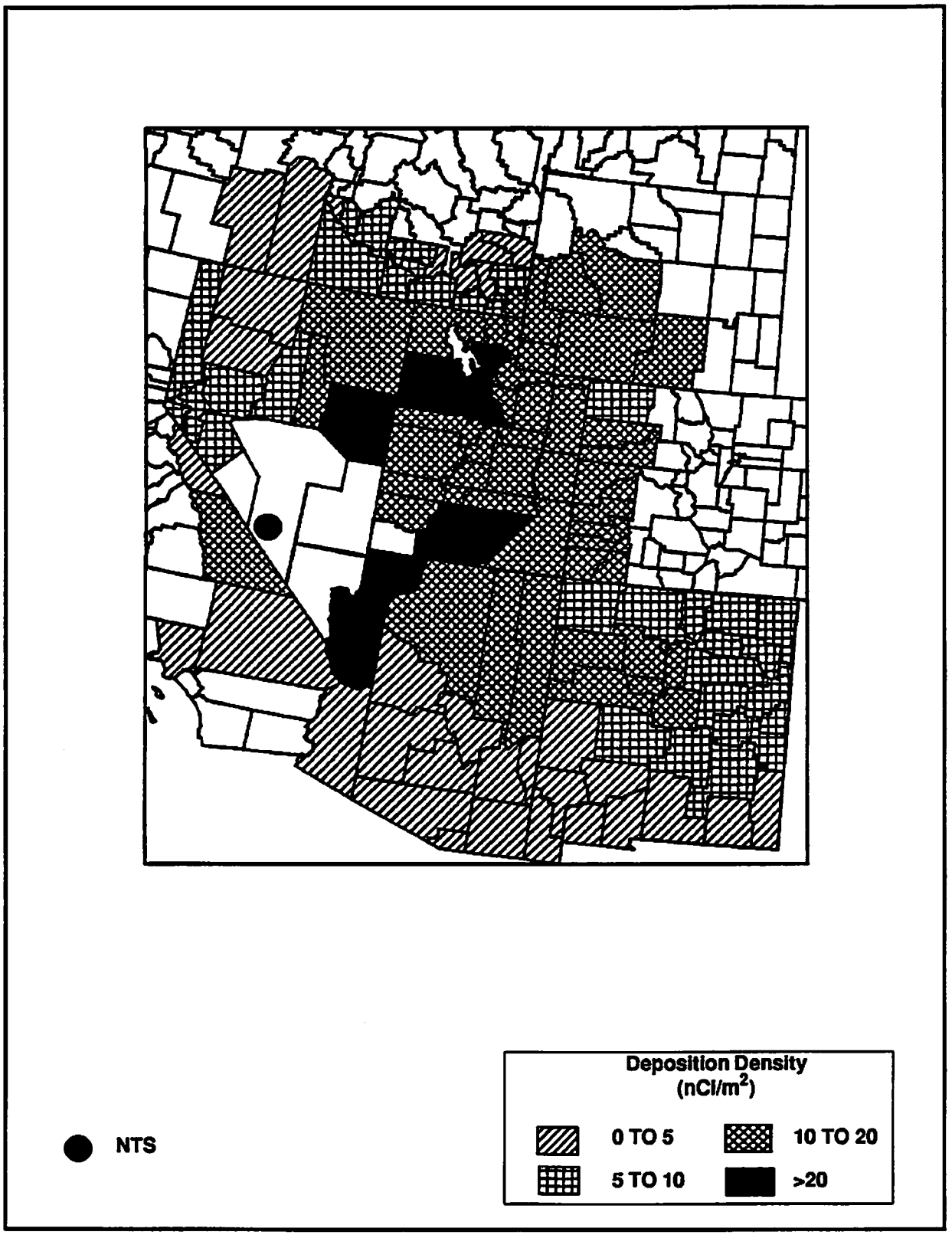


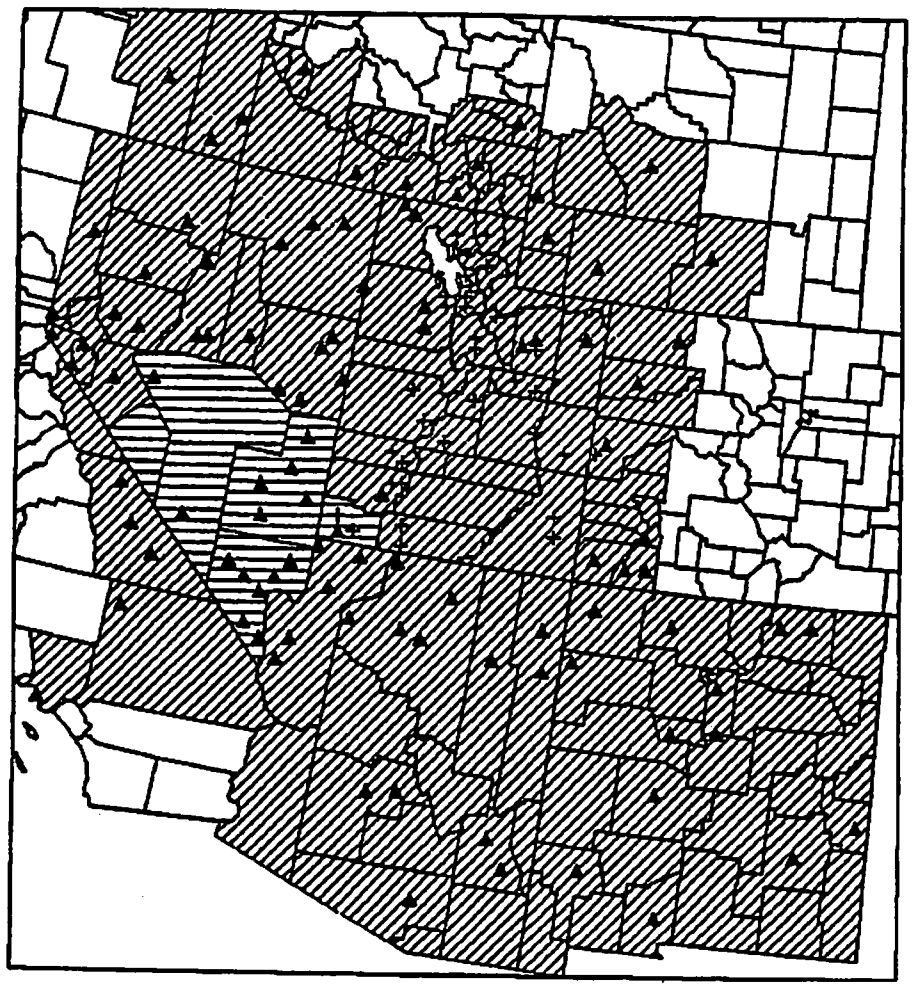
Figure 2. Cumulative Cs deposited from all events over the Phase-II area.

6.0 SOIL-ANALYSIS RESULTS

Table 3 presents the results of the analyses of approximately 200 soil samples collected either in support of ORERP or by EML/HASL in earlier studies of NTS fallout deposition. Included are samples from sites in the Phase-II region as well as from sites in the Phase-I and Phase-III regions. The locations of soil-sampling sites in the Phase-I and Phase-II regions are shown in Figure 3. The third column of Table 3 is the sample-identification code. Sites identified by EML numbers refer to EML 1979 survey data from Utah as reported in EML-400 (Krey and Beck, 1981). EML, 1957, refers to soil samples collected by EML (HASL) scientists in October 1957 (Beck, 1991). Data for these 1957 samples are reported as of the sampling date. Data for all other sites are decay corrected to January 1, 1983. Data labeled EML, 1983, refer to ORERP sites resampled by EML scientists as part of the ORERP Quality Assurance (QA) Program (Beck, 1987; McArthur and Miller, 1989). Data labeled EML, 1974, refer to samples collected by EML scientists in June 1974 (Hardy, 1976; Krey and Beck, 1981). These 1974 data are believed to be comparable in quality to the later ORERP and EML data, as very little global fallout occurred after June 1974. EML samples collected in 1971 were not used in this report (except for the Marion, Utah, site for which no other data were available), as additional global fallout was deposited after 1971.

6.1 Total Cs and Pu.

The fourth and fifth columns of Table 3 give the total Cs and Pu inventories inferred from each of the soil samples (McArthur and Miller, 1989; Krey and Beck, 1981; Beck, 1985; Beck et al., 1990). Only the calculated inventories are given in this report. Specific activities and sample parameters such as area and weights of sample, moisture content, etc., can be found in the references. The reported uncertainties, one standard deviation (SD), represent counting errors only. The true uncertainty in sample activity is slightly larger, particularly for Pu, due to additional measurement error (see McArthur and Miller, 1989). Furthermore, as all the NTS Pu is not always removed from the sample by the acid-leach process utilized (Krey and Bogen, 1987), the variance in total Pu for samples with large NTS Pu fractions is probably even greater. This variance occurs because differing fractions of the NTS Pu may have been removed from samples from even the same site. For example, the total Pu leached from four different aliquots of top cut EML, 1983 soil from Ely, Nevada, varied by over a factor of two as is shown in Table 4. However, the true variance in the inventory inferred from the activity in a given sample is even larger due to an additional estimated eight-percent sampling error. This is the mean sampling error found in previous EML studies and results from estimating an inventory from one set of ten cores with total area of approximately 620 cm^2 (Krey and



▲ ORERP Sampling Sites

+ EML 1979 Sampling Sites

Figure 3. Phase-I and Phase-II region soil-sampling locations.

Beck, 1981). When comparing total inventory estimates at different sites in the same area, the actual expected standard deviation would thus be expected to be on the order of 9 to 10 percent for Cs and 10 to 15 percent for Pu.

6.2 Cs/Pu Ratios.

Because the global Cs and Pu depositions at given sites are correlated, as verified in previous EML studies, resulting in a well defined ratio of cumulative Cs to Pu at all sites of 53±2 in 1979 (Beck and Krey, 1983), the error in the ratio of Cs to Pu (Table 3, column 6) for global fallout is generally more closely represented by combining the counting errors only (assuming additional measurement errors were minor). However, the NTS Cs and Pu contributions at a site are likely to be uncorrelated because different events at different times exhibited large differences in Cs/Pu ratios. Thus the true uncertainty in Cs/Pu ratios that are much less than 48, the value expected for all global fallout in 1983, is likely to be much larger than that given. Those ratios imply a large contribution from NTS fallout. This point should be kept in mind in comparing the Cs/Pu ratio for different sites in the same area. If the Cs/Pu ratio is significantly greater than 48, a problem may exist with either the Cs or Pu, as most events depositing significant amounts of fission products had Cs/Pu activity ratios less than 50 at the time of testing (corresponding to less than 30 in 1983). The only exceptions were one or two relatively high-yield tower events, fueled totally with uranium, that may have deposited significant Cs with little additional Pu. However, our calculations of NTS Cs/Pu from the CDB deposition-density estimates, described earlier, did not reveal any instances where sites were likely to have received all their NTS fallout deposition from these events. We would not expect soil from any sites in the Phase-II region to exhibit a Cs/Pu ratio greater than 48. The true Cs/Pu ratio for sites with very low ratios (i.e., very high NTS Pu) is likely to be even lower than shown due to the incomplete leaching problem described earlier.

6.3 $^{240}Pu/^{239}Pu$ Atom Ratio.

The seventh column of Table 3 gives $R = {}^{240}Pu/{}^{239}Pu$ for the entire soil core. Similarly R′, in column 8, is the sample $^{241}Pu/^{239}Pu$ (corrected for decay to January 1, 1983). The actual measured atom ratios for each of the two-depth segments of the soil core at a site were used along with the corresponding Pu activities and sample weights to calculate the total core atom ratio and thus allow comparisons from site to site. (See McArthur and Miller, 1989 for individual top and bottom segment values.) The combined values cited here indicate the relative NTS contamination at a specified site. These ratios are insensitive to sampling error and thus are very sensitive indications of the presence of NTS fallout at the specified site. Samples with $R << 0.18$ or $R' << 0.0046$ [0.18 and

0.0046 are the expected ratios corrected for decay to 1983, if all the Pu is from global fallout (Krey et al., 1976)] presumably contain a substantial fraction of NTS-derived Pu. These samples should also generally exhibit a total Cs/Pu ratio << 48, as discussed above. A lack of consistency between these three values casts doubt on the validity of the soil sample or the site. The R′ values are less precise than the R values, due to the decay corrections required and the low activities present. The R′ values were generally used only as a check to detect a gross error in R.

6.4 Average Annual Precipitation.

The ninth column in Table 3 contains the average annual precipitation at each site. This was estimated by averaging available data on long-term mean annual precipitation for the site with the average precipitation over the four-year period 1961 through 1965. These data were weighted in this manner because about half the global fallout is known to have been deposited during this period (Toonkel, 1980). The global fallout inventories at a given site are known to be highly correlated with average annual precipitation. However, the deposition density per unit precipitation varies strongly as a function of both latitude and longitude. Thus, the total global fallout deposition density per centimeter of average annual precipitation in Utah was about twice that for the northeastern United States. In general, we have observed that available data on global fallout collected in rain (Toonkel, 1977) suggest that the following relationship approximately describes this correlation:

$$I = cP/(1 - e^{-x}), \qquad (1)$$

where

$$x = (P/7.8)^{1/4};$$

P is the average annual precipitation in cm; I is the inventory of global Cs in nCi/m^2 as of January 1, 1983; and c is an empirical coefficient which varies from about 0.7 to 2.3 depending on latitude and longitude.

Our estimates of c are given in the last column of Table 3 and were used to make the independent rough estimates of global fallout Cs for each site tabulated in Table 5.

The footnotes to Table 3 point out suspect samples and indicate inconsistencies in Cs/Pu and Pu-atom ratios. Also indicated are samples where all the Cs deposited may not have been collected due to an extraordinarily deep penetration of Cs into the soil (McArthur and Miller, 1989). Samples that failed QA tests are also indicated. Some sites, as indicated, were sampled both by ORERP and EML teams as part of the ORERP QA Program. At some sites, the in situ gamma spectrometric analyses, which were done for

each site sampled, were inconsistent with the soil Cs inventory. This indicated that the site was possibly disturbed or not representative of the general area.

7.0 CUMULATIVE NTS DEPOSITION DENSITY ESTIMATES FROM SOIL DATA

7.1 Pu-Atom-Ratio Method.

Table 5 presents estimates of NTS Cs and Pu deposition density made using the methods developed by EML and described by Krey and Beck (1981) and by Beck and Krey (1982). The method relies on the fact that the atom ratio of $^{240}Pu/^{239}Pu$ is different for NTS fallout as opposed to global fallout. Used as fuel in nuclear weapons, ^{239}Pu is made in reactors by neutron activation of ^{238}U. A small amount of ^{240}Pu is produced as a contaminant via neutron activation of ^{239}Pu, with the exact ratio to ^{239}Pu depending on the irradiation time of the original uranium source material. Thermonuclear explosions, which produced the bulk of the fallout termed "global," produce a very high neutron flux, significantly increasing the ratio of ^{240}Pu to ^{239}Pu in the fallout debris. In contrast, the fission tests carried out at the NTS did not significantly alter this ratio from that present in the original fuel. This ratio varied over a range of about 0.02 to 0.07 for most NTS tests (Hicks and Barr, 1984). In contrast, the ratio for the cumulative global fallout in soils throughout the world as of 1979 was 0.180±0.003 (Krey et al., 1976).

As shown in Krey and Beck (1981), Pu from a mixture of two sources can be resolved by applying the following relationship:

$$(Pu)_n/(Pu)_g = Y = [(R_g - R_s)/(R_s - R_n)]\,[(1 + 3.73R_n)/(1 + 3.73R_g)], \qquad (2)$$

where

Pu = Pu deposition per unit area,
R = $^{240}Pu/^{239}Pu$ atom ratio,
g = global fallout,
n = NTS fallout,
s = sample.

This allows the calculation of $(Cs)_n$:

$$(Pu)_s = (Pu)_g + (Pu)_n \qquad (3)$$
$$(Pu)_g = (Pu)_s/(1 + Y) \qquad (4)$$
$$(Cs)_n = (Cs)_s - (Cs/Pu)_g\,(Pu)_g \qquad (5)$$
$$(Cs)_g = 48\,(Pu)_g \text{ for 1983.} \qquad (6)$$

The calculations presume knowledge of the isotopic ratio R_n of the mixture of NTS Pu in the soil sample. Because the isotopic ratios varied considerably from event to event, it is desirable to have an estimate of the exact ratios for the cumulative NTS Pu in the sample from a given site in order to interpret the soil data. However, the individual Cs/Pu ratios required for making such an estimate on an event-by-event basis are not available for publication, and thus all results presented in this report will be for an expected range of Pu atom ratios and Cs/Pu ratios. As the measured Pu atom ratio in a given soil sample may not exactly reflect the mixture actually present due to the measurement errors discussed above, and as the large uncertainties in the CDB estimates themselves will result in highly uncertain R_n estimates, we deemed it sufficient to present the ranges of expected NTS fallout deposition.

7.2 NTS Pu Estimates.

The third column of Table 5 lists a range of possible NTS Pu inventories at each site using the equations given above. The range of likely NTS Pu-deposition densities was calculated assuming values of 0.025 and 0.055 for the $^{240}Pu/^{239}Pu$ atom ratio associated with NTS fallout. (Note: If the actual measured R_s was <0.055, that value was used as an upper limit instead.) Even though R_n for individual events varied from <0.015 to about 0.07 (Hicks and Barr, 1984), we concluded that the range of values between 0.025 and 0.055 adequately encompasses the composition of accumulated NTS Pu at any site with significant NTS fallout. The mean for all events in each test series is shown in Figure 4. Estimates of the most likely R_n for cumulative NTS fallout at each site, made from unpublished data as described earlier, indicated that for 129 out of the 142 CDB entries, R_n fell within this range. For counties where R_n fell outside this range, the estimated cumulative deposition density was negligible.

Unless R_s is << 0.18, the calculation of NTS Pu is relatively insensitive to the exact value of R_n and, for most sites, the uncertainty in these estimates of NTS Pu is on the same order as the estimated range. The cited errors are likely to be underestimates, as they do not include all measurement error or error due to incomplete leaching. The global Pu fraction, although not listed separately, can be calculated by subtracting the estimated NTS Pu given in Table 5 from the total Pu inventory given in Table 3. These global Pu estimates are expected to be much more accurate than the NTS Pu estimates, as all the global Pu is expected to have been leached from the sample.

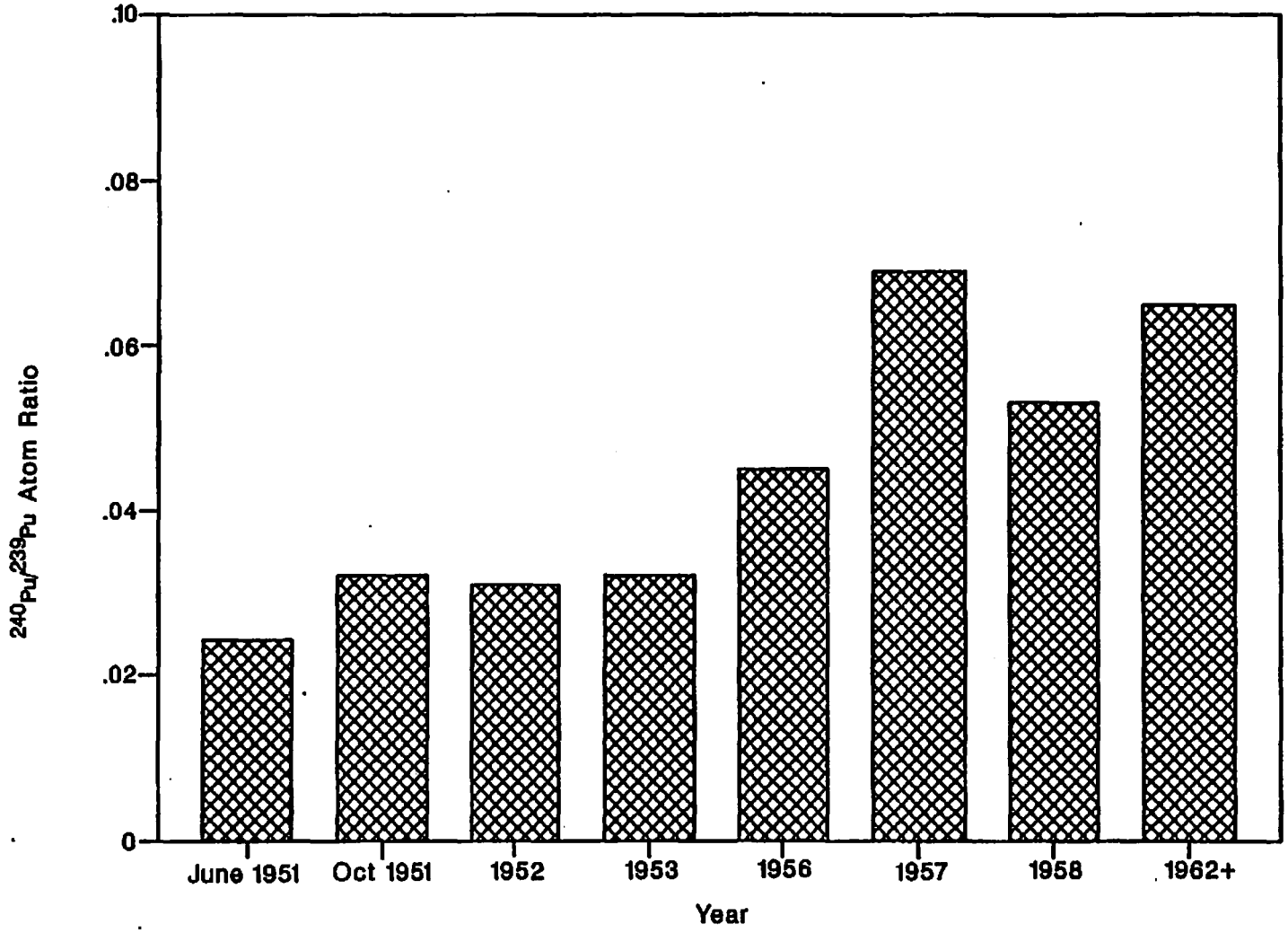


Figure 4. NTS event plutonium-atom ratios averaged over each test series.

7.3 NTS Cs Estimates.

The fourth column of Table 5 gives the expected range of cumulative NTS Cs deposition density, as calculated from the global Pu deposition-density range using equations 5 and 6. The deposition densities calculated from equation 5 have been multiplied by 1.9 to correct for decay from the approximate midpoint of NTS fallout in 1955 to January 1, 1983, the date of the reported sample activities as given in Table 1. Again, the range of the resultant estimates is generally not much larger than the associated uncertainty, obviating the necessity of knowing the exact value of R_n, and furthermore, the uncertainty is again somewhat understated. As this calculation uses only the global Pu inventory, no additional uncertainty due to incomplete leaching is involved. When the calculated deposition density as of 1983 was less than zero for both $R_n = 0.025$ and $R_n = 0.055$, an upper limit estimate of the deposition density is given. This estimate was obtained by first adding 1.65 times one SD to the negative value calculated for $R_n = 0.055$ in order to obtain a 90 percent confidence level upper limit as of 1983. (One SD times 1.65 represents the 90 percent confidence interval of a normal distribution.) If the result of this calculation was greater than zero, it was then multiplied by 1.9 (to correct for decay) to provide an estimate of the corresponding upper limit for deposition in the 1950s. If the result was still less than zero, then "<0" is given in Table 5. A similar calculation was carried out for negative estimates based on average annual precipitation. (The precipitation-based estimates are described in Section 7.5.)

This NTS Cs deposition-density estimate is generally our best estimate of NTS fallout, particularly if corroborated by one of the other two methods, and particularly if consistent with the value of R_s and $(Cs/Pu)_s$. The uncertainty estimates given in Table 5 for both Cs_n and Pu_n were obtained by propagating the uncertainties of each term in Equations 2 through 5. These uncertainty estimates are dominated by the sampling error. As was discussed earlier, the uncertainty estimates for Pu_n do not account for possible unleachable Pu in the sample.

For samples where the range of estimates is significantly larger than the estimated uncertainty, one can sometimes infer from the other data or estimates whether the actual NTS Pu-atom ratio was likely to have been closer to the lower or higher end of the assumed range. It should be noted that the Pu in most of the events depositing significant amounts of fission products had an R_n closer to the lower end of the 0.025-0.055 range used. In their analysis of Utah soils, Krey and Beck (1981) used a single value of 0.032 for all sites in Utah and concluded that it was unlikely R_n varied by more than 0.009 from that value for any site in Utah.

7.4 Estimates of Cs_n from Cs/Pu Ratio.

A second set of estimates of NTS Cs deposition density, given in the fifth column of Table 5, was calculated by multiplying the middle of the range of NTS estimates in column 3 by 15 and 50, respectively. The ratio of Cs/Pu for individual NTS events varied considerably as shown in Figure 5 based on data from Hicks (1984). However, our calculations using unpublished data on individual event Cs/Pu ratios suggest a range of NTS Cs/Pu of 15 to 50 reasonably encompasses most sites. Eighty-five of the 142 entries were calculated to be within this range. However, the appropriate ratio for about 20 counties is probably less than 15 due to certain areas having been heavily impacted by one or more events depositing large amounts of Pu relative to fission products. Also, the cumulative fallout in about 40 counties probably had a ratio above 50 (at the time of deposition) because these counties were primarily impacted by one or two events which deposited little Pu. The minimum ratio calculated for any county was 3, while the maximum was 69.

Because of the wide range of possible Cs/Pu, and the large uncertainty in the NTS Pu estimate, these Cs/Pu-based estimates are quite crude. They are mostly useful as a check on internal consistency of the data and corroboration of the prime estimate. These estimates should also be viewed with caution, as in some counties close to the NTS, safety experiments (tests conducted to evaluate the stability of the devices to accidental high-explosive detonations) that generally did not result in the release of fission products, may have deposited relatively high amounts of Pu. One or two such events with high Pu relative to fission products may have had a large influence on the isotopic composition of Pu at a site as well as on the ratio of Cs/Pu. Also, we assume for this calculation that all Pu contained in the soil sample was measured (leached), which is probably not true for sites with high NTS Pu fairly close to the NTS.

A large discrepancy between this estimate based on the measured NTS Pu and the assumed NTS Cs/Pu ratio and the estimate utilizing the measured total Cs and calculated global Pu inventory can indicate possible errors in the estimate of total Cs at a site. This is particularly true if the precipitation-based estimate described below is also in disagreement. A much higher estimate based on the Pu alone probably indicates an additional source of Pu or that the actual NTS Cs/Pu ratio was much less than 15 for that site.

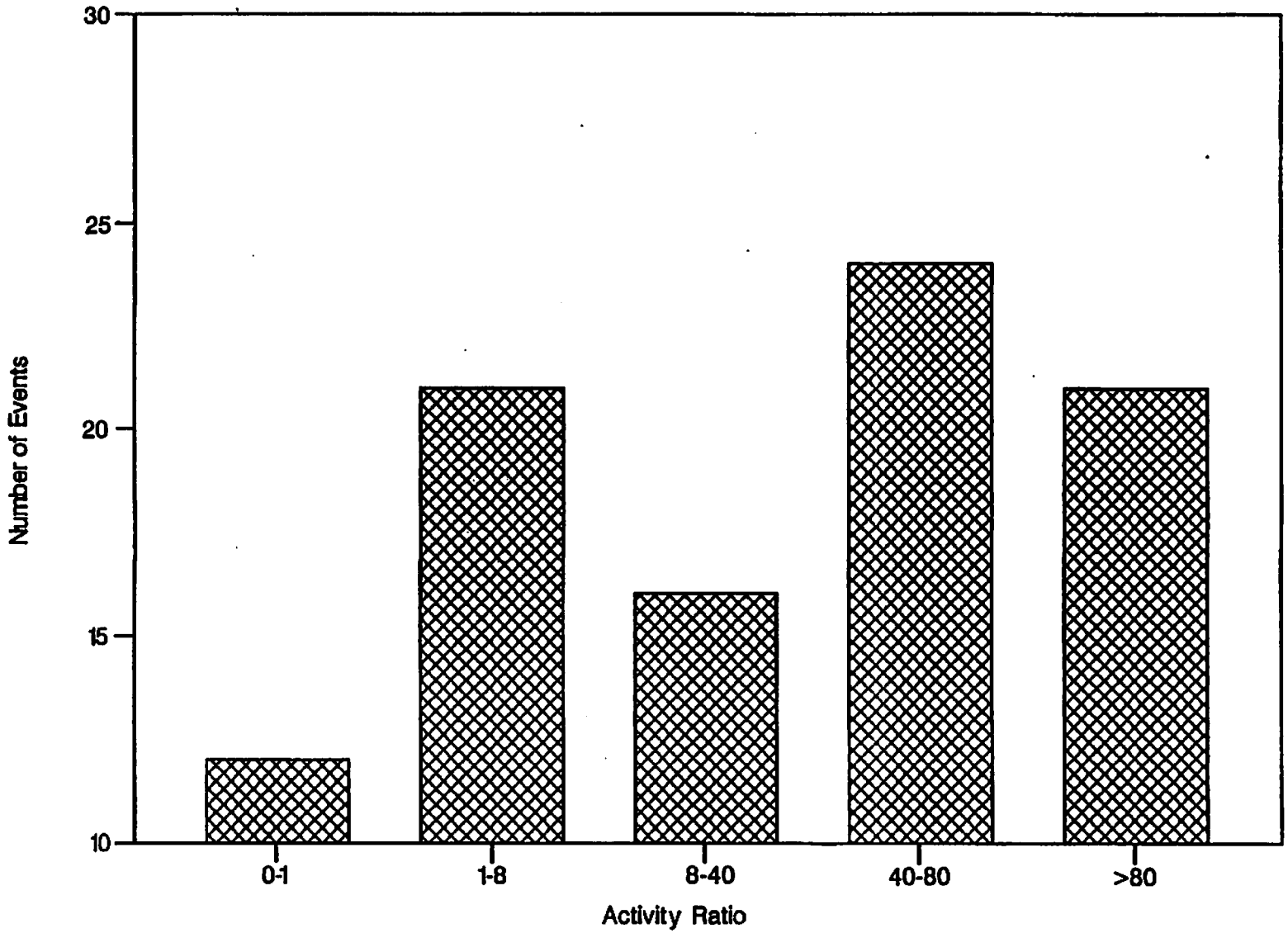


Figure 5. Frequency distribution of Cs/Pu activity ratios for NTS events.

7.5 Average Annual Precipitation Method.

The sixth column of Table 5, labeled "Cs (Precip)," contains a rough estimate of the NTS Cs-deposition density calculated by subtracting an estimate of total global fallout as of January 1, 1983, using equation 1, from the total measured Cs inventory. The result was then multiplied by 1.9 to decay back to roughly the midpoint of NTS fallout deposition. The quoted uncertainty includes an estimated sampling error of 8 percent in the total inventory and an uncertainty of ± 0.1 in the precipitation coefficient (c). It does not include any estimate of error in average annual precipitation or in the applicability of the formula to particular local meteorological conditions. Because the uncertainty is so large, and probably understated, this deposition-density estimate is best utilized only as a check on the deposition-density estimates inferred from the total Pu and its isotopic composition. A large discrepancy between an estimate of NTS deposition based on average precipitation and an estimate based on a Pu measurement can indicate a possible problem in either the total Cs or total Pu measurement for a given sample. This estimate is most useful when it corroborates the other estimates rather than as a primary resource. Because of the poor precision of any single precipitation-based estimate, if more than one site in a town was sampled, it was often best to average the total Cs deposition density inferred from all the sites in order to obtain more precise total and NTS Cs estimates.

7.6 Phase-I and Phase-III Site Data.

Besides soils collected at sites in the Phase-II region, a number of soils were collected by ORERP scientists in the Phase-I study region to confirm the results inferred from the TDB. About 12 samples were also collected at EML gummed-film sites in areas even more removed from the NTS (as distant as St. Louis, see Figure 1). These Phase-III sites were sampled to provide perspective on the decrease in fallout far downwind from the NTS and to investigate whether or not depositions at such distances were large enough to warrant dose analyses comparable in scope to those being done for the Phase-I and Phase-II regions. The results of the analyses of these Phase-III site soils are also given in Table 5.

7.7 Estimates from 1957 Soil Samples.

The total inventories measured at some sites in October 1957 provide upper limits to the NTS deposition. Almost all significant deposition from NTS occurred prior to October 1957. Our best estimates of the net NTS Pu and Cs components are given in Table 6 for these samples. These "best" estimates were obtained by subtracting an estimate of the global inventory from the total Cs measured inventory in 1957. These global Cs

estimates were inferred from total Cs inventories measured at eastern U.S. sites in 1957 by comparing the average annual precipitation at these sites, where the NTS component was only estimated to be about 3-4 nCi/m^2 (Beck et al., 1990), to the average annual precipitation at the sites in our study regions. Estimates of NTS deposition using relative average annual precipitation can be made more precisely from the 1957 soil samples than from the 1983 samples because global fallout was a smaller fraction of the total inventory at sites near the NTS in 1957 than in 1983. These 1957 data can also provide independent estimates of the most likely values of R_n and Cs/Pu for use in narrowing the range of possible NTS Cs and Pu in that county. Table 6 summarizes the 1957 data along with our estimates of R_n and Cs/Pu based on those data. These estimates were made by applying equations 2 through 5 given earlier, but solving for R_n given Cs_n as opposed to the normal application of solving for Cs_n.

Data for Albuquerque sites with obvious anomalous Pu, as inferred from anomalous $^{238}Pu/^{239}Pu$ and/or $^{240}Pu/^{239}Pu$ ratios (Beck, 1987), are discussed separately in Appendix B.

8.0 COMPARISON OF CDB WITH SOIL-SAMPLE RESULTS

In Table 7, deposition density-estimates from all acceptable soil samples in a county are averaged for comparison with the CDB estimate of total deposition density. Separate columns are provided for each of the three methods used to estimate Cs-deposition density. The second column gives the number of different sites sampled in the county. The third column gives the total number of samples analyzed, which may be greater than the total number of sites because of duplicate ORERP and EML samples at the same site. The fourth column gives the number of samples with at least partially valid data. (Some samples were only analyzed for Cs and thus provide only a "precip"-based estimate.) Only these acceptable samples were used in obtaining the county averages. Tables 3 and 5 indicate the samples considered suspect and thus not acceptable.

Unless the uncertainty on a particular sample differs greatly from the other samples in that county, no weighting was used. If only an upper limit deposition density is given in Table 5 (column 6), it was treated as zero for the purpose of calculating the mean deposition density for that county and the mean estimates so calculated in Table 7, under the column heading "precipitation," are prefixed by a ~ symbol.

The CDB cumulative Cs deposition-density estimate is given in the last column of Table 7. In order to compare our soil-sample-based deposition-density estimates with the total

cumulative CDB sum, it was necessary to first convert the CDB estimates, which were assumed to be medians or GM H+12 hour exposure-rate estimates, to arithmetic mean Cs-deposition densities. The individual exposure-rate estimates given in the CDB in Appendix A were converted to Cs-deposition density using the ratios given in Table 2 (Hicks, 1981). To sum over all events, each GM was converted to an arithmetic mean and variance using the associated GSD as follows:

$$u = \ln(GM) \tag{7}$$
$$a = \ln(GSD) \tag{8}$$
$$x = \exp(u + a^2/2) \tag{9}$$
$$s^2 = \exp(2u + a^2)[\exp(a^2) - 1]. \tag{10}$$

The value labeled CDB is the sum of these arithmetic means and the calculated associated SD about this mean from all events impacting that county. This SD should reflect the expected variability observed between various sites in the county as well as the uncertainty in the CDB estimates themselves. As only a few events generally dominate the deposition in each county, this SD is often still quite large. However, it does reflect the fact that any single measurement of cumulative deposition in that county, i.e., a single soil-sample result, may differ considerably from the estimated sum.

The ratio mean/GM calculated from equations 7 through 10 above is approximately 1.1 for a GSD=1.5, while the corresponding ratio for GSD=1.9 is 1.23. (Note that higher GSD estimates would have implied a significant difference between the mean and GM which we feel would not truly reflect the relative deposition from county to county or the actual cumulative deposition, as the GSDs themselves are only poor estimates.)

Cumulative deposition densities listed in Table 7 for Lincoln, Nye, and Clark Counties, Nevada, and Washington County, Utah, were estimated from the TDB, again using the ratios in Table 2 to convert exposure rate to Cs deposition density and using equations 7 through 10 to sum individual deposition densities. Phase-III site deposition-density estimates are from EML gummed-film data (Beck et al., 1990). The CDB includes only counties in the ORERP Phase-II region.

8.1 Discussion.

Out of the 142 counties and parts of counties for which data were tabulated and cumulative inventories estimated for the CDB, we believe the comparisons shown in Table 7 indicate that only about 12 of these cumulative deposition densities are possibly inconsistent with the soil-sample data. In some cases, the soil data may be incorrect

because the site(s) may have been disturbed since the time of deposition or the site(s) may have been subjected to flooding or runoff. At other sites, the possibility exists that the CDB may be incomplete for that county, i.e., we failed to include or incorrectly estimated fallout for a particular event. We discuss each of these cases separately below and give our best assessment of the reason for the lack of consistency.

8.1.1 Tooele-West, Utah. The soil-sample data for Tooele-West, in particular from Wendover, Utah, suggest the CDB estimate may be slightly too high. However, the site in Wendover sampled by both ORERP and EML scientists in 1983 is suspected to have possibly been disturbed, and the ORERP soil sample was flagged by the QA procedures as being suspect. The estimate of deposition density based on average annual precipitation is highly suspect and highly unrealistic. It appears, from data both at this site as well as at other sites where the average annual precipitation is very low, that the correlation fails. The fact that the little precipitation that did occur, often occurred during thundershowers and scavenged a proportionately larger amount of global fallout from the atmosphere than at other less arid sites, could explain why there is no data correlation.

8.1.2 Utah, Utah. The Cs/Pu-based estimate of deposition density for Utah County is unrealistically high compared to the estimates based on precipitation and $^{240}Pu/^{239}Pu$ atom ratio. This is obviously due to the very high total Pu inventory (the highest measured in the EML 1979 study). We believe this Pu resulted from an event that produced little fission-product activity and was thus not included in the CDB. Measurements of Pu and Cs activity in sediment cores obtained from a reservoir upwind of Utah County also exhibited a similar high Pu (with no corresponding Cs) deposition density during the mid-1950s Krey et al., 1990). We conclude the CDB deposition-density estimates are valid.

8.1.3 Garfield, Utah. The data on postshot monitoring with survey meters for event SMOKY unequivocally predict a substantial Cs deposition in Panguitch (Garfield County, Utah) from event SMOKY. The data from the two EML soil samples in Panguitch and the 1974 sample collected at Panguitch Lake all failed to confirm this. However, in situ gamma spectrometric data collected at other sites in Panguitch (Beck and Krey, 1980) indicated that the total Cs-deposition density measured at the soil sample sites may have been comparatively low. Note that a large uncertainty has been assigned to the CDB estimate.

8.1.4 Emery, Utah. All of the sites in Green River, Utah, sampled by EML in 1979 exhibited very high total inventories of both Cs and Pu relative to those expected from global fallout based on the average annual precipitation in this area. Both the global and

NTS components appeared to be elevated (Krey and Beck, 1981). We suspect that these sites either experienced runoff of both global and NTS fallout from nearby areas or additional deposition from irrigation. The measured R and Cs/Pu are more consistent with the CDB cumulative deposition density than with the more elevated NTS deposition densities calculated in Table 5. Furthermore, the CDB estimates for this county are consistent with those for nearby counties where agreement with soil data is satisfactory.

8.1.5 Lincoln, Wyoming. The results from both soil samples collected in Lincoln County, Wyoming, suggest that one or more of the individual event CDB deposition-density estimates may be too high.

8.1.6 White Pine, Nevada. Very high inventories of Pu were also measured in Ely, Nevada. A large fraction of the Pu in the soil at this site was found to be incompletely leached during chemical analysis and thus the actual Pu inventories are probably even higher than given in Tables 3 and 5. It is clear that the CDB does not properly include the source of this Pu; this is because as mentioned previously, the R_n and Cs/Pu calculated for the cumulative deposition density in this county are inconsistent with each other and neither provides realistic estimates of deposition when used with the soil data. The data from the soil sample collected at nearby Lund, Nevada, by EML scientists in 1957 suggest that R_n in cumulative fallout in 1957 was on the order of 0.5. Multiple aliquot analyses of the EML soil collected at one Ely site (see Table 4) exhibited a wide range due to varying amounts of NTS Pu being leached. In order to achieve a consistent estimate of the NTS Pu fraction at this site from all these data, it is also necessary to assume an R_n on the order of 0.5. Although some additional Pu was known to have been deposited in this area by events subsequent to 1957, it is not believed that enough additional Pu was deposited to change the atom ratio significantly from the 1957 Lund value. The soil data all require an R_n on the order of 0.5 to give consistent positive estimates of NTS fallout. The CDB individual event and cumulative deposition densities are well supported by both gummed-film data and TDB measurements. They are also consistent with the soil data, if the 1957 R_n value inferred at Lund is applied. The CDB cumulative deposition density is also consistent with the estimates based on average annual precipitation. We thus conclude that the CDB adequately reflects the fission-product deposition at Ely within the stated uncertainties. The soil data are consistent with the CDB deposition-density estimates in this area, but not with values of R_n and Cs/Pu calculated from the CDB, suggesting an additional source of Pu is unaccounted for. The deposition-density estimates based on multiplying by an assumed NTS Cs/Pu ratio are thus completely unreliable, both for this reason as well as the incomplete leaching of the Pu from the soil samples.

8.1.7 Western Nevada. The deposition densities for all the counties in western Nevada based on average annual precipitation are all unrealistically high. We believe the reason for this is as discussed earlier for Wendover, namely the failure of the correlation between average annual precipitation and cumulative global fallout for these very arid areas.

8.1.8 Inyo, California. The lack of good agreement between the soil-based estimates and the CDB for Inyo/Furnace Creek, California, may be due to the fact that dispersion of fallout in this county was likely very high, reflecting the sharp fallout patterns typical for areas very close to the NTS.

8.1.9 Los Angeles, California. All the soil data for Los Angeles suggest that more NTS fallout occurred than was accounted for in the CDB. The consistent Pu isotopic data over the years clearly suggest a relatively high deposition of Pu from the NTS. The CDB may not be significantly underestimating the deposition of Cs, since the estimate of deposition density based on average annual precipitation is not out of line with the CDB cumulative deposition density. We have searched carefully, without success, for any data that indicate additional significant deposition of NTS fallout might have occurred in Los Angeles beyond that given in the CDB. Although small amounts of deposition may have occurred from one of the 1951 Ranger series events (FOX), it does not appear from air samples collected in San Diego (Blifford et al., 1956) and from NOAA trajectory analyses, that this event could have deposited a significant amount of Cs in Los Angeles. Unfortunately, no gummed-film or survey-meter data are available for this test series. Similarly, one or two of the Hardtack II events in 1958 may have impacted Los Angeles. However, neither the gummed-film nor the PHS air samples that both provided daily monitoring data during the entire period of testing in 1958 indicated any significant deposition of fission products.

8.1.10 Northwestern New Mexico. Areas of eastern Arizona and northwestern New Mexico also exhibited obviously higher levels of total Pu inventory than expected either from global fallout or from NTS fallout from events included in the CDB. This resulted in the NTS Cs deposition-density estimates based on multiplying by an expected Cs/Pu ratio being completely inconsistent with estimates based on the other two methods or with the CDB estimate. The events producing this Pu are not known, but probably produced little deposition of fission products.

8.1.11 Socorro, New Mexico. The analysis of the soil data for Socorro County, New Mexico, is complicated by the presence of residual Pu from the 1945 TRINITY event. From Douglas (1978), we estimate this TRINITY contribution at about 0.5 nCi/m^2. By

accounting for this extra Pu, the results in the soil-sample data are consistent with the CDB for NTS fallout.

8.1.12 Santa Fe, New Mexico. The soil-sample-based estimates of deposition density are consistently less than the CDB estimates for Santa Fe, New Mexico. Although the CDB estimates for this county are consistent with those for nearby counties, it is possible, due to localized meteorological conditions related to the topography of the area, that Santa Fe actually did receive less NTS fallout than surrounding areas and that one or more of our CDB event values are overestimated.

8.1.13 Other County Data. Although the CDB estimates for a few other counties may also be interpreted to be inconsistent with the soil data, in each of these cases, either the soil data are suspect or the uncertainties are so large as to preclude any reasonable comparison. The agreement between soil data and CDB estimates in adjoining counties implies that the CDB estimates are valid.

For most counties the CDB estimated deposition density is generally less in magnitude than one SD in the estimate of deposition density from a single soil sample, i.e., approximately 8-10 nCi/m^2. This is close to or even below what one might define as the detection limit of the EML method. Thus, one can generally only argue that the NTS Cs estimated from an individual soil analysis is consistent with (or not consistent with) the CDB estimate, as opposed to providing a definitive corroboration. Even when more than one soil sample is available, the soil data are not always precise enough to calculate deposition accurately enough to unambiguously confirm the CDB estimate. The fact that the overall agreement appears to be quite reasonable leads one to accept the CDB estimates unless clearly contradicted by unambiguous soil data.

In general, the agreement of the soil-data results from Clark, Nye, and Lincoln Counties with the TDB estimates is quite good. The larger variance in these data occurred because the sites were often on the fringe of very sharply varying fallout patterns. The agreement between the soil and gummed-film data at the Phase-III sites, where the deposition was generally below the level of detection of the soil method, was still quite satisfactory. It was clear from these soil data that the gummed film was not significantly underestimating fallout at these sites, i.e., that significant undetected deposition did not occur. In addition, the Cs/Pu ratios and R values appropriately approach the values expected for global fallout for sites at large distances from the NTS. The ORERP DAAG concluded, on the basis of these Phase-III site results, that a complete dose assessment was not warranted outside the Phase-II area.

As discussed earlier, the true R_n and/or NTS Cs/Pu ratio at a few sites could be reasonably estimated or delimited from the 1957 soil-sample data. When this 1957 soil sample estimate differed from that calculated from other soil data, the 1957 data were generally used to estimate a "best" deposition density, e.g., at Ely, Nevada, and St. George, Utah, where the soil samples all had significant amounts of unleachable Pu.

As the CDB estimates for counties with gummed-film sites generally relied on those data and required little or no interpolation, we would expect to find our best agreement with the soil data for these counties. As shown in Table 8, which compares the CDB deposition-density estimates with the soil data (and also with the original EML-433 deposition-density estimates), the agreement is generally excellent, and consistent with our uncertainty estimates. This agreement substantiates our reliance on the gummed-film data as a starting point for our interpolation of depositions for other counties.

9.0 SUMMARY AND CONCLUSIONS

Overall the agreement between the soil data and the cumulative deposition-density estimates calculated from the CDB is quite good and gives credence to our individual event exposure-rate estimates, particularly for the events producing most of the fission-product deposition. For sites where the agreement is poor, it often appears to be the case that an extra source of Pu deposition, from either a safety experiment or other event, is not properly accounted for in the CDB. This would not be unexpected because if the fission-product deposition were light, few data would be available and therefore such deposition was not well documented. However, our CDB estimates for that county probably correctly estimate total fission-product deposition density and thus contain all the information needed to adequately estimate doses.

We believe the CDB provides the best available estimates of NTS fallout deposition density in the region studied. All sources of available data were examined in applying our expert judgment to provide the soundest estimates for each NTS event. Even though the available data for some events were quite minimal, the good agreement between the cumulative deposition density estimated from the soil samples and the sum of our CDB estimates suggests that no major sources of fission-product deposition were overlooked.

The estimates given in this report supersede earlier estimates made by Beck and Krey (1982) for Utah, as additional data were available to us whereas their estimates were often based on only one or two soil samples per county. Nevertheless, our current results confirm the overall conclusions of the Beck and Krey study regarding the pattern of fallout

in Utah. In fact, for most counties, the estimated Cs deposition density from this study does not differ significantly from the values reported by Beck and Krey (as shown in the comparison given in Table 9). Where differences do exist, they are well within the respective uncertainties of the two sets of estimates.

Table 1. Sources of data available for each NTS event.

EVENT	FALLOUT	PATTERNS	TRAJECTORIES	AIR	PRECIPITATION	OTHER
Buster-Jangle, 1951:						
BAKER [a]	GF [c]	-	Y [j]	-	-	-
CHARLIE	GF,TDB [d]	-	Y	-	-	-
SUGAR	GF,TDB	N [f]	Y	HASL [k]	-	MOB [n]
UNCLE	GF,TDB	N	Y	HASL	-	MOB
Tumbler-Snapper, 1952:						
ABLE	GF	-	Y	HASL	-	-
BAKER	GF	-	Y	HASL	-	-
CHARLIE	GF	-	Y	HASL	-	-
DOG	GF	-	Y	HASL	-	-
EASY	GF,TDB,K [e]	N,C [g],W [h]	Y	HASL	Y [m]	MOB
FOX	GF,TDB,K	N,C	Y	HASL	Y	MOB
GEORGE	GF,TDB,K	N,C	Y	HASL	Y	MOB
HOW	GF,TDB,K	N,C	Y	HASL	Y	MOB
Upshot-Knothole, 1953:						
ANNIE	GF,TDB,K	N,W	Y	HASL	Y	MOB
RUTH	GF,TDB	N	Y	HASL	-	MOB
NANCY	GF,TDB,K	N,C,W	Y	HASL	Y	MOB
DIXIE [a]	GF	-	Y	HASL	Y	MOB
RAY	GF	-	Y	HASL	-	MOB
BADGER	GF,TDB,K	N	Y	HASL	Y	MOB
SIMON	GF,TDB,K	N,C,W	Y	HASL	Y	MOB
HARRY	GF,TDB,K	N,C,W	Y	HASL	Y	MOB
ENCORE [a]	GF	-	Y	HASL	-	MOB
GRABLE	GF,TDB	N	Y	HASL	Y	MOB
CLIMAX	GF,TDB	N	Y	HASL	Y	MOB

Table 1. Sources of data available for each NTS event (continued).

EVENT	FALLOUT	PATTERNS	TRAJECTORIES	AIR	PRECIPITATION	OTHER
Teapot, 1955:						
WASP	GF	-	Y	-	-	-
MOTH [a]	GF	N	Y	-	-	REM [o]
TESLA	GF,TDB	N	Y	-	-	REM
TURK	GF,TDB,K	N	Y	-	Y	REM
HORNET	GF,TDB	N	Y	-	Y	REM
BEE/ESS	GF,TDB	N	Y	-	Y	REM
APPLE/WASP'	GF,TDB,K	N	Y	-	Y	REM
POST	GF,TDB,K	N	Y	-	Y	REM
MET	GF,TDB,K	N,C	Y	-	Y	REM
HA [a]	GF	-	Y	-	-	-
APPLE 2	GF,TDB,K	N,C,W	Y	-	Y	REM
ZUCHINNI	GF,TDB,K	N,C,W	Y	-	Y	REM
Plumbbob [b], 1957:						
BOLTZMANN/FRANKLIN	GF,TDB	U [l],W	Y	PHS [l]	-	REM
WILSON	GF,TDB	U	Y	PHS	-	-
PRISCILLA	GF,TDB	U	Y	PHS	-	REM
HOOD	GF,TDB,K	U,C	Y	PHS	Y	-
DIABLO	GF,TDB,K	U,C	Y	PHS	Y	-
KEPLER	GF,TDB,K	-	Y	PHS	Y	-
OWENS	GF,TDB,K	-	Y	PHS	Y	-
JOHN [a]	GF	-	Y	PHS	-	-
STOKES [a]	GF	-	Y	PHS	-	-
SHASTA	GF,TDB,K	U,C	Y	PHS	Y	REM
DOPPLER	GF,TDB	C	Y	PHS	Y	-
SMOKY	GF,TDB	U,C,W	Y	PHS	Y	REM, APL [p]
GALILEO	GF,TDB,K	U	Y	PHS	Y	-
FRANKLIN' [a]	GF	-	Y	PHS	-	-
WHEELER/COULOMB-B	GF,TDB	-	Y	PHS	-	-
LAPLACE	GF,TDB	-	Y	PHS	-	-
FIZEAU	GF,TDB	U	Y	PHS	-	REM
NEWTON	GF,TDB	U	Y	PHS	Y	-

Table 1. Sources of data available for each NTS event (continued).

EVENT	FALLOUT	PATTERNS	TRAJECTORIES	AIR	PRECIPITATION	OTHER
Plumbbob [b], 1957: (continued)						
WHITNEY	GF,TDB	U	Y	PHS	-	REM
CHARLESTON	GF,TDB,K	-	Y	PHS	Y	REM
MORGAN	GF,TDB	-	Y	PHS	-	-
Hardtack II [b], 1958: (All events [a])	GF,TDB	N	Y	PHS	-	-
SEDAN, 1962	-, TDB	-	Y	PHS	-	MON
SMALLBOY, 1962	-, TDB	W	Y	PHS	-	APL,MON [q]
PIN STRIPE, 1966	-, TDB	-	-	-	Y	PEND [r]
SCHOONER, 1968	-, TDB	-	-	-	Y	TARP [s], MON
BANEBERRY, 1970	-, TDB	-	-	-	Y	MON

[a] Negligable deposition in Phase-II counties, not included in the CDB.
[b] Limited amount of gummed-film data for Plumbbob, Hardtack II series.
[c] Gummed-film data available.
[d] Some data from Town Database available.
[e] Kriged interpolations used.
[f] NOAA fallout pattern.
[g] Cederwall and Peterson, 1990, pattern.
[h] WSNSO pattern.
[i] UCLA pattern.
[j] Air mass trajectories available.
[k] HASL high-volume air sample data.
[l] PHS high-volume air sample data.
[m] Precipitation data used when making estimates.
[n] HASL mobile team data (exposure-rate, gummed-film, air samples).
[o] HASL remote exposure-rate monitor data.
[p] Aircraft monitoring data.
[q] Offsite monitoring data.
[r] Data also from Pendleton and Lloyd (1970).
[s] Special large trays used to collect fallout.

Table 2. Cs-137 deposition density per unit H+12 hour exposure rate for events included in the CDB. [a]

OPERATION	EVENT	DATE	YIELD [b]	TYPE	nCi-m $^{-2}$/mR-h $^{-1}$
Buster-Jangle:	CHARLIE	10/30/51	14	Air	0.78
	SUGAR	11/19/51	1	Surface	1.03
	UNCLE	11/29/51	1	Crater	1.03
Tumbler-Snapper:	ABLE	04/01/52	1	Air	0.70
	BAKER	04/15/52	1	Air	0.70
	CHARLIE	04/22/52	31	Air	0.76
	DOG	05/01/52	19	Air	0.79
	EASY	05/07/52	12	Tower	1.03
	FOX	05/25/52	11	Tower	1.00
	GEORGE	06/01/52	15	Tower	1.00
	HOW	06/05/52	14	Tower	1.04
Upshot-Knothole:	ANNIE	03/17/53	16	Tower	1.01
	NANCY	03/24/53	24	Tower	0.98
	RUTH	03/31/53	<1	Tower	0.94
	RAY	04/11/53	<1	Tower	0.95
	BADGER	04/18/53	23	Tower	0.95
	SIMON	04/25/53	43	Tower	0.98
	HARRY	05/19/53	32	Tower	0.99
	GRABLE	05/25/53	15	Air	0.75
	CLIMAX	06/04/53	61	Air	0.80
Teapot:	WASP	02/18/55	1	Air	0.88
	TESLA	03/01/55	7	Tower	1.07
	TURK	03/07/55	43	Tower	1.00
	HORNET	03/12/55	4	Tower	0.96
	BEE	03/22/55	8	Tower	1.05
	ESS	03/23/55	1	Crater	0.81
	APPLE I	03/29/55	14	Tower	1.02
	POST	04/09/55	2	Tower	1.06
	MET	04/15/55	22	Tower	1.01
	APPLE II	05/05/55	29	Tower	1.01
	ZUCCHINI	05/15/55	28	Tower	1.02
Plumbbob:	BOLTZMANN	05/28/57	12	Tower	1.03
	WILSON	06/18/57	10	Balloon	0.82
	PRISCILLA	06/24/57	37	Balloon	0.78
	HOOD	07/05/57	74	Balloon	0.80
	DIABLO	07/15/57	17	Tower	0.98
	KEPLER	07/24/57	10	Tower	1.04
	OWENS	07/25/57	10	Balloon	0.88
	SHASTA	08/18/57	17	Tower	0.98
	DOPPLER	08/23/57	11	Balloon	0.81
	SMOKY	08/31/57	44	Tower	0.97
	GALILEO	09/02/57	11	Tower	0.99
	WHEELER	09/06/57	<1	Balloon	0.81
	COULOMB B	09/06/57	<1	Surface	1.07
	LAPLACE	09/08/57	1	Balloon	0.80
	FIZEAU	09/14/57	11	Tower	1.02
	NEWTON	09/16/57	12	Balloon	0.87
	WHITNEY	09/23/57	19	Tower	0.99

Table 2. Cs-137 deposition density per unit H+12 hour exposure rate for events included in the CDB [a] (continued).

OPERATION	EVENT	DATE	YIELD [b]	TYPE	nCi-m $^{-2}$/mR-h $^{-1}$
Plumbbob: (continued)	CHARLESTON	09/28/57	12	Balloon	0.84
	MORGAN	10/07/57	8	Balloon	0.82
Nougat:	SEDAN	07/06/62	104	Crater	0.43
	SMALL BOY	07/14/62	Low	Tower	1.15
Flintlock:	PIN STRIPE	04/25/66	<20	Shaft	0.37
Bowline:	SCHOONER	12/08/68	30	Crater	0.03
Emery:	BANEBERRY	12/18/70	10	Shaft	0.02

[a] Data from Hicks, 1981.
[b] Expressed in kilotons (kt).

Table 3. Results of soil analyses.

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC. [e]	c [f]
UTAH:									
Box Elder/Rosette	Snowville	MH03	130±3	2.9±0.1	46±1	0.158	4.1	35	2.2
	Rosette	MH02	170±4 [h]	4.6±0.1 [h]	37±1 [g]	0.154 [g]	4.0	36	2.2
Box Elder/Tremonton	Brigham	EML115	161±3	4.4±0.3	37±3	0.133	3.3	49	2.2
	Tremonton	EML119	122±2	2.6±0.1	47±3	0.151	3.8	41	2.2
Tooele-East	Tooele	DZ18	116±3	3.1±0.1	38±2	0.138	3.5	41	2.2
	Tooele	EML101 [i]	127±3	3.1±0.2	41±2	0.141	3.6	41	2.2
	Iosepa	DZ21	103±2	4.6±0.1 [j]	22±1	0.086	2.1	30	2.2
Tooele-West	Wendover	DZ16 [k,l]	75±2	2.6±0.1	29±1	0.152	4.0	14	2.1
	Wendover	EML83 [i]	108±2	2.5±0.1	43±3	0.163	5.1	14	2.1
	Wendover	EML, 1974	90+2	2.1±0.1	43±2	0.168	ND [p]	13	2.1
	Ibapah	DZ10	86±2	2.3±0.1	37±2	0.137	3.4	25	2.1
Tooele/ Southeastern	Vernan-Eureka	EML, 1974	119±5	4.3±0.3	28±3	0.116	2.5	38	2.1
Salt Lake	Midvale	EML90	112±3	3.3±0.2	34±2	0.107	2.6	40	2.2
	Salt Lake City	EML95	131±4	5.2±0.2	25±1	0.088	2.1	42	2.2
	Salt Lake City	EML89	121±3	5.0±0.5	24±3	0.084	2.0	40	2.2
	Salt Lake City	EML96	109±4	3.0±0.2	24±1	0.117	2.9	40	2.2
	Magna	EML99	139±2	3.7±0.2	38±2	0.125	3.1	36	2.2
	Bountiful	EML104	138±3	3.8±0.2	36±2	0.124	3.1	~40	2.2
Davis	Layton	EML107	121±3	3.9±0.3	31±3	0.103	2.5	~44	2.2
	Layton	EML108	129±3	4.2±0.2	31±2	0.099	2.4	~44	2.2
Weber	Ogden	EML110	147±3	2.9±0.1	50±3 [g]	0.159 [g,m]	4.4 [m]	44	2.2
Cache	Logan	EML123	121±3	3.2±0.2	37±2	0.122	3.0	44	2.2
	Logan	EML, 1957	31±2 [n]	1.2±0.1 [n]	~25	0.042			
	Cache Forest	EML, 1974	189±3	4.3±0.1	44±2	0.141	3.6	71	2.2

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC. [e]	c [f]
Utah	Payson	EML75	116±3	4.4±0.3	27±2	0.090	2.1	~39	2.2
	Provo	EML83	99±3	5.1±0.3	21±1	0.074	1.7	35	2.2
	Provo	EML85	99±2	4.4±0.2	24±1	0.078	1.8	35	2.2
Juab	Nephi	EML71	80±2	2.2±0.1	36±2	0.123	3.1	36	2.1
	Nephi	EML72	98±4	2.7±0.1	36±2	0.119	3.0	36	2.1
Sanpete	Gunnison	EML66	74±2	2.3±0.1	32±2	0.122	3.1	23	2.1
Sevier	Richfield	EML63	54±2	1.4±0.1	38±3	0.134	3.4	20	2.1
Millard	Filmore	EML54	97±7	2.8±0.1	35±2	0.112	2.7	34	2.1
	Delta	EML58	85±6	2.2±0.1	38±2	0.111	2.7	19	2.1
Beaver	Beaver	EML46 [l]	68±3	2.8±0.1	24±1	0.118	2.9	27	2.1
	Beaver	EML, 1957	28±2 [n]	1.5±0.1 [n]	~19	0.091		27	2.1
	Milford	EML51	78±2 [o]	2.3±0.1	34±2	0.122	3.1	21	2.1
	West Milford	EML, 1974	59±9	2.2±0.2	27±5	0.106	5.0	<20	2.1
Iron/Cedar	Cedar City	E35 [l]	68±1	1.8±0.1	38±1	0.133 [m]	2.4 [m]	30	2.0
	Cedar City	EML35	86±4	2.0±0.1	43±3	0.143	3.6	30	2.0
	Cedar City	EML36	77±4	1.9±0.1	41±3	0.142	3.6	30	2.0
	Cedar City	EML, 1957	47±3 [n]	1.5±0.2 [n]		0.093			
Iron/Parowan	Parowan	E26	102±2	2.4±0.1	43±2	0.141	3.6	31	2.0
	Parowan	EML26A [i]	116±2	2.7±0.2	43±3	0.144	3.5	31	2.0
Kane/Kanab	Kanab	E20	72±2	2.1±0.1	34±1	0.119	2.9	30	1.9
	Kanab	EML20A [i]	84±3	2.3±0.2	37±3	0.123	3.0	30	1.9
Garfield	Panguitch	EML39	64±3 [o]	1.5±0.1	44±4	0.149	3.8	23	2.0
	Panguitch	EML42	74±2	1.8±0.2	40±3	0.140	3.5	23	2.0
	Panguitch Lake	EML, 1974	77±2	2.4±0.1	32±1	0.130	ND	41	2.0
San Juan	Blanding	EML146 [k]	64±2	1.7±0.1	38±2	0.137	3.3	28	2.0
	Monticello	EML149 [l]	117±5	2.1±0.1	57±4	0.139	3.5	33	2.0

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC. [e]	c [f]
Grand	Moab	EML152A	72±2	1.3	55±2 [g]	0.129 [g]	3.1	18	2.2
Emery	Green River	EML141 [i]	108±3 [h]	2.6±0.2 [h]	41±3	0.123	3.0	13	2.2
	Green River	EML142-N [i]	99±3 [h]	4.1±0.2 [h]	24±1	0.101	2.4	13	2.2
	Green River	EML142-S [i]	111±3 [h]	3.0±0.2 [h]	37±2	0.109	2.7	13	2.2
Carbon	Price	EML135	80±2	1.8±0.1	44±3	0.144	3.7	24	2.2
	Price	EML136	67±2	1.6±0.1	42±2	0.154 [m]	4.2 [m]	24	2.2
	Draggerton	EML138	85±3	1.8±0.1	47±3	0.160	4.1	22	2.2
Wasatch	Heber	EML126	99±3	3.9±0.2	26±2	0.100	2.5	39	2.2
	Heber	EML127A	116±3	3.7±0.2	31±2	0.126	3.2	39	2.2
	Charleston	EML, 1983	170±5	4.9±0.3	35±2	0.110	2.4	ND	2.2
	Charleston	EML, 1983	128±4	4.3±0.2	30±2	0.104	2.4	ND	2.2
	Wasatch Park	EML, 1983	168±3	5.2±0.3	36±2	0.104	2.4	ND	2.2
Summit	Marion	EML, 1972	138±8	4.6±0.3	30±2	0.101	2.5	45	2.2
Uinta	Vernal	E132	68±3	2.0±0.1	34±2	0.120	3.2	17	2.2
	Vernal	EML132 [i]	76±2	2.0±0.1	38±1	0.123	3.1	17	2.2
	near Vernal	EML, 1974	63±4	1.7±0.3	37±7	0.116	2.7	20	2.2
Duchesne	Talmadge	AF01	76±2	2.6±0.1	29±1	0.118	3.2	27	2.2
	Talmadge	AF05	71±3	2.3±0.1	31±2	0.128	3.4	27	2.2
	Mountain Home	AF14	78±3	2.4±0.1	32±2	0.142	3.9	26	2.2
	Mountain Home-N.	EML, 1983	87±2	2.2±0.3	40±6	0.138		27	2.2
	Upalco	BF19	74±1	2.2±0.1	34±1	0.130	3.4	24	2.2
	Bluebell	BF22	57±2	ND				24	2.2
	Bluebell	BF01	111±4	ND				24	2.2
	Arcadia	BF03	89±3	2.4±0.1	37±2	0.133	3.5	24	2.2
	Altonah	BF05	64±2	2.0±0.1	32±1	0.123	3.0	25	2.2
	Altonah	BF09	69±3	ND				25	2.2
	Duchesne	BF10	50±2	1.5±0.1	32±2	0.125	3.2	24	2.2
	Duchesne	EML128	72±3	2.2±0.1	33±2	0.139	3.7	24	2.2
	Duchesne	EML129	98±3	2.1±0.1	46±2	0.140	3.6	24	2.2

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC. [e]	c [f]
Washington	St. George	E3	80±2	3.0±0.1	26±1	0.076	1.5	18	2.0
	St. George	EML03 [i]	88±3	3.4±0.2	26±2	0.079	1.8	18	2.0
	St. George	EML05	83±3	2.6±0.1	31±1	0.078	1.7	18	2.0
	St. George	EML, 1957	59±3 [n]	1.9±0.2 [n]	31±4	0.050			
	Dixie Forest	EML, 1974	115±4	3.2±0.1	36±2	0.112	3.1	25	2.0
IDAHO:									
Bonneville	Idaho Falls	AS43	96±2	2.0±0.1	49±2	0.167	4.4	25	2.8
	Idaho Falls	EML, 1983 [i]	97±2	2.1±0.1	46±2	0.166	4.3	25	2.8
Bannock	Pocatello	AS50	106±3	2.4±0.1	44±2	0.171	4.5	27	2.8
Cassia	Burley	MH11	68±3	ND				24	2.1
	Burley	MH12	80±2	2.0±0.1	40±2	0.146	3.8	24	2.1
Oneida	Malad City	MH07 [k]	89±1	2.6±0.1	35±2	0.161	4.3	36	2.2
	Malad City	EML, 1983 [i]	103±3	2.2±0.1	47±3	0.165	4.3	36	2.2 [l]
Twin Falls	Twin Falls	MH14	82±2	1.6	44±1	0.161	4.3	25	2.1
	Twin Falls	EML, 1983 [i]	78±2	1.8±0.1	42±3	0.162	4.4	25	2.1
	Twin Falls	MH17	71±2	1.7±0.1	43±2	0.161	4.3	25	2.1
	Twin Falls	EML, 1974	70±4	2.4±0.3 [j]	29±5	0.103	4.4	25	2.1
Ada	Boise	MH22 [k]	76±1	1.9±0.1	40±2	0.173	4.5	31	2.0
	Boise	EML, 1983 [i]	90±2	1.9±0.1	47±3	0.172	4.4	31	2.0
	Boise	EML, 1957	23±1 [n]	ND					
	Meridian	MH19	63±2	1.4±0.1	45±2	0.174	4.5	31	
OREGON:									
Malheur	Jordan Valley	MH25	80±1	ND				30	2.0
	Basque Station	MH29	81±3 [o]	1.6±0.1	49±2	0.174	4.6	27	2.0
Harney	Hines	MH28	63±2	1.4	45±2	0.170	4.4	28	1.8

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC.[e]	c [f]
WYOMING:									
Carbon	Rawlins	BF15	80±2 [h]	1.8±0.1 [h]	44±2	0.138	3.6	24	2.2
Fremont	Riverton	BF13	72±3	3.7±0.1	20±1	0.068	1.5	21	2.2
Sweetwater	Rock Springs	AS32	77±2 [h]	2.4±0.1 [h]	32±1	0.110	2.8	26	2.2
Lincoln	Kemmerer	AS36	80±3	1.8±0.1	45±2	0.154	4.0	29	2.2
	Afton	AS41	99±2	2.7±0.1	37±2	0.151	4.0	47	2.2
Uinta	Evanston	AS35 [k,l]	60±2 [q]	ND				28	2.2
	Robertson	EML, 1974	115±3	3.5±0.7	33±7	0.103	2.4	36	2.2
	Robertson	EML, 1974 [i]	123±4	4.7±1.9	26±10	0.097	2.5	36	2.2
COLORADO:									
La Plata	Durango	AS10	87±3	1.9±0.1	46±2	0.156	4.1	48	1.8
Montezuma	Cortez	AS06	81±3	3.0±0.1 [j]	27±1	0.104	2.7	34	1.8
	Mancos	AS08	85±3	ND				41	1.8
San Juan	Silverton	AS13	122±2	2.8±0.1	44±2	0.162	4.3	58	1.9
Montrose	Montrose	AS20	65±2	ND				25	2.1
Mesa	Fruita	AS21	70±2	1.8±0.1	38±2	0.127	3.3	21	2.2
	Grand Junction	EML155	86±4	2.1±0.1	41±3	0.127	3.1	21	2.2
	Grand Junction	EML157	80±3	2.1±0.1	38±3	0.125	3.1	21	2.2
Rio Blanca	Meeker	AS26	99±2	2.6±0.1	38±2	0.127	3.3	45	2.2
Moffat	Craig	AS27	98±3	2.2±0.1	45±2	0.144	3.8	33	2.2
	Craig	AS28	102±3	ND			33		

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC. [e]	c [f]
NEVADA:									
Elko	Elko	RM10	74±2	1.6±0.1	46±3	0.165	4.4	26	2.1
	Elko	EML, 1983 [i]	78±2	1.8±0.1	44±3	0.174	4.5	26	2.1
	Elko	EML, 1974	90±6	2.4±0.4	38±7	0.141	3.6	26	2.1
	Carlin	RM08	78±2	1.5±0.1	52±3 [g]	0.164 [g]	4.4	25	2.1
	Wells	RM12	80±2	2.0±0.1	40±2	0.158	4.4	30	2.1
	Wells	EML, 1983 [i]	87±2	1.9±0.1	45±3	0.160	4.2	30	2.1
White Pine/Ely	Ely	DZ04	89±2	6.0±0.2 [j]	15±1	0.078	1.9	24	2.1
	Ely	DZ05	88±2	5.0±0.2 [j]	17±1	0.083	2.0	24	2.1
	Ely	EML, 1983	85±2 [i]	4.1±0.2 [j]	20±1	0.087	2.1	24	2.1
	Ely	EML, 1974	98±2	5.4±0.5 [j]	18±2	0.083	2.1	24	2.1
	McGill	DZ09	77±2	2.7±0.1	28±1	0.115	3.0	23	2.1
White Pine/Lund	Preston	SW03	77±3	2.4±0.1	32±1	0.106	2.7	30	2.1
	Lund	SW02	73±3	2.7±0.1	27±1	0.098	2.4	22	2.1
	Lund	EML, 1957	30±2	4.1±0.1		0.071			2.1
White Pine/Baker	Baker	DZ01	79±2	3.5±0.1	22±1	0.092	2.2	23	2.1
	Baker	EML, 1974	67±2		~7 [j]	~10 [g]	2.3	23	2.1
Eureka	Eureka	SW05 [l]	72±1	1.4±0.1	52±3	0.181	5.3	23	1.9
	Eureka	EML,1983A [i,k,l]	78±1	1.4±0.1	57±3 [g]	0.186 [g]	5.1	23	1.9
	Eureka	EML,1983B [i,k,l]	78±4	1.7±0.1	47±4 [g]	0.160 [g]	4.5	23	1.9
	Eureka	EML,1957	23±1 [n]		0.4 [n]	ND			
	Eureka	EML,1974	98±7	20±0.1	5±1	0.063	1.6	30	
Lander/Battle Mt.	Battle Mountain	RM06	64±2	1.4	45±2	0.143	3.7	26	1.9
Lander/Austin	Austin	GC20	79±2	1.9±0.1	42±2 [g]	0.164 [g]	4.6	35	1.8
	Austin	EML, 1983 [i]	79±2	1.7±0.1	46±2	0.166	4.3	35	1.8
	Austin Summit	GC23	109±4	2.7±0.1	40±2	0.143	3.7	38	1.8
Humboldt	Winnemucca	RM02	68±2	1.6±0.1	42±2	0.157	4.1	22	1.9

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC. [e]	c [f]
Washoe	Gerlach	GC08	92±3 [h]	1.8	51±2	0.168	4.3	20	1.6
	Reno	GC05	47±2	1.1±0.1	42±2	0.162 [m]	4.5 [m]	21	1.5
	Reno	GC06	44±1	1.1	41±2	0.159 [m]	4.4 [m]	21	1.5
Pershing	Lovelock	GC10	58±3	ND				15	1.8
	Lovelock	GC12	51±2	1.1	45±2	0.169 [m]	4.5 [m]	15	1.8
Churchill	Fallon	GC15	64±3	1.5±0.1	43±2	0.162 [m]	4.3 [m]	15	1.7
Mineral	Hawthorne	GC33	52±2	1.2±0.1	42±2	0.167	4.4	17	1.7
Nye	Gabbs	GC19 [k]	68±2 [h]	1.7 [h]	39±2	0.156 [m]	4.1 [m]	20	1.7
	Beatty	BE32	36±2	5.9±0.2 [j]	6±1	0.043	0.9	11	1.7
	Duckwater	SW06 [k]	72±3	5.0±0.1	14±1	0.078	1.9	27	1.9
	Currant	GC50	56±2	1.8±0.1	32±2 [d]	0.111 [g]	2.8	21	1.9
Lyon	Yerington	GC39	43±2	ND				16	1.7
Douglas	Gardnerville	GC43	50±2	ND				22	1.5
Ormsby	Stewart	GC48	64±2	1.4±0.1	46±2	0.173	4.6	32	1.5
Lincoln	Alamo	BE37	66±2	4.6±0.1	14±1	0.064	1.4	10	1.9
	Alamo	BE38	42±2	ND				10	1.9
	Alamo	BE39	54±2	ND				10	1.9
	Alamo	BE40	62±2	ND				10	1.9
	Alamo	KS33	44±2	3.6±0.1	12±1	0.062	1.4	10	1.9
	Alamo	EML, 1983 [l]	52±2	3.7±0.2		0.057		10	1.9
	Alamo	KS34	63±3	ND				10	1.9
	Alamo	EML, 1957	16±2 [n]	2.3±0.1 [n]	~7	0.033		10	1.9
	Hiko	KS36	61±2	3.3±0.1	19±1	0.075	1.8	10	1.9
	Panaca	RM19	64±3	1.8±0.1	36±2	0.115	2.8	23	2.0
	Panaca	EML, 1974	107±4	4.5±0.1	24±1	0.083	2.0	<20	2.0
	Pioche	RM14	63±3 [h]	2.3±0.1 [h]	27±2	0.107	2.7	29	2.0
	Caliente	RM21	57±2	1.8±0.1	32±2	0.113	2.8	21	1.9
	Caliente	EML, 1983 [i]	64±2	1.9±0.1	35±2	0.114	2.8	21	1.9

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC.[e]	c [f]
Clark	Indian Springs	BE10	45±2	3.2±0.1	14±1	0.059	1.3	10	1.8
	Mesquite	KS24	81±2	2.2±0.1	37±2	0.110	2.7	9	2.0
	Mesquite	EML, 1957	31±3 [n]	0.6±0.1 [n]	56±9	0.071		9	2.0
	Bunkerville	KS25	160±3	4.9±0.1	33±1	0.104	2.5	9	2.0
	Bunkerville	KS26	156±3	5.2±0.1	30±1	0.099	2.4	9	2.0
	Logandale	KS27 [l]	43±1	ND				9	2.0
	Overton	KS30	63±3	2.0±0.1	32±2	0.103	2.6	9	2.0
	Overton	EML, 1957	11±2	0.3-1.6		0.036		9	2.0
	Las Vegas	SH05	30±1	ND				10	1.8
	Las Vegas	SH07	40±1	2.0±0.1	20±1	0.089	2.1	10	1.8
	Henderson	SH10	34±2	0.9	38±4	0.117	3.1	11	1.8
	Boulder City	SH11	36±1	1.2	29±1	0.117	3.0	13	1.8
CALIFORNIA:									
Inyo/Furnace	Shoshone	BE06	49±2	ND				10	1.7
	Furnace Creek	BE01	61±2	2.3±0.1	27±1	0.097	2.6	5	1.7
Inyo/Bishop	Independence	BE25	36±1	ND					1.7
	Bishop	BE22	40±1	1.1±0.1	37±2	0.140	3.7	10	1.7
Mono	Bridgeport	GC29 [k,l]	81±3	1.4±0.1	60±4	ND		29	1.7
San Bernadino	Ridgecrest	BE29	19±1	ND				11	1.5
Los Angeles	Los Angeles	BA29	37±4	0.9	46±5	0.142	3.8	36	0.8
	Los Angeles	BA30	37±4	0.8	48±5	0.141	3.5	36	0.8
	Burbank	EML, 1970	41±2	0.7		0.144			
	Long Beach	BA18	31±1	ND	31	0.800			
	Los Angeles	EML, 1958	~16	0.3		0.120			
ARIZONA:									
Mohave/Kingman	Bullhead	BE09	34±2	ND				11	1.7
	Kingman	FM01	52±2 [o]	1.2	44±2	0.136	3.5	10	1.7

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC. [e]	c [f]
Mohave/Littlefield	Littlefield	KS21	120±3	4.3±0.1	28±1	0.110	2.6	9	1.9
Mohave/Moccasin	Moccasin	KS07	66±2	2.7±0.1	24±1	0.100	2.4	25	1.9
Coconino/Fredonia	Fredonia	KS01	80±2	2.1±0.1	38±2	0.130	3.2	25	1.9
	Fredonia	EML, 1983 [i]	74±1	2.0±0.1	37±2	0.133	3.5	25	1.9
Coconino/Rim-Tuba	North Rim	KS05	135±2	ND				77	1.6
	North Rim	KS10	134±2	3.8±0.1	36±1	0.130	3.2	77	1.6
	Tuba City	FM14	55±2	2.0±0.1	27±1	0.109	2.9	17	1.6
	South Rim	FM08	91±3	2.6±0.1	37±2	0.112	2.8	37	1.6
	South Rim	FM10	73±2	ND				37	1.6
Coconino/Flagstaff	Flagstaff	FM45	83±3	1.8±0.1	45±2	0.157	4.0	51	1.5
	Flagstaff	FM46	81±2	2.1±0.1	39±2	0.158	4.0	51	1.5
	Flagstaff	FM50	73±3	1.9±0.1	39±2	ND		51	1.5
	Williams	FM43	106±2	2.2±0.1	48±3	0.154	4.1	59	1.5
Navaho	Holbrook	FM17	61±3	1.8±0.1	34±2	0.134	3.5	20	1.9
Apache	Ganado	FM29	61±2	3.0±0.1	20±1	0.103	2.5	30	1.8
	Fort Defiance	FM54	44±2	ND				38	1.8
	Chinle	FM39	75±3	2.6±0.1	29±2	0.123	3.0	28	1.8
Graham	Solomonville	NM05	42±2	0.7	59±4 [g]	0.160 [g]	3.0	25	1.2
	Safford	NM07	44±2	0.9	49±3	0.167	3.3	25	1.2
Maricopa	Tempe	NM23	33±2	ND				21	1.2
	Tempe	NM24	36±2	ND				21	1.2
	Mesa	NM25	42±2	0.9	46±3	0.164	3.3	20	1.2
	Litchfield	NM26	28±2	0.6	46±4	0.158	3.3	20	1.2
Pima	Tucson	KM28	55±2	1.3	43±2	0.170	4.4	29	1.1
	Tuscon	KM29	38±1	ND				29	1.1
	Tuscon	KM33	43±2	1.1	41±2	0.162	4.4	29	1.1

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC. [e]	c [f]
NEW MEXICO:									
Torrance	Moriarty	NM02	65±3	1.4±0.1	45±3	0.154	3.1	30	1.6
Valencia	Belen	NM03	46±2	1.3±0.1	35±2	0.154	3.2	18	1.6
Dona Ana	Las Cruces	NM04	27±2	0.7	38±3	0.165	3.3	16	1.2
Chavez	Roswell	NM06	56±3	1.3±0.1	43±3	0.157	3.2	25	1.3
Grant	Silver City	NM08	63±3	1.5±0.1	43±3	0.165	3.3	34	1.3
Socorro	Socorro	NM09	46±2	1.5±0.1	31±2	0.124	2.4	20	1.4
	Socorro	NM13	44±1	ND				20	1.4
Eddy	Carlsbad	NM10	33±1	ND				26	1.0
Roosevelt	Portales	NM11	72±3	1.8±0.1	41±2	0.158	3.3	40	1.2
Quay	Tucumcari	NM12	90±3	ND	35	1.4			
Santa Fe	Santa Fe	NM14	65±2	ND	36	1.7			
	Santa Fe	NM15	46±2	1.0	46±2	0.169	3.5	40	1.2
	Santa Fe	NM16	54±2	1.3±0.1	44±3	0.158	3.3	40	
Colfax	Raton	NM17	78±2	2.0±0.1	40±2	0.143	2.9	36	1.4
	Cimarron	NM18	74±3	1.6±0.1	46±2	0.161	3.3	38	1.4
Rio Arriba	Chama	NM19	85±3	1.7±0.1	49±2	0.169	3.4	46	1.7
San Juan	Farmington	NM20	70±2	ND				22	1.8
	Farmington	NM21	46±2	1.3	37±2	0.140	2.8	22	1.8
	Farmington	NM22	58±3	1.3±0.1	44±3	0.158	3.2	22	1.8
	Farmington	AS01	70±2	ND				22	1.8
McKinley	Gallup	FM16	74±3	1.9±0.1	39±2	0.127	3.2	30	1.7

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC. [e]	c [f]
Bernalillo	Albuquerque	AQ01	61	1.22	50	0.166	3.5	20	1.7
	Albuquerque	AQ11	58	1.27	45	0.152	3.3	20	1.7
	Albuquerque	AQ12	55	1.30	42	0.145	3.0	20	1.7
	Albuquerque	AQ13	61	1.64	37	0.145	3.0	20	1.7
	Albuquerque	AQ14	62	1.54	40	0.148	3.1	20	1.7
	Albuquerque	AQ15	54	1.18	46	0.154	3.2	20	1.7
	Albuquerque	AQ17	49	1.17	42	0.148	3.1	20	1.7
	Albuquerque	AQ18	56	1.34	42	0.152	3.2	20	1.7
	Albuquerque	AQ19 [l]	77	1.85	42	0.146	3.0	20	1.7
	Albuquerque	AQ20	52	1.25	42	0.151	3.1	20	1.7
	Albuquerque	AQ21	59	1.31	45	0.142	2.9	20	1.7
	Albuquerque	AQ23	57	1.61	35	0.143	2.9	20	1.7
	Albuquerque	AQ26	62	1.32	47	ND		20	1.7
	Albuquerque	AQ27	64	1.31	49	0.154	3.0	20	1.7
	Albuquerque	AQ29	61	1.37	45	0.158	3.2	20	1.7
	Albuquerque	AQ32	55	1.16	47	0.141	2.8	20	1.7
PHASE-III Sites:									
	Seattle, WA	BA03	73±2	1.5±0.1	49±2	0.169	4.4	87	0.7
	Medford, OR	BA11	43±2	1.1	41±3	0.171	4.4	53	0.6
	San Francisco, CA	BA15	54±3	0.8	54±4	0.166	4.2	51	0.7
		BA13	45±1	ND				51	0.7
	Memphis, TN	KM01 [k,l]	64±2 [o]	ND				121	0.9
		KM06	122±3	2.3±0.1	53±2	0.175	4.6	121	0.9
	Dallas, TX	KM13	67±2	1.4	49±3	0.170	4.5	90	0.6
	Corpus Christi, TX	KM18	41±1	0.8	54±3	ND		60	0.6
		KM21	46±2	1.0	47±3	0.171	4.5	60	0.5
	Scottsbluff, NE	RB01	92±3	1.9±0.1	48±3	0.159	4.2	37	2.0

Table 3. Results of soil analyses (continued).

COUNTY	TOWN	SAMPLE ID NUMBER	Cs [a]	Pu [a]	Cs/Pu [b]	R [c]	R'x10³ [d]	PREC. [e]	c [f]
PHASE-III Sites: (continued)	Rapid City, SD	RB08	183±4	3.8±0.1	48±2	0.172	4.6	~50 [q]	2.6
		RB11	199±4	ND				~50 [q]	2.6
	Billings, MT	RB16	93±3	1.9±0.1	50±2	0.171	4.6	37	2.0
	Wichita, KS	SA02	97±3	1.8±0.1	53±2	ND		79	0.9
		SA07	87±2	1.7±0.1	52±2	0.169	4.5	79	0.9
	Des Moines, IA	SA19	113±3	2.1±0.1	54±3 [g]	0.177 [g]	4.7	77	1.1
	St. Louis, MO	SA20	106±3	1.9±0.1	55±2	0.180	4.7	86	1.1
		SA26	123±3	2.5±0.1	49±2	0.181	4.7	86	1.1

[a] Total inventory of Cs, Pu expressed in nCi/m^2.
[b] Activity ratio.
[c] $R = {}^{240}Pu/{}^{239}Pu$.
[d] $R' = {}^{241}Pu/{}^{240}Pu$.
[e] Average annual precipitation expressed in centimeters.
[f] Precipitation coefficient.
[g] Cs/Pu ratio and R not consistent.
[h] Sampling depth may have been insufficient to contain all activity.
[i] Same site as previous entry.
[j] Pu anomalously high.
[k] Sample failed QA, see McArthur and Miller, 1989.
[l] Site possibly disturbed.
[m] R and R' are not consistent.
[n] Cs, Pu as of 1957.
[o] Cs inconsistent with in situ measurement.
[p] No data available.
[q] Data are suspect.

Table 4. Results of replicate analyses of top fraction of EML, 1983 soil sample from Ely, Nevada, for Pu.[a]

ALIQUOT NUMBER	$^{239+240}Pu$ [b]	^{238}Pu [b]	$^{240}Pu/^{239}Pu$ [c]
1	1.45±0.09	0.16±0.02	0.125
2	2.96±0.18	0.18±0.03	0.079
3	2.49±0.12	0.23±0.02	0.092
4	1.40±0.07	0.19±0.02	0.122

a A value of $^{240}Pu/^{239}Pu$ = 0.045±0.05 for NTS Pu gives the most consistent (i.e., the smallest percentage spread) estimates of global Pu for all four aliquots. This corresponds to NTS Cs approximately 13-21 nCi/m^2 for the entire core.

b Deposition density, nCi/m^2.

c Atom ratio.

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data.[a]

COUNTY	TOWN	Pu_n[b]	Cs_n[b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP)[c]
UTAH:					
Box Elder/Rosette	Snowville	(0.3-0.4)±0.1	(7-17)±11	5-18	57±25
	Rosette[d]	(0.6-0.8)±0.1	<0	11-35	130±35
Box Elder/ Tremonton	Brigham	(1.0-1.3)±0.4	(<0-27)±22	17-57	27±30
	Tremonton	(0.3-0.5)±0.2	(27-38)±9	6-20	21±15
Tooele-East	Tooele	(0.6-0.8)±0.1	(<0-15)±9	11-36	10±20
	Tooele	(0.6-0.8)±0.2	(10-27)±13	10-33	30±25
	Iosepa[d]	(2.3-3.1)±0.1	(<0-63)±10	41-135	30±20
Tooele-West	Wendover[d]	(0.3-0.5)±0.1	<0	6-20	63±15
	Wendover[d]	(0.2-0.3)±0.1	<14	3-11	25±20
	Wendover	(0.1-0.2)±0.1	<4	2-7	95±20
	Ibapah	(0.5-0.6)±0.1	(<0-11)±8	9-28	27±15
Tooele-Southeastern	Vernan-Eureka	(1.4-1.9)±0.3	(<0-2)±15	25-83	30±15
Salt Lake	Midvale	(1.2-1.7)±0.2	(23-63)±11	22-77	17±20
	Salt Lake City	(2.5-3.4)±0.2	(7-90)±16	45-147	36±25
	Salt Lake City	(2.6-3.5)±0.5	(9-95)±22	46-152	28±25
	Salt Lake City	(0.9-1.3)±0.2	(19-49)±13	17-55	6±20
	Magna	(1.0-1.3)±0.3	(16-48)±13	17-57	68±25
	Bountiful	(1.0-1.4)±0.3	(8-42)±16	18-60	40±25
Davis	Layton	(1.6-2.1)±0.4	(10-63)±17	28-93	4±25
	Layton	(1.8-2.4)±0.3	(19-78)±13	32-105	19±25
Weber	Ogden	(0.3-0.4)±0.1	(36-46)±9	3-16	42±25
Cache	Logan	(0.9-1.2)±0.2	(17-48)±14	16-53	6±25
	Logan[e]	0.9	13±3	~13	-
	Cache Forest	(1.5-2.1)±0.2	(47-74)±15	27-90	0±30

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued).

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP)[c]
Utah	Payson	(2.1-2.8)±0.2	(10-80)±16	38-122	19±20
	Provo	(3.0-4.1)±0.3	(9-110)±13	54-177	23±20
	Provo	(2.5-3.4)±0.3	(25-108)±11	44-147	25±20
Juab	Nephi	(0.6-0.8)±0.1	(3-24)±9	11-37	<0
	Nephi	(0.8-10.1)±0.2	(13-40)±11	15-48	0±17
Sanpete	Gunnison	(0.7-0.9)±0.2	(<0-10)±9	12-39	15±13
Sevier	Richfield	(0.3-0.4)±0.1	(0-11)±8	5-18	<11
Millard	Filmore	(0.9-1.3)±0.2	(15-47)±9	17-55	3±20
	Delta	(0.8-1.0)±0.1	(28-53)±9	13-44	49±15
Beaver	Beaver [d]	(0.8-1.2)±0.2	<0	15-48	<0
	Beaver [e]	~1.3	~16		
	Milford	(0.7-0.9)±0.2	(<0-18)±9	11-38	36±15
	West Milford	(0.8-1.1)±0.2	(<0-13)±20	15-48	6±20
Iron/Cedar	Cedar City [d]	(0.4-0.5)	(2-15)±6	7-25	<0
	Cedar City	(0.3-0.5)±0.1	(13-25)±9	6-20	11±15
	Cedar City	(0.3-0.5)±0.2	(2-13)±11	6-20	<22
	Cedar City [e]	~1.2	~34		
Iron/Parowan	Parowan	(0.4-0.6)	(13-28)±8	8-26	47±20
	Parowan	(0.4-0.6)±0.2	(15-30)±13	8-26	74±20
Kane/Kanab	Kanab	(0.6-0.8)±0.1	(3-23)±6	11-37	<6
	Kanab	(0.6-0.9)±0.2	(4-27)±9	11-38	8±15
Garfield	Panguitch	(0.2-0.3)±0.2	(6-12)±9	4-13	0±10
	Panguitch	(0.3-0.5)±0.2	(4-15)±11	6-20	17±15
	Panguitch Lake	(0.6-0.8)±0.2	(<0-0)±10	10-34	<0

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued).

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP)[c]
San Juan	Blanding	(0.3-0.5)±0.1	(<0-9)±9	6-20	<0
	Monticello [d]	(0.4-0.5)±0.2	(68-82)±13	7-23	49±20
Grand	Moab	(0.3-0.4)±0.1	(46-57)±6	5-18	15±15
Emery	Green River [d]	(0.7-1.0)±0.3	(31-55)±14	13-43	115±25
	Green River [d]	(1.7-2.3)±0.3	(<0-21)±14	30-120	97±25
	Green River [d]	(1.1-1.5)±0.2	(32-68)±14	20-65	120±25
Carbon	Price	(0.3-0.4)±0.1	(13-23)±9	5-18	21±15
	Price	(0.2-0.3)±0.1	(<0-3)±7	3-12	<17
	Draggerton	(0.2-0.2)±0.1	(9-15)±9	3-10	34±15
Wasatch	Heber	(1.6-2.2)±0.3	(<0-33)±13	28-95	6±20
	Heber	(1.0-1.3)±0.3	(<0-2)±13	17-58	38±25
	Charleston	(1.7-2.3)±0.3	(30-87)±15	30-100	-
	Charleston	(1.7-2.3)±0.3	(1-57)±15	30-100	-
	Wasatch Peak	(2.0-2.8)±0.4	(29-93)±16	36-120	-
Summit	Marion	(1.9-2.6)±0.4	(8-41)±15	34-115	23±15
Uinta	Vernal	(0.6-0.8)	(<0-18)±7	11-35	13±15
	Vernal	(0.6-0.8)±0.2	(11-27)±9	11-33	28±15
	Near Vernal	(0.5-0.7)±0.3	(13-30)±15	10-32	4±15
Duchesne	Talmadge	(0.8-1.1)±0.1	(<0-5)±8	14-48	<14
	Talmadge	(0.6-0.8)±0.1	≤8	10-34	<5
	Mountain Home	(0.4-0.6)±0.1	<0	8-25	3±15
	Mountain Home-N.	(0.4-0.6)±0.1	(3-17)±10	8-26	13±15
	Upalco	(0.5-0.7)±0.1	(<0-7)±7	9-31	4±15
	Bluebell	-	-	-	<0
	Bluebell	-	-	-	74±20
	Arcadia	(0.5-0.7)±0.1	(<0-15)±10	10-32	32±15
	Altonah	(0.6-0.8)±0.1	(<0-5)±7	10-34	<0

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued).

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP)[c]
Duchesne (continued)	Altonah	-	-	-	<10
	Duchesne	(0.4-0.6)	<(0-5)±7	7-24	<0
	Duchesne	(0.4-0.6)±0.2	<6	7-24	0±15
	Duchesne	(0.4-0.5)±0.2	(26-40)±9	7-23	50±20
Washington	St. George	(1.7-2.2)±0.1	(31-76)±8	30-97	42±15
	St. George	(1.8-2.5)±0.2	(27-90)±9	32-108	57±15
	St. George	(1.5-2.0)±0.2	(50-100)±10	26-88	47±15
	St. George [e]	1.7	~51	-	-
	Dixie Forest	(1.1-1.5)±0.1	(25-61)±10	20-65	89±20
IDAHO:					
Bonneville	Idaho Falls	(0.1-0.2)	(10-15)±8	2-7	4±15
	Idaho Falls	(0.1-0.2)	(0-4)±7	2-8	6±15
Bannock	Pocatello	(0.1-0.1)±0.1	<9	2-6	10±15
Cassia	Burley	-	-	-	<9
	Burley	(0.3-0.4)±0.1	(<0-4)±4	6-19	11±15
Oneida	Malad City [d]	(0.2-0.3)±0.1	<0	4-12	<0
	Malad City	(0.2-0.2)±0.1	(4-9)±11	3-9	2±20
Twin Falls	Twin Falls	(0.1-0.2)	(19-23)±7	3-9	21±15
	Twin Falls	(0.1-0.2)±0.1	<11	2-8	13±15
	Twin Falls	(0.2-0.2)	(<0-0)±7	3-9	0±15
	Twin Falls [d]	(0.9-1.3)	(0-30)±20	17-55	0±15
Ada	Boise [d]	(0.1-0.1)±0.1	<0	1-4	<6
	Boise	(0.1-0.1)±0.1	(2-4)±7	1-4	17±15
	Boise [e]	-	~6	-	-
	Meridian	(0-0.1)	<4	1-2	<0

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued).

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP)[c]
OREGON:					
Malheur	Jordan Valley	-	-	-	2±15
	Basque Station	(0-0.1)	(9-11)±8	1-3	17±15
Harney	Hines	0.1	<7	1-4	<13
WYOMING:					
Carbon	Rawlins	(0.4-0.5)	(16-28)±6	6-22	17±15
Fremont	Riverton	(2.3-3.2)±0.1	(11-90)±10	40-140	17±15
Sweetwater	Rock Springs	(0.9-1.2)±0.1	(2-30)±7	15-50	0±15
Lincoln	Kemmerer	(0.2-0.3)	(7-14)±8	4-13	<13
	Afton	(0.3-0.5)±0.1	≤0	6-20	<0
Uinta	Evanston [d]	-	-	-	<0
	Robertson	(1.4-1.9)±0.1	(23-70)±9	25-83	23±25
	Robertson	(2.0-2.8)±0.1	(0-55)±9	36-120	38±25
COLORADO:					
La Plata	Durango	(0.2-0.3)	(11-18)±8	4-13	<0
Montezuma	Cortez	(1.2-1.6)±0.1	(<0-23)±9	21-70	2±15
	Mancos	-	-	-	<0
San Juan	Silverton	(0.2-0.3)±0.1	(<0-4)±8	4-13	34±25
Montrose	Montrose	-	-	-	<4
Mesa	Fruita	(0.5-0.6)	(8-24)±6	9-28	13±15
	Grand Junction	(0.5-0.7)±0.1	(19-38)±9	9-32	44±15
	Grand Junction	(0.6-0.8)±0.1	(11-29)±7	10-33	22±15
Rio Blanca	Meeker	(0.7-0.9)±0.1	(8-30)±9	11-39	<0

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued).

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP)[c]
Moffat	Craig	(0.4-0.5)±0.1	(18-30)±9	6-22	6±20
	Craig	-	-	-	13±20
NEVADA:					
Elko	Elko	(0.1-0.1)	(4-7)±9	2-7	8±15
	Elko	0.1	≤6	1-3	15±15
	Elko	(0.4-0.6)	(<0-6)±8	8-25	30±20
	Carlin	(0.1-0.1)	(20-23)±8	2-7	21±15
	Wells	(0.3-0.3)	(<0-3)±11	5-15	<23
	Wells	(0.2-0.2)	(4-9)±9	3-10	7±15
White Pine/Ely	Ely [d]	(3.3-4.5)±0.2	(<0-42)±16	57-195	40±15
	Ely [d]	(2.6-3.6)±0.2	(<0-34)±15	46-152	38±15
	Ely [d]	(2.0-2.7)±0.2	(<0-42)±15	34-117	32±15
	Ely [d]	(2.8-3.9)±0.2	(<0-44)±16	50-165	57±15
	McGill	(0.9-1.2)±0.1	(<0-4)±10	16-52	23±15
White Pine/Lund	Preston	(0.9-1.2)±0.1	(8-38)±8	16-52	32±15
	Lund	(1.1-1.6)±0.1	(0-33)±8	21-68	21±15
	Lund [e]	1.0	~21	-	-
White Pine/Baker	Baker	(1.5-2.1)±0.1	(<0-24)±9	27-90	25±15
	Baker [d]	(3.9-5.3)±0.2	<0	69-230	2±15
Eureka	Eureka [d]	(0-0)	(8-8)±7	0	23±15
	Eureka [d]	≤0	(20-20)±8	0	34±20
	Eureka	(0.2-0.2)	(9-14)±8	2-9	34±20
	Eureka [e]	0.2	13±2	-	-
	Eureka [d]	13-18	(<0-30)±9	-	42±20
Lander/Battle Mountain	Battle Mountain	(0.3-0.3)	(14-21)±6	4-15	<8

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued).

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP) [c]
Lander/Austin	Austin	(0.1-0.2)	<8	2-8	0±15
	Austin	(0.1-0.1)±0.1	(1-5)±8	2-7	0±15
	Austin Summit	(0.5-0.6)±0.1	(1-16)±10	8-27	40±25
Humboldt	Winnemucca	(0.2-0.2)	(<0-0)±6	3-10	17±15
Washoe	Gerlach	(0.1-0.1)	(16-19)±8	2-6	90±15
	Reno	(0.1-0.1)	<8	2-5	8±10
	Reno	(0.1-0.1)	<6	2-6	2±10
Pershing	Lovelock	-	-	-	36±10
	Lovelock	(0.1-0.1)	(<0-1)±5	1-3	23±10
Churchill	Fallon	(0.1-0.2)	(<0-1)±8	2-7	50±10
Mineral	Hawthorne	(0.1-0.1)	<7	1-5	21±10
Nye	Gabbs	(0.2-0.3)	≤4	3-11	40±15
	Beatty [d]	(4.9-5.8)±0.3	(<0-70)±15	-	15±10
	Duckwater [d]	(2.8-3.8)±0.2	(<0-30)±17	50-165	10±15
	Currant	(0.6-0.8)±0.1	(1-21)±6	11-36	60±10
Lyon	Yerington	-	-	-	10±10
Douglas	Gardnerville	-	-	-	10±10
Ormsby	Stewart	(0-0.1)	(<0-0)±7	1-2	0±20
Lincoln	Alamo	(3.0-4.1)±0.1	(<0-83)±11	53-178	70±10 [g]
	Alamo	-	-	-	25±10 [g]
	Alamo	-	-	-	48±10 [g]
	Alamo	-	-	-	63±10 [g]
	Alamo	(2.6-3.3)±0.1	(<0-57)±9	44-147	28±10 [g]
	Alamo	(2.6-3.6)±0.1	(4-90)±5	47-155	44±10 [g]
	Alamo	-	-	-	65±10 [g]

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued).

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP) [c]
Lincoln (continued)	Alamo [e]	2.2 [f]	~11 [f]	-	-
	Hiko	(1.9-2.6)±0.1	(<0-54)±9	34-113	61±10 [g]
	Panaca	(0.6-0.8)	(11-30)±7	10-34	4±10
	Panaca	(2.4-3.2)±0.1	(6-85)±9	41-135	85±20
	Pioche	(0.9-1.2)±0.1	(<0-17)±9	15-52	<<0
	Caliente	(0.6-0.8)±0.1	(<0-19)±6	11-35	4±10
	Caliente	(0.6-0.8)±0.1	(7-28)±5	11-36	17±10
Clark	Indian Springs	(2.2-3.0)±0.1	(1-72)±9	39-130	34±10
	Mesquite	(0.8-1.0)±0.1	(23-47)±7	13-44	105±15
	Mesquite [e]	0.5±0.1	~27	-	-
	Bunkerville	(1.9-2.5)±0.1	(28-91)±12	33-110	250±25 [g]
	Bunkerville	(2.1-2.9)±0.1	(21-95)±12	39-125	245±25 [g]
	Logandale [d]	-	-	-	30±10
	Overton	(0.8-1.1)±0.1	(10-35)±7	13-42	68±10 [g]
	Overton [e]	<1.3	~7	-	-
	Las Vegas	-	-	-	6±5
	Las Vegas	(1.0-1.3)±0.1	(<0-15)±5	16-58	25±10
	Henderson	(0.3-0.4)	(8-17)±4	5-16	6±5
	Boulder City	(0.4-0.5)	(<0-2)±4	7-23	4±10
CALIFORNIA:					
Inyo/Furnace	Shoshone	-	-	-	40±10
	Furnace Creek	(1.0-1.3)±0.1	(<0-31)±6	17-58	95±10 [g]
Inyo/Bishop	Independence	-	-	-	4±10
	Bishop	(0.2-0.3)	(<0-3)±5	4-12	8±10
Mono	Bridgeport [d]	-	-	-	30±15
San Bernadino	Ridgecrest	-	-	-	≤0
Los Angeles	Los Angeles	(0.2-0.2)	(9-15)±5	3-10	8±15
	Los Angeles	(0.1-0.2)	(12-16)±4	2-8	0±15
	Burbank	0.13	<6	-	-

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued).

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP) [c]
Los Angeles	Long Beach	-	-	-	0±10
(continued)	Los Angeles	~0.16	~8	-	~8
ARIZONA:					
Mohave/Kingman	Bullhead	-	-	-	11±5
	Kingman	(0.3-0.4)	(13-22)±5	5-16	49±10
Mohave/Littlefield	Littlefield	(1.5-2.0)±0.1	(<0-19)±12	26-88	177±20 [g]
Mohave/Moccasin	Moccasin	(1.1-1.5)±0.1	(<0-13)±8	20-65	4±15
Coconino/Fredonia	Fredonia	(0.5-0.7)±0.1	(7-25)±8	9-31	30±15
	Fredonia	(0.4-0.6)±0.1	(<0-13)±7	8-26	19±15
Coconino/Rim	North Rim	-	-	-	<13
	North Rim	(1.0-1.3)±0.1	(<0-23)±11	16-58	<11
	Tuba City	(0.7-1.0)±0.1	(<0-9)±8	13-42	30±15
	South Rim	(0.9-1.1)±0.1	(12-42)±9	15-50	27±15
Coconino/Flagstaff	Flagstaff	(0.2-0.3)	(7-13)±8	4-12	<0
	Flagstaff	(0.2-0.3)±0.1	≤0	4-12	<0
	Flagstaff	-	-	-	<0
	Williams	(0.3-0.3)±0.1	(23-31)±8	5-15	<30
Navaho	Holbrook	(0.4-0.5)	<10	7-23	17±10
Apache	Ganado	(1.2-1.6)±0.1	≤8	21-70	≤0
	Fort Defiance	-	-	-	<<0
	Chinle	(0.7-1.0)±0.1	<12	13-42	15±15
Graham	Solomonville	0.1	(19-21)±5	1-4	2±5
	Safford	0.1	(5-7)±5	1-3	6±5

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued):

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP) [c]
Maricopa	Tempe	-	-	-	0±7
	Tempe	-	-	-	0±7
	Mesa	(0.1-0.1)	(2-4)±5	1-4	16±8
	Litchfield	(0.1-0.1)	(3-5)±4	1-4	≤0
Pima	Tucson	(0.1-0.1)	<5	1-4	~4
	Tucson	-	-	-	~4
	Tucson	(0.1-0.1)	<4	1-5	~4
NEW MEXICO:					
Torrance	Moriarty	(0.2-0.2)	(6-12)±8	3-10	2±15
Valencia	Belen	(0.2-0.2)	<0	3-9	10±10
Dona Ana	Las Cruces	(0.05-0.06)	≤0	1-3	0±5
Chavez	Roswell	(0.1-0.2)	(0-4)±7	3-9	23±15
Grant	Silver City	(0.1-0.1)	<10	2-6	10±15
Socorro	Socorro	(0.4-0.5) [h]	(0-0)±5	8-24	13±10
	Socorro	-	-	-	10±10
Eddy	Carlsbad	-	-	-	<7
Roosevelt	Portales	(0.2-0.2)	<10	3-10	0±15
Quay	Tucumcari	-	-	-	50±15
Santa Fe	Santa Fe	-	-	-	<<0
	Santa Fe	(0.1-0.1)	(<0-1)±5	1-4	<<0
	Santa Fe	(0.1-0.2)	(0-4)±6	2-7	<<0
Colfax	Raton	(0.3-0.5)	(<0-8)±8	6-20	25±15
	Cimarron	(0.1-0.2)	(5-9)±8	2-8	11±15

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued).

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP)[c]
Rio Arriba	Chama	(0.1-0.1)	(9-12)±8	2-6	<0
San Juan	Farmington	-	-	-	30±15
	Farmington	(0.2-0.3)	(<0-1)±6	4-13	<4
	Farmington	(0.1-0.2)	(1-5)±7	2-8	8±15
	Farmington	-	-	-	30±15
McKinley	Gallup	(0.5-0.7)	(11-27)±9	8-29	11±15
Bernalillo	Albuquerque	(0.1-0.1)	(11-14)±7	1-5	27±15
	Albuquerque	(0.2-0.2)	(7-12)±7	3-10	21±15
	Albuquerque	(0.2-0.3)	(6-13)±6	4-13	15±15
	Albuquerque	(0.3-0.4)	≤11	5-16	27±15
	Albuquerque	(0.2-0.3)	(<0-5)±8	4-14	28±15
	Albuquerque	(0.1-0.2)	(4-9)±6	3-9	13±15
	Albuquerque	(0.2-0.2)	(1-6)±6	3-10	4±15
	Albuquerque	(0.2-0.2)	(0-5)±7	3-10	17±15
	Albuquerque [d]	(0.3-0.4)	(4-13)±8	5-18	57±15
	Albuquerque	(0.2-0.2)	(<0-5)±7	3-10	10±15
	Albuquerque	(0.2-0.3)	(13-21)±7	4-14	23±15
	Albuquerque	(0.3-0.4)	(<0-1)±8	5-16	19±15
	Albuquerque	-	-	-	28±15
	Albuquerque	(0.2-0.2)	(15-20)±8	3-9	32±15
	Albuquerque	(0.1-0.2)	(1-6)±8	2-8	27±15
	Albuquerque	(0.2-0.3)	(14-22)±6	4-13	15±15
PHASE-III SITES:					
	Seattle, WA	(0.1-0.1)	(8-10)±6	1-4	0±15
	Medford, OR	(0-0.1)±0.1	≤0	1-3	~6±15
	San Francisco, CA	(0.1-0.1)	(13-15)±4	1-3	23±15
		-	-	-	6±15

Table 5. Estimates of NTS Cs and Pu deposition densities calculated from the soil data [a] (continued).

COUNTY	TOWN	Pu_n [b]	Cs_n [b]	$Pu_n(Cs/Pu)_n$	Cs(PRECIP)[c]
PHASE-III SITES: (continued)	Memphis, TN	-	-	-	<<0 [d]
		(0.1-0.1)±0.1	(25-27)±10	1-3	<25
	Dallas, TX	(0.1-0.1)	(7-9)±7	1-4	27±15
	Corpus Christi, TX	-	-	-	<0
		(0-0.1)	(1-3)±5	1-3	<10
	Scottsbluff, NE	(0.2-0.3)	(14-20)±8	3-11	10±15
	Rapid City, SD	(0.1-0.2)±0.1	(7-11)±13	2-7	-
		-	-	-	-
	Billings, MT	(0.1-0.1)	(11-14)±9	1-4	11±15
	Wichita, KS	-	-	-	19±15
		(0.1-0.1)	(19-21)±8	2-5	0±15
	Des Moines, IA	0	(25-26)±9	0-2	32±20
	St. Louis, MO	0±0.1	(25-25)±8	~0	8±10
		<0.1	0±10	~0	8±10

[a] Deposition density, nCi/m^2.
[b] Cs, Pu deposition density from NTS fallout; see text, Section 7.3.
[c] Cs estimated from precipitation.
[d] Data are suspect, see Table 3.
[e] See Table 6.
[f] At time of deposition.
[g] Precipitation estimate is suspect.
[h] Contaminated by TRINITY Pu (see text and Appendix B).

Table 6. Estimates of fallout deposition densities calculated from soil samples collected in 1957. [a,b]

	Measured			Estimated					
SITE	Cs	Pu	R_s [c]	Cs_g [d]	Pu_g [d]	R_n [e]	Cs_n [f]	Cs/Pu	PRECIPITATION [g]
Alamo, NV	16±2	2.4±0.2 2.1±0.1	0.042 0.033	5	0.10	0.036 0.028	11	5	10
Mesquite, NV	31±3	0.6±0.1 1.5±0.1	0.071 0.072	4	0.10	0.050 0.052	27	60	9
Overton, NV	11±2	1.6±0.1 0.3	0.036 0.072	4	0.10	0.030 0.035	7	≤5	9
Eureka, NV	23±1	0.4 0.4		10	0.23		13	65	23
Lund, NV	30±2	1.1±0.1 1.2±0.1	0.075 0.067	9	0.15	0.058 0.050	21	22	22
Beaver, UT	28±2	1.6±0.1 1.4±0.1	 0.091	12	0.20 0.20	 ~0.080	16	13	27
Cedar City, UT	47±3	1.7±0.1 1.2±0.1	 0.093	13	0.20 0.20	 ~0.080	34	29	30
Logan, UT	31±2	1.2±0.1	0.079	18	0.30	~0.040	13	15	44
St. George, UT	59±3	2.2±0.2 1.5±0.1	0.048 0.053	8	0.15	0.039 0.040	51	≤30	18
Boise, ID	23±1			17			6		31
Albuquerque, NM	~16			~8			8	20	
Ithaca, NY	21±2	0.4	0.188	18	0.30		3		80
New Brunswick, NJ	22±4	0.3±0.1	0.177	18	0.30		4		80

[a] Deposition densities, nCi/m^2; Pu data reflects duplicate aliquot analyses.
[b] Beck, 1991.
[c] $^{240}Pu/^{239}Pu$, atom ratio of the sample.
[d] Cs, Pu global fallout deposition density.
[e] $^{240}Pu/^{239}Pu$, atom ratio of NTS fallout.
[f] NTS Cs-deposition density.
[g] Average annual precipitation in cm/yr.

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses.

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
UTAH:							
Box Elder/Rosette	2	2	1	(7-17)±11	5-18	57±25	9±2
Box Elder/ Tremonton	2	2	2	(<23-36)±8	9-24	22±13	17±5
Tooele-East	2	3	3	(<3-28)±5	18-58	25±10	22±6
Tooele-West [d]	3	4	1	(≤0-11)±8	9-28	27±15	21±5
Salt Lake	6	6	6	(14-65)±6	28-91	33±10	21±4
Davis	2	2	2	(15-70)±10	30-98	23±18	23±6
Weber	1	1	1	(36-49)±9	3-16	42±25	22±5
Cache	3	3	2	(15-30)±10 13±3 [g]	16-53 16 [g]	6±25	17±5
Utah	3	3	3	(15-100)±8	45-150 [f]	22±12	23±5
Juab	2	2	2	(8-30)±7	18-42	0±17	16±3
Sanpete	1	1	1	(<0-10)±9	12-39	15±13	13±3
Sevier	1	1	1	(0-11)±8	5-18	<11	12±3
Millard	2	2	2	(22-50)±6	15-50	25±12	18±4
Beaver	4	4	3	(<0-16)±9 16 [g]	15-50 14 [g]	~18±10	16±4
Iron/Cedar	4	4	3	(6-18)±6 34 [g]	6-22 12 [g]	~4±10	16±3
Iron/Parowan	1	2	2	(14-29)±7	8-26	60±14	16±3
Kane/Kanab	1	2	2	(4-25)±5	11-38	~4±10	34±20

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses (continued).

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
Kane/Orderville	0	0	0	-	-	-	38±20
Garfield	3	3	3	(≤3-9)±6	7-22	~6±9	31±8 [e]
San Juan [d]	2	2	1	(<0-9)±9	7-21	<0	12±4
Grand	1	1	1	(46-57)±6	5-18	15±15	15±4
Emery [d]	3	3	2	(31-61)±10	16-54	111±15	15±4 [e]
Carbon	3	3	3	(<7-15)±5	4-13	~18±9	11±3
Wasatch	5	5	5	(<11-54)±7	28-93 [f]	2±16	19±4
Summit	1	1	1	(8-41)±15	34-115	23±15	20±4
Uinta	2	3	3	(<8-25)±6	11-34	15±9	14±3
Duchesne	13	13	13 [h]	(<2-9)±3	9-30	~13±5	13±2
Washington	4	5	5 [h]	(33-82)±5 51	27-92 ~54	39±9	92±30 [i]
Iron/Modena	0	0	0	-	-	-	18±3
Rich	0	0	0	-	-	-	18±6
Morgan	0	0	0	-	-	-	23±6
Daggett	0	0	0	-	-	-	13±3
Piute	0	0	0	-	-	-	14±3
Wayne	0	0	0	-	-	-	11±2

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses (continued).

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
IDAHO:							
Bonneville	1	2	2	(5-10)±6	2-8	5±11	3±1
Bannock	1	1	1	<9	2-6	10±15	4±1
Cassia	2	2	2 [h]	(<0-4)±8	6-19	~6±11	6±2
Oneida	1	2	1	(4-9)±11	3-9	2±20	7±2
Twin Falls	3	4	3 [h]	(≤6-8)±4	3-9	9±8	6±2
Ada	3	4	3	(<0-6)±4 [g]	1-3	≤9±10	6±1
Bear Lake	0	0	0	-	-	-	12±4
Caribou	0	0	0	-	-	-	6±2
Bingham	0	0	0	-	-	-	3±1
Franklin	0	0	0	-	-	-	9±2
Power	0	0	0	-	-	-	4±1
Minidoka	0	0	0	-	-	-	5±1
Lincoln	0	0	0	-	-	-	6±2
Jerome	0	0	0	-	-	-	5±1
Gooding	0	0	0	-	-	-	7±3
Elmore	0	0	0	-	-	-	6±2
Canyon	0	0	0	-	-	-	3±1

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses (continued).

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
Owynee	0	0	0	-	-	-	7±2
OREGON:							
Malheur	2	1	2 [h]	(9-11)±8	1-3	10±11	2±.4
Harney	1	1	1	<7	1-4	<13	2±.3
WYOMING:							
Carbon	1	1	1	(16-28)±6	6-22	17±15	12±2
Fremont	1	1	1	(11-90)±10	40-140 [f]	17±15	19±6
Sweetwater	1	1	1	(2-30)±7	15-50	0±15	14±4
Lincoln	2	2	2	(<3-7)±6	5-16	<6	14±5 [e]
Uinta [d]	2	3	2	(≤12-62)±10	30-100 [f]	30±17	14±3
Sublette	0	0	0	-	-	-	15±6
COLORADO:							
La Plata	1	1	1	(11-18)±8	4-13	<0	12±4
Montezuma	2	2	2 [h]	(<0-23)±9	21-70	~1±11	10±3
San Juan	1	1	1	(<0-4)±8	4-13	34±25	10±3
Montrose	1	1	1 [h]	-	-	<4	14±4
Mesa	3	3	3	(13-30)±4	9-31	30±9	17±3
Rio Blanco	1	1	1	(8-30)±9	11-39	<0	13±3
Moffat	2	2	2 [h]	(18-30)±9	6-22	10±14	10±2
Dolores	0	0	0	-	-	-	12±4

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses (continued).

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
San Miguel	0	0	0	-	-	-	10±3
Ouray	0	0	0	-	-	-	10±3
Delta	0	0	0	-	-	-	15±4
Garfield	0	0	0	-	-	-	16±4
NEVADA:							
Elko	4	6	6	(≤5-8)±4	4-11	~13±7	10±2
White Pine/Ely	4	5	5	(<0-33)±8	41-136 [f]	38±7	20±3
White Pine/Lund	3	3	3	(4-36)±6 21 [g]	18-60	27±11	30±4
White Pine/Baker	2	2	1	(<0-24)±9	27-90	25±15	27±6
Eureka [d]	3	5	4 [h]	(≤8-17)±4 13 [g]	-	33±10	15±3
Lander/ Battle Mountain	1	1	1	(14-21)±6	4-15	<8	6±2
Lander/Austin	2	3	3	(≤0-7)±5	4-14	13±10	10±2
Humboldt	1	1	1	0±6	3-10	17±15	4±1
Washoe	3	3	3	(<5-6)±5	2-6	5±7	7±2
Pershing	2	2	2 [h]	(<0-1)±5	1-3	23±10	5±1
Churchill	1	1	1	(0-1)±8	2-7	50±10	8±2
Mineral	1	1	1	<7	1-5	21±10	9±2

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses (continued).

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
Lyon	1	1	1 [h]	-	-	10±10	6±2
Douglas	1	1	1 [h]	-	-	10±10	6±2
Ormsby	1	1	1	(<0-0)±7	1-2	0±10	6±2
Nye/Gabbs	1	1	1	≤4	3-11	40±15	8±2 [i]
Nye/Beatty	1	1	1	(<0-70)±15 [f]		15±10	2±1 [i]
Nye/Duckwater	1	1	1	(<0-30)±17	50-165	10±15	27±3 [i]
Nye/Currant	1	1	1	(1-21)±6	11-36	60±10	22±2 [i]
Lincoln/Alamo	7	8	8 [h]	(<0-90)±7 11 [g]	48-160 [f] 16 [g]	49±4	21±5 [i]
Lincoln/Hiko	1	1	1	(<0-54)±9	34-113 [f]	61±10	26±8 [i]
Lincoln/Panaca	2	2	1	(11-30)±7	10-34	4±10	15±4 [i]
Lincoln/Pioche	1	1	1	(<0-17)±9	15-52	<0	16±3 [i]
Lincoln/Caliente	1	2	2	(<3-24)±4	11-35	11±7	14±2 [i]
Clark/Indian Springs	1	1	1	(1-72)±9	39-130	34±10	
Clark/Mesquite	2	2	2	(23-47)±7 27 [g]	13-44 53 [g]	105±15	47±20 [i]
Clark/ Bunkerville	2	2	2	(24-93)±8	36-117	247±18	108±35 [i]
Clark/Overton	2	2	2	(10-35)±7 7 [g]	13-42 4 [g]	68±10	10±3 [i]

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses (continued).

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
Clark/Las Vegas	2	2	2 [h]	(<0-15)±5	16-58 [f]	10±6	2±1 [i]
Clark/Henderson	1	1	1	(8-17)±4	5-16	6±5	1 [i]
Clark/Boulder City	1	1	1	(<0-2)±4	7-23	4±10	2±1 [i]
Storey	0	0	0	-	-	-	6±2
CALIFORNIA: Inyo/Furnace	2	2	2 [h]	(<0-31)±6	17-58	69±7	22±10
Inyo/Bishop	2	2	2 [h]	(<0-3)±5	4-12	6±7	3±1
Mono	1	1	1 [h]	-	-	30±15	3±1
San Bernadino	1	1	1 [h]	-	-	<0	3±1
Los Angeles	5	5	5	(9-11)±4	3-9	4±5	1±0.5
ARIZONA: Mohave/Kingman	2	2	2 [h]	(13-22)±5	5-16	30±5	6±2
Mohave/Littlefield	1	1	1	(<0-19)±12	26-88	177±20	36±11
Mohave/Moccasin	1	1	1	(<0-13)±8	20-65	4±15	19±7
Coconino/Fredonia	1	2	2	(<3-19)±6	8-29	25±11	25±13
Coconino/Rim-Tuba	5	5	5 [h]	(<4-25)±6	15-50	~12±7	20±7
Coconino/Flagstaff	4	4	4	(<10-15)±5	4-13	<0	6±1
Navaho	1	1	1	<10	7-23	17±10	12±3
Apache	3	3	3 [h]	<10	17-56	<5±9	18±5

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses (continued).

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
Graham	2	2	2	(12-14)±3	1-4	4±3	2±1
Maricopa	4	4	4 [h]	(3-5)±3	1-4	4±4	2±1
Pima	3	3	3 [h]	<5	1-5	4	4±1
Yavapai	0	0	0	-	-	-	2±1
Gila	0	0	0	-	-	-	2±1
Yuma	0	0	0	-	-	-	2±0.4
Pinal	0	0	0	-	-	-	2±1
Greenlee	0	0	0	-	-	-	2±1
Santa Cruz	0	0	0	-	-	-	3±1
Cochise	0	0	0	-	-	-	2±1
NEW MEXICO: Torrance	1	1	1	(6-12)±8	3-10	2±15	11±3
Valencia	1	1	1	<0	3-9	10±10	12±3
Dona Ana	1	1	1	≤0	1-3	0±5	2±1
Chavez	1	1	1	(0-4)±7	3-9	23±15	8±2
Grant	1	1	1	<10	2-6	10±15	2±1
Socorro	2	2	2 [h]	(<0-0)±5	8-24	12±7	6±1
Eddy	1	1	1	-	-	<7	3±1
Roosevelt	1	1	1	<10	3-10	0±15	7±2

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses (continued).

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
Quay	1	1	1	-	-	50±15	8±2
Santa Fe	3	3	3 [h]	(<0-3)±4	2-6	<<0	11±3 [e]
Colfax	2	2	2	(<3-9)±5	4-14	18±11	8±2
Rio Arriba	1	1	1	(9-12)±8	2-6	<0	8±2
San Juan	4	4	4 [h]	(0-3)±4	3-11	17±8	9±2
McKinley	1	1	1	(11-27)±9	8-29	11±15	15±4
Bernalillo	16	16	15 [h]	(5-10)±2 [g]	3-11	20±4	11±2
Catron	0	0	0	-	-	-	5±1
Hidalgo	0	0	0	-	-	-	2±1
Los Alamos	0	0	0	-	-	-	9±2
Sandoval	0	0	0	-	-	-	14±4
Sierra	0	0	0	-	-	-	3±1
Luna	0	0	0	-	-	-	2±1
Taos	0	0	0	-	-	-	7±2
Lincoln	0	0	0	-	-	-	8±3
Otero	0	0	0	-	-	-	2±1
Mora	0	0	0	-	-	-	8±2
San Miguel	0	0	0	-	-	-	8±2

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses (continued).

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
Guadalupe	0	0	0	-	-	-	9±2
De Baca	0	0	0	-	-	-	7±2
Union	0	0	0	-	-	-	8±2
Harding	0	0	0	-	-	-	8±2
Curry	0	0	0	-	-	-	7±2
Lea	0	0	0	-	-	-	3±1
PHASE-III SITES:							
Seattle, WA	1	1	1	(8-10)±6	1-4	0±15	<1 [j]
Medford, OR	1	1	1	<0	1-3	6±15	≤1 [j]
San Francisco, CA	2	2	2	(13-15)±4 [e]	1-3	15±10	≤1 [j]
Memphis, TN	2	2	1	(25-27)±10	1-3	<12	6 [j]
St. Louis, MO	2	2	2	(13-13)±7	0	8±10	4 [j]
Dallas, TX	1	1	1	(7-9)±7	1-4	27±15	6 [j]
Des Moines, IA	1	1	1	(25-26)±9 [e]	0-2	32±20	5 [j]
Corpus Christi, TX	2	2	2	(1-3)±5	1-3	<5	1 [j]
Scottsbluff, NE	1	1	1	(14-20)±8	3-11	10±15	5 [j]
Rapid City, SD	2	2	2	(7-11)±13	2-7	-	4 [j]

Table 7. Comparison of cumulative CDB deposition-density estimates with estimates calculated from soil analyses (continued).

COUNTY/TOWN	TOTAL SITES	SOIL SAMPLES [a]	VALID DATA [b]	NTS Cs DEPOSITION [c]			
				R_n	Pu	Precipitation	CDB
PHASE-III SITES: (continued)							
Billings, MT	1	1	1	**(11-14)±9**	1-4	11±15	3 [j]
Wichita, KS	2	2	2	**(19-21)±9**	2-5	10±10	7 [j]

[a] Total soil samples analyzed.
[b] Total soil samples having valid data.
[c] In nCi/m^2, estimated by each of the methods described in text.
[d] Data for some sites suspicious, see Tables 3 and 5.
[e] CDB and soil estimates not consistent.
[f] High Pu makes this estimate questionable.
[g] Estimate from HASL 1957 sample, see Table 6.
[h] Cs estimates only for some sites. Sites with obviously anomalous precipitation-based estimate not included in average.
[i] Cumulative Cs estimated from TDB.
[j] Cumulative Cs from gummed-film (Beck, et al., 1990).

Table 8. Comparison of County DataBase cumulative Cs deposition-density estimates with cumulative deposition-density estimates calculated from soil analyses at gummed-film sites and with previous gummed-film-based estimates.[a]

SITE	CDB [b]	SOIL [b]	Beck,1984 [b]
Elko, NV	11±3	3-7	10
Ely, NV	22±5	0-40	19
Las Vegas, NV	2	<0-15	2
Reno, NV	5±1	<7	4
Winnemucca, NV	4±2	0	5
Flagstaff, AZ	6±2	0-13	6
Tucson, AZ	4±1	<5	4
Boise, ID	6±2	~6	6
Pocatello, ID	4±1	<9	3
Albuquerque, NM	11±3	≤7	11
Roswell, NM	8±4	0-4	11
Milford, UT	15±4	≤0-18	8
Salt Lake City, UT	21±6	12-78	19
Grand Junction, CO	17±5	15-34	17
Rock Springs, WY	14±4	2-30	11

[a] Soil estimate and Beck, 1984 are for sites in the listed city only. CDB estimate is for all sites in the county. See Table 5 for other sites in the county.
[b] Deposition density, nCi/m^2.

Table 9. Comparison of CDB cumulative Cs deposition-density estimates with previous soil-sample-based estimates.

COUNTY	TOWN	CDB [a]	Krey and Beck (1982) [a,b]
UTAH:			
Box Elder	Tremonton	17±5	28±11
	Brigham	17±5	9±18
Tooele	Tooele	22±6	14±14
Juab	Nephi	16±3	12±7
Millard	Delta	18±4	33±9
	Filmore	18±4	23±11
Beaver	Milford	16±4	≤9±11
	Beaver	16±4	≤9±12
	Minersville	16±4	18±36
Iron	Cedar City	16±3	9±9
	Parowan	16±3	18±14
	Modena	18±3	9≤9
Cache	Logan	17±5	25±16
Weber	Ogden	22±5	40±10
Davis	Layton	23±6	30±10
	Clearfield	23±6	≤9±15
Salt Lake	Salt Lake City	21±4	26±11
	Bountiful	21±4	18±18
	Midvale	21±4	14±28
	Magna	21±4	25±14
Summit	Marion	20±5	23±14
Utah	Provo	23±4	33±8
	Payson	23±4	23±18
Wasatch	Heber	19±4	≤9±10
Duchesne	Duchesne	13±2	≤9±9
Uinta	Vernal	14±31	16±10

Table 9. Comparison of CDB cumulative Cs deposition-density estimates with previous soil-sample-based estimates (continued).

COUNTY	TOWN	CDB [a]	Krey and Beck (1982) [a,b]
Carbon	Price	11±3	≤9±9
	Draggerton	11±3	9±9
Sanpete	Manti	13±3	≤9±9
	Gunnison	13±3	≤9±9
Sevier	Richfield	12±3	≤9±9
Emery	Green River	15±4	39±19
Grand	Moab	15±4	18±2
Garfield	Panguitch	31±8	≤9±10
Kane	Kanab	34±20	11±11
San Juan	Blanding	12±4	≤9±9
	Monticello	12±4	35±7 [c]
COLORADO:			
Mesa	Grand Junction	17±3	19±6

[a] Deposition density, nCi/m^2.
[b] Krey and Beck values calculated assuming NTS $^{240}Pu/^{239}Pu = 0.032$ and decay corrected to approximate midpoint of NTS testing.
[c] Data are suspect.

Table 8. Comparison of CDB cumulative in [illegible]-dose estimates with [illegible] soil sample-based estimates (per house).

COUNTY	TOWN	CDB[a]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Grand Junction	1732	[illegible]

[a] Concentration density, [illegible]
[b] [illegible] values [illegible] [illegible] [illegible]

APPENDIX A

THE COUNTY DATA BASE

The County Data Base as it was used by the ORERP researchers is provided on the following 44 pages. This data base was originally produced as a very large spreadsheet, and it is reproduced this way in this Appendix. The 142 counties or county segments are listed vertically, and the 52 nuclear events considered are listed horizontally in chronological order. All counties or county segments are listed for the first five nuclear events on the first four pages of the Appendix table; then the process is repeated for the next five nuclear events.

The County Data Base was developed for the purpose of providing input into dosimetry calculations, and the intent was for it to be an analogue of the Town Data Base (Thompson, 1990). Therefore, the values in the County Data Base consist of the external gamma-exposure-rate value in mR/hr at H + 12 hrs, the estimated time of arrival of the cloud in hrs post event, and expressions of uncertainty for each. Thus, although the County Data Base was developed from estimates of Cs-deposition density, the tabulated values are of external gamma-exposure rate. Fortunately, the conversion factor was generally one, if the Cs-deposition density was provided in units of nCi/m^2. If the correct conversion factor was more than 20% different from one, a correction was made using the values in Hicks (1981).

In the listing of the County Data Base, the following abbreviations are used.

BJ	Operation Buster-Jangle
TS	Operation Tumbler-Snapper
H12	External gamma-exposure rate at H + 12 hrs, mR/hr
GSD	Geometric standard deviation for H12, no units
TOA	Time of cloud arrival following detonation, hrs
ASD	Arithmetic standard deviation for TOA, hrs

	BJ-CHARLIE				SUGAR				UNCLE				TS-ABLE				TS-BAKER			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH																				
Box Elder-Rosette	0				0.1	1.7	13	2.6	0.03	1.7	22	4.4	0.01	1.7	22	4.4	0.07	1.7	84	17
Box Elder-Tremonton	0				0.05	1.7	12	2.4	0.02	1.7	21	4.2	0.07	1.7	20	4.0	0.03	1.7	84	17
Tooele-West	0				0.1	1.5	10	2.0	0.07	1.5	20	4.0	0.01	1.7	20	4.0	0.07	1.7	80	16
Tooele-East	0				0.03	1.7	11	2.2	0.03	1.7	21	4.2	0.14	1.7	20	2.0	0.04	1.7	84	17
Juab	0				0.2	1.7	6	0.6	0.04	1.7	18	3.6	0.07	1.7	18	3.6	0.14	1.7	72	7.2
Millard	0				0				0.02	1.5	16	3.2	0.14	1.7	15	1.5	0.14	1.7	72	7.2
Beaver	0				0				0				0.43	1.7	12	1.2	0.07	1.7	72	14
Iron-Cedar City	0				0				0				0				0.04	1.7	72	14
Iron-Modena	0				0				0				0				0.14	1.7	72	7.2
Iron-Parowan	0				0				0				0.07	1.9	12	2.4	0.06	1.7	72	14
Cache	0				0.01	1.7	14	2.8	0.01	1.7	21	4.2	0.07	1.7	22	4.4	0.01	1.7	72	14
Rich	0				0.01	1.7	14	2.8	0.01	1.7	21	4.2	0.07	1.7	22	4.4	0			
Weber	0				0.01	1.7	14	2.8	0.01	1.5	21	4.2	0.07	1.7	22	4.4	0			
Morgan	0				0.01	1.7	13	2.6	0.01	1.5	21	4.2	0.07	1.7	22	4.4	0			
Davis	0				0.01	1.7	13	2.6	0.01	1.5	21	4.2	0.11	1.7	22	2.2	0			
Salt Lake	0				0.01	1.5	13	2.6	0.01	1.5	21	4.2	0.14	1.5	21	2.1	0			
Summit	0				0.01	1.7	14	2.8	0.01	1.7	22	4.4	0.10	1.7	22	2.2	0			
Daggett	0				0				0.01	1.7	22	4.4	0.06	1.7	24	4.8	0			
Utah	0				0				0.01	1.5	23	4.6	0.21	1.7	18	1.8	0.14	1.9	72	7.2
Wasatch	0				0				0.01	1.7	22	4.4	0.17	1.7	21	2.1	0			
Duchesne	0				0				0.01	1.7	23	4.6	0.07	1.7	23	4.6	0			
Uintah	0				0				0.01	1.7	23	4.6	0.06	1.7	24	4.8	0			
Carbon	0				0				0				0.29	1.7	18	1.8	0			
Sanpete	0				0				0				0.29	1.7	15	1.5	0.07	1.7	72	14
Sevier	0				0				0				0.29	1.7	15	1.5	0.04	1.7	72	14
Emery	0				0				0				0.21	1.7	18	1.8	0			
Grand	0				0				0				0.10	1.7	24	2.4	0			
Piute	0				0				0				0.29	1.7	14	1.4	0.03	1.7	72	14
Wayne	0				0				0				0.14	1.7	18	1.8	0			
Garfield	0				0				0				0				0			
Kane-Kanab	0				0				0				0				0.06	1.9	72	14
Kane-Orderville	0				0				0				0				0.06	1.7	72	14
San Juan	0				0				0				0				0			
OREGON																				
Malheur	0				0.2	1.7	13	1.3	0.01	1.7	27	5.4	0				0.04	1.7	84	17
Harney	0				0.2	1.7	13	1.3	0				0				0			

	BJ-CHARLIE				SUGAR				UNCLE				TS-ABLE				TS-BAKER			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA																				
Mohave-Littlefield	0				0				0				0				0.07	1.9	20	4.0
Mohave-Kingman	0				0				0				0				1.4	1.9	10	1.0
Mohave-Moccasin	0				0				0				0				0.07	1.9	18	3.6
Coconino-Fredonia	0				0				0				0				0.07	1.9	20	4.0
Coconino-Rim/TubaCty	0				0				0				0				0.06	1.7	108	22
Coconino-Flag/Williams	0				0				0				0				0.07	1.5	108	22
Navajo	0				0				0				0				0.03	1.9	108	22
Apache	0				0				0				0				0.03	1.9	108	22
Yavapai	0				0				0				0				0.57	1.9	20	2.0
Gila	0				0				0				0				0.07	1.7	108	22
Yuma	0				0				0				0				0.16	1.5	108	11
Maricopa	0				0				0				0				0.16	1.7	108	11
Pinal	0				0				0				0				0.16	1.7	108	11
Graham	0				0				0				0				0.07	1.7	108	22
Greenlee	0				0				0				0				0.07	1.7	108	22
Pima	0				0				0				0				0.17	1.5	108	11
Santa Cruz	0				0				0				0				0.17	1.7	108	11
Cochise	0				0				0				0				0.07	1.7	108	22
IDAHO																				
Bear Lake	0				0.01	1.7	14	2.8	0.01	1.7	25	5.0	0.04	1.7	76	15	0.01	1.7	108	22
Caribou	0				0.01	1.7	14	2.8	0.01	1.7	25	5.0	0.04	1.7	76	15	0.01	1.7	106	21
Bonneville	0				0.01	1.7	14	2.8	0.01	1.7	25	5.0	0.01	1.7	80	16	0.01	1.7	104	21
Bingham	0				0.01	1.7	14	2.8	0.01	1.7	27	5.4	0.01	1.7	80	16	0.01	1.7	104	21
Bannock	0				0.02	1.5	14	2.8	0.01	1.5	27	5.4	0.01	1.5	80	16	0.01	1.5	102	20
Franklin	0				0.01	1.7	14	2.8	0.01	1.7	27	5.4	0.01	1.7	80	16	0.01	1.7	102	20
Oneida	0				0.02	1.7	14	2.8	0.01	1.7	27	5.4	0.01	1.7	80	16	0.03	1.7	100	20
Power	0				0.02	1.7	14	2.8	0.01	1.7	27	5.4	0.01	1.7	80	16	0.03	1.7	100	20
Cassia	0				0.1	1.5	14	2.8	0.02	1.7	27	5.4	0.01	1.7	80	16	0.14	1.7	96	9.6
Minidoka	0				0.1	1.7	14	2.8	0.01	1.7	27	5.4	0.01	1.7	80	16	0.07	1.7	100	20
Lincoln	0				0.1	1.7	14	2.8	0.01	1.7	27	5.4	0.01	1.7	80	16	0.10	1.7	100	20
Jerome	0				0.1	1.7	15	3.0	0.01	1.7	27	5.4	0.01	1.7	80	16	0.11	1.7	100	10
Twin Falls	0				0.2	1.7	15	1.5	0.02	1.7	22	4.4	0				0.14	1.7	84	8.4
Gooding	0				0.2	1.7	15	1.5	0.01	1.7	23	4.6	0				0.11	1.7	84	8.4
Elmore	0				0.5	1.7	15	1.5	0.01	1.7	24	4.8	0				0.10	1.7	84	17
Ada	0				0.7	1.5	16	1.6	0.01	1.5	24	4.8	0				0.10	1.5	84	17
Canyon	0				0.5	1.7	16	1.6	0.01	1.7	24	4.8	0				0.09	1.7	84	17
Owyhee	0				1	1.7	14	1.4	0.02	1.7	24	4.8	0				0.14	1.7	84	8.4

	BJ-CHARLIE				SUGAR				UNCLE				TS-ABLE				TS-BAKER			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO																				
Montezuma	0				0				0				0				0			
La Plata	0				0				0				0				0			
Dolores	0				0				0				0				0			
San Juan	0				0				0				0				0			
San Miguel	0				0				0				0				0			
Ouray	0				0				0				0				0			
Montrose	0				0				0				0.03	1.7	30	6.0	0			
Delta	0				0				0				0.04	1.7	30	6.0	0			
Mesa	0				0				0				0.04	1.5	30	6.0	0			
Garfield	0				0				0				0.04	1.7	30	6.0	0			
Rio Blanco	0				0				0				0.04	1.7	30	6.0	0			
Moffat	0				0				0				0.04	1.7	30	6.0	0			
WYOMING																				
Uinta	0				0.01	1.7	15	3.0	0.03	1.7	24	4.8	0.10	1.7	32	3.2	0			
Sweetwater	0				0				0.03	1.5	24	4.8	0.04	1.5	32	6.4	0			
Carbon	0				0				0.02	1.7	24	4.8	0.07	1.7	32	6.4	0			
Fremont	0				0				0.01	1.7	24	4.8	0.06	1.7	32	6.4	0			
Sublette	0				0				0.01	1.7	24	4.8	0.04	1.7	32	6.4	0			
Lincoln	0				0.01	1.7	14	2.8	0.01	1.7	24	4.8	0.03	1.7	32	6.4	0.01	1.7	108	22
NEVADA																				
Washoe	0				0.01	1.7	16	3.2	0				0				0.03	1.5	80	16
Humboldt	0				0.3	1.7	12	1.2	0				0				0			
Elko	0				1.2	1.5	8	0.8	0.1	1.5	18	3.6	0				0.09	1.5	85	17
White Pine-Lund/Prstn	0				0.45	1.5	3	0.3	1	1.5	6	0.6	0.14	1.9	10	1.0	0.28	1.9	48	4.8
White Pine-Baker	0				0.4	1.7	4	0.4	0.3	1.7	7	0.7	0.14	1.9	10	1.0	0.14	1.9	48	4.8
White Pine-Ely	0				0.45	1.5	4	0.4	0.53	1.5	7	0.7	0.07	1.9	12	2.4	0.14	1.9	48	4.8
Lander-Battle Mountain	0				0.6	1.7	5	0.5	0				0				0.04	1.7	56	11
Lander-Austin	0				0.08	1.7	4	0.8	0				0				0.07	1.7	52	10
Eureka	0				1.2	1.5	4	0.4	0.05	1.7	9	1.8	0				0.21	1.7	56	5.6
Pershing	0				0.2	1.7	8	0.8	0				0				0.03	1.7	64	13
Churchill	0				0.03	1.7	10	2.0	0				0				0.04	1.7	70	14
Ormsby	0				0				0				0				0.03	1.7	72	14
Storey	0				0				0				0				0.03	1.7	70	14
Lyon	0				0				0				0				0.03	1.7	70	14
Douglas	0				0				0				0				0.03	1.7	70	14
Mineral	0				0				0				0				0.01	1.7	70	14

	BJ-CHARLIE				SUGAR				UNCLE				TS-ABLE				TS-BAKER			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO																				
San Juan	0				0				0				0				0			
McKinley	0				0				0				0				0.01	1.7	108	22
Valencia	0				0				0				0				0.01	1.7	108	22
Catron	0				0				0				0				0.03	1.7	108	22
Grant	0				0				0				0				0.03	1.7	108	22
Hidalgo	0				0				0				0				0.03	1.7	108	22
Rio Arriba	0				0				0				0				0			
Los Alamos	0				0				0				0				0			
Sandoval	0				0				0				0				0			
Bernalillo	0				0				0				0				0.01	1.5	108	22
Socorro	0				0				0				0				0.01	1.7	108	22
Sierra	0				0				0				0				0.03	1.7	108	22
Luna	0				0				0				0				0.03	1.7	108	22
Dona Ana	0				0				0				0				0.03	1.7	108	22
Taos	0				0				0				0				0			
Santa Fe	0				0				0				0				0			
Torrance	0				0				0				0				0			
Lincoln	0				0				0				0				0			
Otero	0				0				0				0				0			
Colfax	0				0				0				0				0			
Mora	0				0				0				0				0			
San Miguel	0				0				0				0				0			
Guadalupe	0				0				0				0				0			
De Baca	0				0				0				0				0			
Chaves	0				0				0				0				0			
Eddy	0				0				0				0				0			
Union	0				0				0				0				0			
Harding	0				0				0				0				0			
Quay	0				0				0				0				0			
Curry	0				0				0				0				0			
Roosevelt	0				0				0				0				0			
Lea	0				0				0				0				0			
CALIFORNIA																				
Mono	0				0				0				0				0			
Inyo-Bishop	0				0				0				0				0.04	1.7	12	2.4
Inyo-Furnace Creek	0.65	1.9	4	0.4	0				0				0				1.4	1.9	9	0.9
San Bernardino	0				0				0				0				0.71	1.7	12	1.2
Los Angeles	0.65	1.9	8	0.8	0				0				0				0.21	1.5	24	2.4

	TS-CHARLIE				TS-DOG				TS-EASY				TS-FOX				TS-GEORGE			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH																				
Box Elder-Rosette	0.03	1.7	100	20	0				1	1.7	7	0.7	0.1	1.7	30	6.0	1.5	1.7	12	1.2
Box Elder-Tremonton	0				0				5	1.7	7	0.7	0.2	1.7	30	3.0	0.4	1.7	12	1.2
Tooele-West	0.04	1.7	100	20	0				11	1.5	6	0.6	0.2	1.7	18	1.8	0.2	1.7	9	0.9
Tooele-East	0				0.01	1.7	28	5.6	5	1.7	6	0.6	0.2	1.7	18	1.8	0.1	1.7	9	1.8
Juab	0.07	1.7	100	20	0.01	1.7	18	3.6	2	1.7	6	0.6	0.6	1.7	12	1.2	0.1	1.7	6	1.2
Millard	0.05	1.7	100	20	0.05	1.7	16	3.2	2	1.9	5	0.5	1.3	1.7	13	1.3	0.3	1.7	4	0.4
Beaver	0.03	1.7	100	20	0.06	1.7	15	3.0	0.4	1.7	3	0.3	1.3	1.7	14	1.4	0.2	1.7	23	2.3
Iron-Cedar City	0.01	1.7	100	20	0.05	1.7	14	2.8	0.05	1.9	3	0.6	0.6	1.5	13	1.3	0.15	1.7	24	2.4
Iron-Modena	0				0.13	1.9	13	1.3	0.4	1.7	3	0.3	5.8	1.5	11	1.1	0.15	1.7	24	2.4
Iron-Parowan	0				0.08	1.9	14	2.8	0.05	1.9	3	0.6	1.5	1.5	13	1.3	0.15	1.7	24	2.4
Cache	0.03	1.7	100	20	0.01	1.7	30	6.0	4	1.7	7	0.7	0.1	1.7	30	6.0	0.5	1.7	10	1.0
Rich	0.03	1.7	100	20	0.01	1.7	30	6.0	5	1.7	7	0.7	0.1	1.7	24	4.8	0.3	1.7	10	1.0
Weber	0.05	1.7	100	20	0.01	1.7	30	6.0	5	1.7	7	0.7	0.2	1.7	18	1.8	0.1	1.7	9	1.8
Morgan	0.05	1.7	100	20	0.01	1.7	30	6.0	4.5	1.7	7	0.7	0.2	1.7	18	1.8	0.1	1.7	8	1.6
Davis	0.05	1.7	100	20	0.01	1.7	30	6.0	4.5	1.7	7	0.7	0.2	1.7	18	1.8	0.1	1.7	8	1.6
Salt Lake	0.05	1.5	100	20	0.01	1.5	30	6.0	4	1.5	6	0.6	0.23	1.5	15	1.5	0.05	1.5	8	1.6
Summit	0.03	1.7	100	20	0.01	1.7	30	6.0	4	1.7	7	0.7	0.4	1.7	18	1.8	0.3	1.7	9	0.9
Daggett	0.01	1.7	100	20	0.01	1.7	32	6.4	0.2	1.7	8	0.8	0.4	1.7	20	2.0	0.1	1.7	9	1.8
Utah	0.04	1.7	100	20	0.01	1.7	28	5.6	4	1.7	6	0.6	0.5	1.7	12	1.2	0.1	1.9	15	3.0
Wasatch	0.03	1.7	100	20	0.01	1.7	30	6.0	3	1.7	6.5	0.7	0.4	1.7	18	1.8	0.1	1.9	18	3.6
Duchesne	0.01	1.7	100	20	0.01	1.7	32	6.4	0.2	1.7	8	0.8	0.5	1.7	19	1.9	0.2	1.9	24	2.4
Uintah	0.01	1.7	100	20	0.01	1.7	36	7.2	0.08	1.7	8	1.6	0.7	1.7	20	2.0	0.2	1.9	30	3.0
Carbon	0.01	1.7	100	20	0.01	1.7	36	7.2	0.05	1.7	8	1.6	0.8	1.7	19	1.9	0.4	1.9	24	2.4
Sanpete	0.03	1.7	100	20	0.04	1.7	20	4.0	1	1.9	8	0.8	0.7	1.7	15	1.5	0.4	1.9	22	2.2
Sevier	0.01	1.7	100	20	0.04	1.7	20	4.0	0.05	1.7	6	1.2	1	1.7	14	1.4	0.4	1.9	22	2.2
Emery	0.01	1.7	100	20	0.04	1.7	48	9.6	0.05	1.7	7	1.4	1	1.7	16	1.6	0.6	1.9	27	2.7
Grand	0.01	1.7	100	20	0.04	1.7	48	9.6	0.06	1.7	8	1.6	0.9	1.7	17	1.7	0.8	1.9	32	3.2
Piute	0.01	1.7	100	20	0.04	1.7	36	7.2	0.06	1.7	7	1.4	1	1.7	14	1.4	0.3	1.9	22	2.2
Wayne	0.01	1.7	100	20	0.04	1.7	48	9.6	0.02	1.7	7	1.4	0.9	1.7	14	1.4	0.5	1.9	30	3.0
Garfield	0.01	1.7	100	20	0.03	1.7	36	7.2	0.04	1.7	8	1.6	0.8	1.5	14	1.4	0.15	1.9	30	3.0
Kane-Kanab	0.07	1.7	100	20	0.03	1.7	30	6.0	0				0.6	1.7	12	1.2	0.15	1.9	36	3.6
Kane-Orderville	0.04	1.7	100	20	0.03	1.7	20	4.0	0				0.6	1.7	12	1.2	0.15	1.9	36	3.6
San Juan	0.03	1.7	100	20	0.03	1.7	36	7.2	0				0.6	1.7	18	1.8	0.15	1.9	36	3.6
OREGON																				
Malheur	0				0				0.02	1.7	8	1.6	0.04	1.7	96	19	0.1	1.7	42	8.4
Harney	0				0				0.01	1.7	8	1 6	0.03	1.7	96	19	0.1	1.7	42	8.4

	TS-CHARLIE				TS-DOG				TS-EASY				TS-FOX				TS-GEORGE			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA																				
Mohave-Littlefield	0.20	1.7	6	0.6	0.06	1.9	12	2.4	0				0.5	1.7	12	1.2	0.3	1.9	40	4.0
Mohave-Kingman	0.07	1.7	6	1.2	0.06	1.9	11	2.2	0				0.2	1.7	12	1.2	0.3	1.9	40	4.0
Mohave-Moccasin	0.07	1.7	7	1.4	0.06	1.9	13	2.6	0				0.5	1.7	12	1.2	0.3	1.9	40	4.0
Coconino-Fredonia	0.07	1.7	8	1.6	0.05	1.7	18	3.6	0				0.5	1.7	12	1.2	0.2	1.9	40	4.0
Coconino-Rim/TubaCty	0.13	1.7	24	2.4	0.06	1.7	18	3.6	0				0.5	1.7	20	2.0	0.2	1.9	40	4.0
Coconino-Flag/Williams	0.21	1.5	50	5.0	0.05	1.5	30	6.0	0.02	1.7	8	1.6	0.5	1.5	20	2.0	0.2	1.9	40	4.0
Navajo	0.13	1.7	56	5.6	0.05	1.7	36	7.2	0.01	1.7	8	1.6	0.5	1.7	22	2.2	0.3	1.9	40	4.0
Apache	0.13	1.7	60	6.0	0.05	1.7	40	8.0	0.01	1.7	8	1.6	0.5	1.7	24	2.4	0.5	1.9	40	4.0
Yavapai	0.13	1.7	52	5.2	0.04	1.7	36	7.2	0				0.3	1.7	30	3.0	0.3	1.9	40	4.0
Gila	0.07	1.7	60	12	0.03	1.7	50	10	0				0.4	1.7	50	5.0	0.3	1.9	40	4.0
Yuma	0.01	1.5	60	12	0				0				0.02	1.5	100	20	0.03	1.5	40	8.0
Maricopa	0.03	1.7	56	11	0.01	1.7	50	10	0				0.2	1.7	40	4.0	0.3	1.9	40	4.0
Pinal	0.03	1.7	60	12	0.01	1.7	80	16	0				0.4	1.7	60	6.0	0.3	1.9	40	4.0
Graham	0.03	1.7	68	14	0.03	1.7	80	16	0				0.4	1.7	50	5.0	0.4	1.9	40	4.0
Greenlee	0.04	1.7	68	14	0.03	1.7	80	16	0				0.4	1.7	50	5.0	0.4	1.9	40	4.0
Pima	0.01	1.5	64	13	0.01	1.5	100	20	0				0.38	1.5	80	8.0	0.4	1.5	40	4.0
Santa Cruz	0.01	1.7	64	13	0.01	1.7	100	20	0				0.4	1.7	80	8.0	0.3	1.9	40	4.0
Cochise	0.01	1.7	70	14	0.01	1.7	100	20	0				0.4	1.7	80	8.0	0.4	1.9	40	4.0
IDAHO																				
Bear Lake	0.01	1.7	100	20	0.01	1.7	32	6.4	2	1.7	7	0.7	0.05	1.7	60	12	0.7	1.7	15	1.5
Caribou	0.01	1.7	100	20	0.01	1.7	32	6.4	1	1.7	7	0.7	0.03	1.7	60	12	0.6	1.7	16	1.6
Bonneville	0.01	1.7	100	20	0.01	1.7	34	6.8	0.5	1.7	7	0.7	0.02	1.7	60	12	0.5	1.7	18	1.8
Bingham	0.01	1.7	100	20	0.01	1.7	36	7.2	0.2	1.7	7	0.7	0.02	1.7	60	12	0.5	1.7	17	1.7
Bannock	0.01	1.5	100	20	0.01	1.5	36	7.2	0.6	1.5	7	0.7	0.02	1.5	60	12	0.6	1.5	17	1.7
Franklin	0.01	1.7	100	20	0.01	1.7	36	7.2	2	1.7	7	0.7	0.05	1.7	60	12	0.8	1.7	16	1.6
Oneida	0.01	1.7	100	20	0.01	1.7	36	7.2	2	1.7	7	0.7	0.1	1.7	48	9.6	1	1.7	13	1.3
Power	0.01	1.7	100	20	0.01	1.7	36	7.2	0.6	1.7	7	0.7	0.02	1.7	60	12	0.6	1.7	14	1.4
Cassia	0.01	1.7	100	20	0				0.3	1.7	8	0.8	0.1	1.7	36	7.2	1	1.7	11	1.1
Minidoka	0.01	1.7	100	20	0				0.3	1.7	8	0.8	0.05	1.7	48	9.6	0.5	1.7	12	1.2
Lincoln	0.01	1.7	100	20	0				0.2	1.7	8	0.8	0.05	1.7	48	9.6	0.3	1.7	15	1.5
Jerome	0.01	1.7	100	20	0				0.2	1.7	8	0.8	0.07	1.7	48	9.6	0.6	1.7	14	1.4
Twin Falls	0.01	1.7	100	20	0				0.2	1.7	9	0.9	0.1	1.7	24	4.8	1	1.7	15	1.5
Gooding	0				0				0.1	1.7	10	2.0	0.06	1.7	60	12	0.3	1.7	18	1.8
Elmore	0				0				0.09	1.7	10	2.0	0.05	1.7	60	12	0.2	1.7	21	2.1
Ada	0				0				0.09	1.5	5	1.0	0.03	1.5	60	12	0.2	1.5	40	4.0
Canyon	0				0				0.05	1.7	6	1.2	0.03	1.7	60	12	0.1	1.7	42	8.4
Owyhee	0				0				0.1	1.7	7	1.4	0.07	1.7	60	12	0.2	1.7	42	4.2

	TS-CHARLIE				TS-DOG				TS-EASY				TS-FOX				TS-GEORGE			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO																				
Montezuma	0.03	1.7	100	20	0.04	1.7	42	8.4	0				0.5	1.7	18	1.8	0.5	1.9	40	4.0
La Plata	0.03	1.7	100	20	0.04	1.7	44	8.8	0				0.5	1.7	18	1.8	1	1.9	40	4.0
Dolores	0.01	1.7	100	20	0.04	1.7	56	11	0				0.5	1.7	18	1.8	0.5	1.9	40	4.0
San Juan	0.01	1.7	100	20	0.04	1.7	56	11	0				0.5	1.7	18	1.8	0.5	1.9	40	4.0
San Miguel	0.01	1.7	100	20	0.04	1.7	56	11	0				0.5	1.7	18	1.8	0.6	1.9	40	4.0
Ouray	0.01	1.7	100	20	0.04	1.7	56	11	0				0.5	1.7	18	1.8	0.5	1.9	40	4.0
Montrose	0.01	1.7	100	20	0.04	1.7	56	11	0.02	1.7	10	2.0	0.6	1.7	18	1.8	1.5	1.9	40	4.0
Delta	0.01	1.7	100	20	0.04	1.7	56	11	0.03	1.7	10	2.0	0.7	1.7	18	1.8	0.8	1.7	40	4.0
Mesa	0.01	1.5	100	20	0.03	1.5	56	11	0.07	1.5	10	2.0	0.8	1.5	18	1.8	0.9	1.5	36	3.6
Garfield	0.01	1.7	100	20	0.03	1.7	56	11	0.05	1.7	9	1.8	0.8	1.7	19	1.9	0.5	1.7	36	3.6
Rio Blanco	0.01	1.7	100	20	0.03	1.7	56	11	0.04	1.7	8	1.6	0.7	1.7	19	1.9	0.3	1.9	40	4.0
Moffat	0.01	1.7	100	20	0.03	1.7	56	11	0.06	1.7	8	1.6	0.7	1.7	21	2.1	0.2	1.9	48	4.8
WYOMING																				
Uinta	0.01	1.7	100	20	0.01	1.7	30	6.0	3	1.7	8	0.8	0.15	1.7	20	2.0	0.1	1.7	48	9.6
Sweetwater	0.01	1.5	100	20	0.01	1.5	30	6.0	0.3	1.5	8	0.8	0.06	1.5	21	4.2	0.2	1.5	55	5.5
Carbon	0.01	1.7	100	20	0.01	1.7	30	6.0	0.4	1.7	10	1.0	0.7	1.7	24	2.4	0.2	1.7	60	6.0
Fremont	0.01	1.7	100	20	0.01	1.7	30	6.0	3	1.7	10	1.0	0.1	1.7	24	4.8	0.4	1.7	18	1.8
Sublette	0.01	1.7	100	20	0.01	1.7	30	6.0	3	1.7	9	0.9	0.04	1.7	23	4.6	0.4	1.7	15	1.5
Lincoln	0.01	1.7	100	20	0.01	1.7	30	6.0	2	1.7	8	0.8	0.02	1.7	22	4.4	0.4	1.7	12	1.2
NEVADA																				
Washoe	0.10	1.5	61	6.1	0				0.04	1.5	7	1.4	0.1	1.5	6	1.2	0.2	1.5	36	3.6
Humboldt	0				0				0.01	1.5	7	1.4	0.05	1.7	5	1.0	0.1	1.7	36	7.2
Elko	0.03	1.5	85	17	0				0.3	1.5	7	0.7	0.16	1.5	6	0.6	2.1	1.5	10	1.0
White Pine-Lund/Prstn	0.07	1.7	68	14	0				4.2	1.5	3	0.3	0.2	1.9	3	0.3	0.1	1.9	8	1.6
White Pine-Baker	0.07	1.7	68	14	0				4	1.7	4	0.4	0.2	1.9	3	0.3	0.1	1.9	8	1.6
White Pine-Ely	0.07	1.7	68	14	0				4.6	1.5	4	0.4	0.2	1.9	3	0.3	0.1	1.9	8	1.6
Lander-Battle Mountain	0				0				0.05	1.7	5	1.0	0.1	1.9	5	1.0	0.1	1.9	6	1.2
Lander-Austin	0				0				0.05	1.7	5	1.0	0.2	1.9	5	0.5	0.2	1.9	6	0.6
Eureka	0.03	1.7	68	14	0				0.2	1.7	5	0.5	0.2	1.9	4	0.4	2.6	1.5	6	0.6
Pershing	0				0				0.02	1.7	8	1.6	0.08	1.9	6	1.2	0.1	1.9	40	8.0
Churchill	0				0				0.03	1.7	8	1.6	0.2	1.9	6	0.6	0.1	1.9	36	7.2
Ormsby	0.10	1.7	60	6.0	0				0.04	1.7	8	1.6	0.14	1.9	6	0.6	0.1	1.9	40	8.0
Storey	0.10	1.7	60	6.0	0				0.04	1.7	8	1.6	0.14	1.9	6	0.6	0.1	1.9	40	8.0
Lyon	0.10	1.7	60	6.0	0				0.03	1.7	8	1.6	0.14	1.9	6	0.6	0.1	1.9	40	8.0
Douglas	0.10	1.7	60	6.0	0				0.03	1.7	8	1.6	0.1	1.9	6	1.2	0.1	1.9	40	8.0
Mineral	0.08	1.7	60	12	0				0.03	1.7	8	1.6	0.1	1.9	6	1.2	0.1	1.9	40	8.0

	TS-CHARLIE				TS-DOG				TS-EASY				TS-FOX				TS-GEORGE			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO																				
San Juan	0.07	1.7	100	20	0.05	1.7	42	8.4	0				0.5	1.7	24	2.4	0.4	1.9	40	4.0
McKinley	0.10	1.7	100	10	0.05	1.7	42	8.4	0				0.5	1.7	30	3.0	0.5	1.9	40	4.0
Valencia	0.07	1.7	100	20	0.05	1.7	48	9.6	0				0.5	1.7	30	3.0	0.4	1.9	40	4.0
Catron	0.03	1.7	100	20	0.04	1.7	50	10	0				0.4	1.7	50	5.0	0.4	1.9	40	4.0
Grant	0.03	1.7	100	20	0.03	1.7	90	18	0				0.4	1.7	70	7.0	0.4	1.9	40	4.0
Hidalgo	0.01	1.7	100	20	0.01	1.7	100	20	0				0.4	1.7	80	8.0	0.4	1.9	40	4.0
Rio Arriba	0.04	1.7	100	20	0.03	1.7	48	9.6	0				0.4	1.7	30	3.0	0.4	1.9	40	4.0
Los Alamos	0.04	1.7	100	20	0.03	1.7	50	10	0				0.5	1.7	30	3.0	0.4	1.9	40	4.0
Sandoval	0.05	1.7	100	20	0.04	1.7	50	10	0				0.5	1.7	30	3.0	0.4	1.9	40	4.0
Bernalillo	0.05	1.5	100	20	0.03	1.5	60	12	0				0.45	1.5	40	4.0	0.4	1.5	40	4.0
Socorro	0.04	1.7	100	20	0.03	1.7	60	12	0				0.4	1.7	50	5.0	0.4	1.9	40	4.0
Sierra	0.01	1.7	100	20	0.03	1.7	90	18	0				0.6	1.7	70	7.0	0.4	1.9	40	4.0
Luna	0.01	1.7	100	20	0.01	1.7	90	18	0				0.4	1.7	80	8.0	0.4	1.9	40	4.0
Dona Ana	0.01	1.7	100	20	0.01	1.7	90	18	0				0.4	1.7	80	8.0	0.4	1.9	40	4.0
Taos	0.03	1.7	100	20	0.01	1.7	60	12	0				0.4	1.7	36	3.6	0.4	1.9	40	4.0
Santa Fe	0.03	1.7	100	20	0.03	1.7	60	12	0				0.4	1.7	40	4.0	0.4	1.9	40	4.0
Torrance	0.03	1.7	100	20	0.03	1.7	70	14	0				0.3	1.7	50	5.0	0.4	1.9	40	4.0
Lincoln	0.03	1.7	100	20	0.04	1.7	70	14	0				0.3	1.7	60	6.0	0.4	1.9	40	4.0
Otero	0.01	1.7	100	20	0.03	1.7	90	18	0				0.3	1.7	80	8.0	0.4	1.9	40	4.0
Colfax	0				0				0				0.3	1.7	40	4.0	0.2	1.9	40	4.0
Mora	0.01	1.7	100	20	0.01	1.7	80	16	0				0.3	1.7	40	4.0	0.4	1.9	40	4.0
San Miguel	0.01	1.7	100	20	0.01	1.7	80	16	0				0.3	1.7	50	5.0	0.4	1.9	40	4.0
Guadalupe	0.03	1.7	100	20	0.03	1.7	70	14	0				0.3	1.7	50	5.0	0.4	1.9	40	4.0
De Baca	0.03	1.7	100	20	0.04	1.7	80	16	0				0.3	1.7	60	6.0	0.4	1.9	40	4.0
Chaves	0.03	1.5	100	20	0.04	1.5	80	16	0				0.22	1.5	60	6.0	0.4	1.5	40	4.0
Eddy	0.01	1.7	100	20	0.04	1.7	100	20	0				0.2	1.7	80	8.0	0.4	1.9	40	4.0
Union	0				0				0				0.3	1.7	50	5.0	0.1	1.9	40	8.0
Harding	0.01	1.9	100	20	0.01	1.7	80	16	0				0.3	1.7	50	5.0	0.2	1.9	40	4.0
Quay	0.01	1.9	100	20	0.01	1.7	80	16	0				0.3	1.7	50	5.0	0.2	1.9	40	4.0
Curry	0.01	1.9	100	20	0.03	1.7	80	16	0				0.2	1.7	60	6.0	0.2	1.9	40	4.0
Roosevelt	0.03	1.9	100	20	0.04	1.7	80	16	0				0.2	1.7	60	6.0	0.2	1.9	40	4.0
Lea	0.01	1.9	100	20	0.04	1.7	100	20	0				0.2	1.7	80	8.0	0.2	1.9	40	4.0
CALIFORNIA																				
Mono	0.13	1.7	12	1.2	0				0.02	1.7	6	1.2	0.05	1.9	96	19	0.2	1.9	36	3.6
Inyo-Bishop	0.13	1.7	12	1.2	0				0.02	1.7	6	1.2	0.03	1.9	96	19	0.2	1.9	6	0.6
Inyo-Furnace Creek	0.13	1.7	12	1.2	0				0.02	1.7	6	1.2	0.03	1.9	96	19	1	1.9	6	0.6
San Bernardino	0.10	1.7	15	1.5	0				0.02	1.7	6	1.2	0.03	1.9	96	19	0			
Los Angeles	0.05	1.5	36	7.2	0				0.02	1.7	6	1.2	0.02	1.5	96	19	0.01	1.5	40	8.0

	TS-HOW				ANNIE				NANCY				RUTH				RAY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH																				
Box Elder-Rosette	1.5	1.7	13	1.3	0				1	1.7	18	1.8	0				0			
Box Elder-Tremonton	0.2	1.7	13	1.3	0				5	1.7	18	1.8	0				0			
Tooele-West	0.4	1.7	13	1.3	0				1.4	1.5	12	1.2	0				0			
Tooele-East	0.2	1.7	13	1.3	0				7	1.7	12	1.2	0				0			
Juab	0.03	1.7	9	1.8	0				0.1	1.7	10	2.0	0				0			
Millard	0.01	1.7	8	1.6	0				0.01	1.7	12	2.4	0.01	1.7	36	7.2	0			
Beaver	0.01	1.7	12	2.4	0.01	1.5	5	1.0	0				0.01	1.5	36	7.2	0.06	1.5	30	6.0
Iron-Cedar City	0.01	1.7	15	3.0	0.05	1.7	4	0.8	0				0.02	1.7	24	4.8	0.06	1.9	30	6.0
Iron-Modena	0.01	1.7	15	3.0	0				0				0.02	1.7	24	4.8	0.06	1.9	20	4.0
Iron-Parowan	0.01	1.7	15	3.0	0				0				0.02	1.7	24	4.8	0.05	1.9	30	6.0
Cache	0.3	1.7	17	1.7	0				6	1.7	16	1.6	0				0			
Rich	0.15	1.7	20	2.0	0				7	1.7	17	1.7	0				0			
Weber	0.15	1.7	15	1.5	0				8	1.5	14	1.4	0				0			
Morgan	0.13	1.7	16	1.6	0				8	1.7	12	1.2	0				0			
Davis	0.15	1.7	16	1.6	0				8	1.7	13	1.3	0				0			
Salt Lake	0.15	1.5	15	1.5	0				7	1.5	12	1.2	0.01	1.5	100	20	0			
Summit	0.12	1.7	18	1.8	0				5	1.7	13	1.3	0				0			
Daggett	0.04	1.7	24	4.8	0				0.01	1.7	24	4.8	0				0			
Utah	0.04	1.7	15	3.0	0				1	1.9	13	1.3	0.01	1.7	100	20	0			
Wasatch	0.04	1.7	18	3.6	0				0.5	1.9	16	1.6	0.01	1.7	100	20	0			
Duchesne	0.04	1.7	18	3.6	0				0.01	1.7	24	4.8	0.01	1.7	100	20	0			
Uintah	0.04	1.7	22	4.4	0				0.01	1.7	24	4.8	0				0			
Carbon	0.02	1.7	18	3.6	0				0				0.01	1.7	100	20	0			
Sanpete	0.01	1.7	12	2.4	0				0.01	1.7	18	3.6	0.01	1.7	96	19	0			
Sevier	0.01	1.7	12	2.4	0				0.01	1.7	18	3.6	0.01	1.7	96	19	0.05	1.9	36	7.2
Emery	0.01	1.7	18	3.6	0				0.01	1.7	20	4.0	0.01	1.7	72	14	0.04	1.9	40	8.0
Grand	0.01	1.7	26	5.2	0				0.01	1.7	24	4.8	0.01	1.7	72	14	0.04	1.9	48	9.6
Piute	0.01	1.7	15	3.0	0				0				0.01	1.7	72	14	0.05	1.9	36	7.2
Wayne	0.01	1.7	18	3.6	0				0				0.01	1.7	72	14	0.05	1.9	36	7.2
Garfield	0.01	1.7	18	3.6	0				0				0				0.05	1.9	36	7.2
Kane-Kanab	0.01	1.7	21	4.2	0.1	1.7	6	1.2	0				0.05	1.7	24	4.8	0.05	1.9	36	7.2
Kane-Orderville	0.01	1.7	21	4.2	2.4	1.5	4	0.4	0				0				0.05	1.9	36	7.2
San Juan	0.01	1.7	24	4.8	0.7	1.7	8	0.8	0				0				0.02	1.9	48	9.6
OREGON																				
Malheur	0.2	1.7	13	1.3	0				0				0				0			
Harney	0.1	1.7	14	2.8	0				0				0				0			

	TS-HOW				ANNIE				NANCY				RUTH				RAY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA																				
Mohave-Littlefield	0				0.2	1.5	4	0.4	0				0.15	1.7	12	1.2	0.05	1.9	36	7.2
Mohave-Kingman	0				0				0				0.1	1.9	13	2.6	0.1	1.9	36	7.2
Mohave-Moccasin	0				0.1	1.7	4	0.8	0				0.05	1.7	12	2.4	0.05	1.7	36	7.2
Coconino-Fredonia	0				0.05	1.7	6	1.2	0				0.05	1.7	24	4.8	0.05	1.9	36	7.2
Coconino-Rim/TubaCty	0				0				0				0.1	1.7	22	4.4	0.05	1.9	44	8.8
Coconino-Flag/Williams	0				0				0				0.1	1.5	24	4.8	0.06	1.5	48	9.6
Navajo	0				0.1	1.7	7	1.4	0				0.06	1.7	56	11	0.04	1.7	51	10
Apache	0				0.3	1.7	8	0.8	0				0.04	1.7	56	11	0.03	1.7	54	11
Yavapai	0				0				0				0.15	1.7	36	3.6	0.06	1.7	45	9.0
Gila	0				0				0				0.2	1.7	46	4.6	0.02	1.7	50	10
Yuma	0				0				0				0				0.5	1.5	30	3.0
Maricopa	0				0				0				0.28	1.5	36	3.6	0.02	1.5	48	9.6
Pinal	0				0				0				0.15	1.7	46	4.6	0.02	1.7	50	10
Graham	0				0				0				0.1	1.7	56	11	0.02	1.7	50	10
Greenlee	0				0				0				0.05	1.7	60	12	0.02	1.7	60	12
Pima	0				0				0				0.04	1.5	46	9.2	0.01	1.7	48	9.6
Santa Cruz	0				0				0				0.01	1.7	46	9.2	0.02	1.7	48	9.6
Cochise	0				0				0				0.05	1.7	60	12	0.02	1.7	50	10
IDAHO																				
Bear Lake	0.2	1.7	18	1.8	0				5	1.7	18	1.8	0				0			
Caribou	0.4	1.7	18	1.8	0				2	1.7	20	2.0	0				0			
Bonneville	0.4	1.7	18	1.8	0				0.5	1.7	22	2.2	0				0			
Bingham	0.4	1.7	18	1.8	0				0.04	1.7	24	4.8	0				0			
Bannock	0.5	1.5	17	1.7	0				0.5	1.7	21	2.1	0				0			
Franklin	0.3	1.7	17	1.7	0				3	1.7	21	2.1	0				0			
Oneida	0.4	1.7	16	1.6	0				1	1.7	22	2.2	0				0			
Power	0.7	1.7	16	1.6	0				0.06	1.7	36	7.2	0				0			
Cassia	2	1.7	14	1.4	0				0.07	1.7	36	7.2	0				0			
Minidoka	2	1.7	14	1.4	0				0.04	1.7	36	7.2	0				0			
Lincoln	3	1.7	14	1.4	0				0.01	1.7	36	7.2	0				0			
Jerome	2	1.7	14	1.4	0				0.02	1.7	36	7.2	0				0			
Twin Falls	2	1.7	14	1.4	0				0.05	1.7	36	7.2	0				0			
Gooding	4	1.7	14	1.4	0				0.02	1.7	36	7.2	0				0			
Elmore	3	1.7	14	1.4	0				0.02	1.7	36	7.2	0				0			
Ada	3	1.5	12	1.2	0				0				0				0			
Canyon	1	1.7	13	1.3	0				0				0				0			
Owyhee	3	1.7	14	1.4	0				0.02	1.7	36	7.2	0				0			

	TS-HOW				ANNIE				NANCY				RUTH				RAY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO																				
Montezuma	0				0.55	1.5	10	1.0	0				0				0.02	1.7	60	12
La Plata	0				0.5	1.7	11	1.1	0				0				0.02	1.7	60	12
Dolores	0				0.1	1.9	12	2.4	0				0				0.02	1.7	60	12
San Juan	0				0.02	1.7	15	3.0	0				0				0.02	1.7	60	12
San Miguel	0				0.02	1.7	15	3.0	0.01	1.7	60	12	0				0.02	1.7	60	12
Ouray	0				0.02	1.7	15	3.0	0.01	1.7	60	12	0				0.02	1.7	60	12
Montrose	0				0.02	1.7	20	4.0	0.02	1.7	60	12	0				0.02	1.7	60	12
Delta	0				0.02	1.7	20	4.0	0.02	1.7	60	12	0				0.02	1.7	60	12
Mesa	0.02	1.5	30	6.0	0.02	1.5	26	5.2	0.03	1.7	60	12	0				0.03	1.5	60	12
Garfield	0.02	1.7	30	6.0	0				0.02	1.7	60	12	0				0.02	1.7	60	12
Rio Blanco	0.03	1.7	27	5.4	0				0.02	1.7	60	12	0				0			
Moffat	0.04	1.7	21	4.2	0				0.02	1.7	60	12	0				0			
WYOMING																				
Uinta	0.11	1.7	21	2.1	0				3	1.9	16	1.6	0				0			
Sweetwater	0.1	1.5	30	6.0	0				0.04	1.9	18	3.6	0				0			
Carbon	0.07	1.7	36	7.2	0				0.02	1.9	28	5.6	0				0			
Fremont	0.3	1.7	36	3.6	0				6	1.9	20	2.0	0				0			
Sublette	0.3	1.7	30	3.0	0				6	1.9	20	2.0	0				0			
Lincoln	0.11	1.7	21	2.1	0				6	1.9	18	1.8	0				0			
NEVADA																				
Washoe	0.2	1.5	12	1.2	0				0				0				0			
Humboldt	2.1	1.5	13	1.3	0				0				0				0			
Elko	2.8	1.5	12	1.2	0				0.08	1.5	10	2.0	0				0			
White Pine-Lund/Prstn	0.3	1.7	7	0.7	0				1.4	1.5	6	0.6	0				0			
White Pine-Baker	0				0				5	1.9	7	0.7	0				0			
White Pine-Ely	0.2	1.7	8	0.8	0				1	1.5	7	0.7	0				0			
Lander-Battle Mountain	3	1.7	11	1.1	0				0				0				0			
Lander-Austin	2.5	1.7	8	0.8	0				0				0				0			
Eureka	1	1.5	7	0.7	0				0.1	1.7	9	1.8	0				0			
Pershing	0.3	1.7	11	1.1	0				0				0				0			
Churchill	0.2	1.7	9	0.9	0				0				0				0			
Ormsby	0.2	1.7	8	0.8	0				0				0				0			
Storey	0.2	1.7	8	0.8	0				0				0				0			
Lyon	0.1	1.7	9	1.8	0				0				0				0			
Douglas	0.1	1.7	9	1.8	0				0				0				0			
Mineral	0.05	1.7	7	1.4	0				0				0				0			

	TS-HOW				ANNIE				NANCY				RUTH				RAY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO																				
San Juan	0				0.3	1.7	10	1.0	0				0				0.01	1.7	60	12
McKinley	0				0.1	1.7	11	2.2	0				0.03	1.7	60	12	0.02	1.7	60	12
Valencia	0				0.05	1.7	12	2.4	0				0.04	1.7	60	12	0.02	1.7	60	12
Catron	0				0				0				0.05	1.7	60	12	0.02	1.7	60	12
Grant	0				0				0				0.05	1.7	60	12	0.02	1.7	60	12
Hidalgo	0				0				0				0.05	1.7	60	12	0.02	1.7	60	12
Rio Arriba	0				0.3	1.7	12	1.2	0				0.01	1.7	70	14	0.01	1.7	70	14
Los Alamos	0				0.2	1.7	12	1.2	0				0.03	1.7	70	14	0.02	1.7	70	14
Sandoval	0				0.1	1.7	12	2.4	0				0.03	1.7	70	14	0.02	1.7	70	14
Bernalillo	0				0.01	1.5	13	2.6	0				0.03	1.5	70	14	0.01	1.5	70	14
Socorro	0				0				0				0.04	1.7	70	14	0.02	1.7	66	13
Sierra	0				0				0				0.04	1.7	70	14	0.02	1.7	66	13
Luna	0				0				0				0.04	1.7	60	12	0.02	1.7	64	13
Dona Ana	0				0				0				0.03	1.7	70	14	0.02	1.7	66	13
Taos	0				0.3	1.7	13	1.3	0				0.01	1.7	72	14	0.01	1.7	70	14
Santa Fe	0				0.1	1.7	13	2.6	0				0.02	1.7	76	15	0.01	1.7	70	14
Torrance	0				0.1	1.7	13	2.6	0				0.03	1.7	76	15	0.01	1.7	70	14
Lincoln	0				0				0				0.03	1.7	76	15	0.02	1.7	70	14
Otero	0				0				0				0.03	1.7	76	15	0.02	1.7	70	14
Colfax	0				0.26	1.5	14	1.4	0				0.01	1.5	76	15	0.01	1.5	80	16
Mora	0				0.2	1.7	14	1.4	0				0.02	1.7	76	15	0.01	1.7	80	16
San Miguel	0				0.2	1.7	14	1.4	0				0.02	1.7	80	16	0.01	1.7	80	16
Guadalupe	0				0.2	1.7	14	1.4	0				0.02	1.7	80	16	0.01	1.7	80	16
De Baca	0				0.2	1.7	14	1.4	0				0.02	1.7	80	16	0.01	1.7	80	16
Chaves	0				0.2	1.7	14	1.4	0				0.02	1.5	80	16	0.02	1.5	80	16
Eddy	0				0.1	1.7	15	3.0	0				0.02	1.7	80	16	0.02	1.7	80	16
Union	0				0.2	1.7	15	1.5	0				0.01	1.7	84	17	0.01	1.7	80	16
Harding	0				0.2	1.7	15	1.5	0				0.02	1.7	80	16	0.01	1.7	80	16
Quay	0				0.2	1.7	15	1.5	0				0.02	1.7	84	17	0.01	1.7	80	16
Curry	0				0.2	1.7	15	1.5	0				0.02	1.7	84	17	0.01	1.7	80	16
Roosevelt	0				0.2	1.7	15	1.5	0				0.02	1.7	84	17	0.02	1.7	80	16
Lea	0				0.1	1.7	16	3.2	0				0.02	1.7	84	17	0.02	1.7	80	16
CALIFORNIA																				
Mono	0.6	1.7	7	0.7	0				0				0				0			
Inyo-Bishop	0.3	1.7	5	0.5	0				0				0				0.01	1.5	4	0.8
Inyo-Furnace Creek	0.3	1.7	5	0.5	0				0				0				0.05	1.7	3	0.6
San Bernardino	0				0				0				0.1	1.9	12	2.4	0.2	1.9	5	0.5
Los Angeles	0				0				0				0				0			

	BADGER				SIMON				HARRY				GRABLE				CLIMAX			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH																				
Box Elder-Rosette	0.03	1.7	60	12	0.03	1.7	40	8.0	0.03	1.7	40	8.0	0.07	1.7	22	4.4	0			
Box Elder-Tremonton	0.05	1.7	60	12	0.05	1.7	40	8.0	0.1	1.7	42	8.4	0.13	1.7	21	2.1	0			
Tooele-West	0.05	1.7	60	12	0.03	1.7	45	9.0	0.05	1.7	40	8.0	0.07	1.7	20	4.0	0			
Tooele-East	0.05	1.7	60	12	0.15	1.7	45	4.5	0.1	1.7	36	7.2	0.13	1.7	20	2.0	0			
Juab	0.07	1.7	48	9.6	0.2	1.7	36	3.6	3	1.7	9	0.9	0.40	1.7	18	1.8	0			
Millard	0.1	1.7	36	7.2	0.6	1.7	22	2.2	4	1.7	8	0.8	0.40	1.7	12	1.2	0			
Beaver	0.2	1.5	30	3.0	1.1	1.5	18	1.8	2	1.7	6	0.6	0.21	1.5	8	0.8	0.04	1.5	12	2.4
Iron-Cedar City	0.3	1.9	24	2.4	0.5	1.7	18	1.8	5.6	1.5	5	0.5	0.07	1.9	5	1.0	0.13	1.7	8	0.8
Iron-Modena	0.5	1.9	22	2.2	1	1.5	16	1.6	3.3	1.5	4	0.4	0.07	1.9	5	1.0	0			
Iron-Parowan	0.3	1.9	28	2.8	0.5	1.7	18	1.8	2.8	1.7	5	0.5	0.11	1.7	6	0.6	0.06	1.9	6	1.2
Cache	0.05	1.7	60	12	0.04	1.7	40	8.0	0.1	1.7	40	8.0	0.13	1.7	24	2.4	0			
Rich	0.05	1.7	60	12	0.07	1.7	40	8.0	0.1	1.7	44	8.8	0.13	1.7	24	2.4	0			
Weber	0.05	1.7	60	12	0.07	1.7	40	8.0	0.1	1.7	36	7.2	0.13	1.7	22	2.2	0			
Morgan	0.05	1.7	60	12	0.1	1.7	40	8.0	0.1	1.7	36	7.2	0.13	1.7	22	2.2	0			
Davis	0.05	1.7	60	12	0.1	1.7	40	8.0	0.1	1.7	36	7.2	0.13	1.7	21	2.1	0			
Salt Lake	0.06	1.5	60	12	0.14	1.5	40	4.0	0.1	1.5	36	7.2	0.27	1.5	20	2.0	0.01	1.5	21	4.2
Summit	0.08	1.7	60	12	0.1	1.7	40	8.0	0.2	1.7	44	4.4	0.20	1.7	21	2.1	0.01	1.7	22	4.4
Daggett	0.06	1.7	60	12	0.1	1.7	40	8.0	0.4	1.7	48	4.8	0.27	1.7	24	2.4	0.03	1.7	24	4.8
Utah	0.07	1.7	60	12	0.15	1.7	40	4.0	3	1.7	10	1.0	0.40	1.7	18	1.8	0.05	1.7	20	4.0
Wasatch	0.05	1.7	60	12	0.15	1.7	40	4.0	3	1.7	10	1.0	0.27	1.7	19	1.9	0.04	1.7	20	4.0
Duchesne	0.05	1.7	60	12	0.2	1.7	40	4.0	0.4	1.7	11	1.1	0.40	1.7	20	2.0	0.03	1.7	21	4.2
Uintah	0.04	1.7	60	12	0.2	1.7	40	4.0	0.5	1.7	11	1.1	0.27	1.7	24	2.4	0.03	1.7	22	4.4
Carbon	0.05	1.7	60	12	0.2	1.7	40	4.0	4	1.7	9	0.9	0.40	1.7	21	2.1	0.13	1.7	16	1.6
Sanpete	0.06	1.7	48	9.6	0.3	1.7	38	3.8	4	1.7	8	0.8	0.40	1.7	14	1.4	0.04	1.7	14	2.8
Sevier	0.09	1.7	48	9.6	0.5	1.7	27	2.7	2	1.7	8	0.8	0.40	1.7	14	1.4	0.04	1.7	15	3.0
Emery	0.06	1.7	60	12	0.5	1.7	35	3.5	3	1.7	9	0.9	0.27	1.7	15	1.5	0.25	1.7	16	1.6
Grand	0.05	1.7	60	12	0.8	1.7	40	4.0	3	1.7	10	1.0	0.27	1.7	18	1.8	0.25	1.7	18	1.8
Piute	0.3	1.7	48	4.8	0.5	1.7	24	2.4	2	1.7	7	0.7	0.13	1.7	12	1.2	0.08	1.7	13	2.6
Wayne	0.2	1.7	36	3.6	0.5	1.7	32	3.2	3	1.7	8	0.8	0.13	1.7	15	1.5	0.25	1.5	16	1.6
Garfield	0.3	1.7	24	2.4	0.5	1.7	24	2.4	6	1.7	6	0.6	0.13	1.7	12	1.2	0.38	1.7	14	1.4
Kane-Kanab	0.2	1.7	14	1.4	1	1.7	18	1.8	23	1.9	5	0.5	0.04	1.7	10	2.0	0.50	1.9	13	1.3
Kane-Orderville	0.3	1.7	16	1.6	1	1.7	18	1.8	23	1.9	5	0.5	0.07	1.7	10	2.0	0.38	1.9	12	1.2
San Juan	0.1	1.7	28	5.6	1.5	1.7	35	3.5	5	1.7	8	0.8	0.05	1.7	15	3.0	0.38	1.7	21	2.1
OREGON																				
Malheur	0				0.02	1.7	84	17	0.01	1.7	24	4.8	0.13	1.7	72	7.2	0			
Harney	0				0.02	1.7	84	17	0				0.13	1.7	72	7.2	0			

	BADGER				SIMON				HARRY				GRABLE				CLIMAX			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA																				
Mohave-Littlefield	0.2	1.7	6	0.6	1.5	1.7	10	1.0	22	1.5	3	0.3	0				0.38	1.7	5	0.5
Mohave-Kingman	0.25	1.5	6	0.6	1.5	1.9	15	1.5	0				0				0.25	1.7	12	1.2
Mohave-Moccasin	0.2	1.7	7	0.7	1.7	1.7	13	1.3	11	1.7	5	0.5	0				0.25	1.7	7	0.7
Coconino-Fredonia	0.2	1.7	12	1.2	1.7	1.7	15	1.5	15	1.9	5	0.5	0				0.50	1.7	12	1.2
Coconino-Rim/TubaCty	3	1.7	8	0.8	10	1.7	15	1.5	0.5	1.7	5	0.5	0				1.3	1.7	15	1.5
Coconino-Flag/Williams	0.02	1.5	12	2.4	2	1.5	15	1.5	0				0				0.16	1.5	15	1.5
Navajo	3	1.7	14	1.4	4	1.7	16	1.6	0				0				0.44	1.7	18	1.8
Apache	3	1.7	16	1.6	6	1.7	20	2.0	3	1.7	9	0.9	0				0.38	1.7	20	2.0
Yavapai	0				0				0				0				0			
Gila	0				0				0				0				0			
Yuma	0				0				0				0				0			
Maricopa	0				0				0				0				0			
Pinal	0				0				0				0				0			
Graham	0				0				0				0				0			
Greenlee	0				0				0				0				0			
Pima	0				0				0				0				0			
Santa Cruz	0				0				0				0				0			
Cochise	0				0				0				0				0			
IDAHO																				
Bear Lake	0.04	1.7	60	12	0.04	1.7	30	6.0	0.1	1.7	36	7.2	0.13	1.7	32	3.2	0			
Caribou	0.03	1.7	60	12	0.03	1.7	32	6.4	0.05	1.7	36	7.2	0.13	1.7	32	3.2	0			
Bonneville	0.01	1.7	60	12	0.02	1.7	36	7.2	0.02	1.7	36	7.2	0.09	1.7	32	6.4	0			
Bingham	0.02	1.7	60	12	0.03	1.7	36	7.2	0.02	1.7	36	7.2	0.09	1.7	32	6.4	0			
Bannock	0.01	1.5	60	12	0.03	1.7	36	7.2	0.03	1.5	36	7.2	0.09	1.5	32	6.4	0			
Franklin	0.02	1.7	60	12	0.04	1.7	36	7.2	0.1	1.7	36	7.2	0.13	1.7	32	3.2	0			
Oneida	0.02	1.7	60	12	0.04	1.7	36	7.2	0.03	1.7	36	7.2	0.13	1.7	30	3.0	0			
Power	0.03	1.7	60	12	0.04	1.7	36	7.2	0.02	1.7	36	7.2	0.13	1.7	30	3.0	0			
Cassia	0.02	1.7	60	12	0.04	1.7	36	7.2	0.01	1.7	36	7.2	0.13	1.7	26	2.6	0			
Minidoka	0				0.03	1.7	36	7.2	0				0.13	1.7	28	2.8	0			
Lincoln	0				0.03	1.7	36	7.2	0				0.13	1.7	28	2.8	0			
Jerome	0				0.03	1.7	36	7.2	0				0.13	1.7	28	2.8	0			
Twin Falls	0				0.03	1.7	36	7.2	0.01	1.7	24	4.8	0.13	1.7	24	2.4	0			
Gooding	0				0.03	1.7	36	7.2	0				0.13	1.7	24	2.4	0			
Elmore	0				0.03	1.7	36	7.2	0				0.13	1.7	24	2.4	0			
Ada	0				0.03	1.7	36	7.2	0				0.13	1.5	24	2.4	0			
Canyon	0				0.02	1.7	36	7.2	0				0.09	1.7	24	4.8	0			
Owyhee	0				0.02	1.7	36	7.2	0.01	1.7	24	4.8	0.13	1.7	24	2.4	0			

	BADGER				SIMON				HARRY				GRABLE				CLIMAX			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO																				
Montezuma	0.06	1.7	33	6.6	1.5	1.7	40	4.0	4	1.7	9	0.9	0				0.26	1.5	22	2.2
La Plata	0.05	1.7	35	7.0	1.5	1.7	42	4.2	5	1.7	10	1.0	0				0.25	1.7	23	2.3
Dolores	0.04	1.7	34	6.8	2	1.7	42	4.2	5	1.7	10	1.0	0.05	1.7	20	4.0	0.25	1.7	21	2.1
San Juan	0.03	1.7	36	7.2	1	1.7	40	4.0	5	1.7	10	1.0	0.04	1.7	20	4.0	0.25	1.7	22	2.2
San Miguel	0.03	1.7	36	7.2	1	1.7	40	4.0	5	1.7	10	1.0	0.04	1.7	21	4.2	0.25	1.7	21	2.1
Ouray	0.02	1.7	37	7.4	1	1.7	40	4.0	5	1.7	10	1.0	0.07	1.7	21	4.2	0.25	1.7	22	2.2
Montrose	0.04	1.7	42	8.4	1	1.7	40	4.0	5	1.7	12	1.2	0.27	1.7	20	2.0	0.25	1.7	20	2.0
Delta	0.02	1.7	48	9.6	1	1.7	40	4.0	3.5	1.7	13	1.3	0.40	1.7	20	2.0	0.25	1.7	21	2.1
Mesa	0.03	1.5	50	10	1.3	1.5	40	4.0	4.2	1.5	13	1.3	0.37	1.5	19	1.9	0.25	1.5	18	1.8
Garfield	0.03	1.7	52	10	0.7	1.7	40	4.0	3	1.7	12	1.2	0.27	1.7	20	2.0	0.25	1.7	20	2.0
Rio Blanco	0.03	1.7	52	10	0.7	1.7	42	4.2	0.5	1.7	13	1.3	0.27	1.7	22	2.2	0.19	1.7	22	2.2
Moffat	0.03	1.7	55	11	0.2	1.7	42	4.2	0.4	1.7	16	1.6	0.27	1.7	24	2.4	0.13	1.7	24	2.4
WYOMING																				
Uinta	0.05	1.7	60	12	0.1	1.7	36	7.2	0.2	1.7	48	4.8	0.27	1.7	24	2.4	0.06	1.7	24	4.8
Sweetwater	0.05	1.5	60	12	0.1	1.5	36	7.2	0.3	1.5	18	1.8	0.32	1.5	30	3.0	0.18	1.5	26	2.6
Carbon	0.04	1.7	60	12	0.2	1.7	36	3.6	0.25	1.7	60	6.0	0.40	1.7	36	3.6	0.25	1.7	30	3.0
Fremont	0.04	1.7	60	12	0.2	1.7	40	4.0	0.2	1.7	64	6.4	0.27	1.7	36	3.6	0.13	1.7	30	3.0
Sublette	0.01	1.7	60	12	0.05	1.7	37	7.4	0.1	1.7	56	11	0.13	1.7	34	3.4	0			
Lincoln	0.02	1.7	60	12	0.05	1.7	36	7.2	0.2	1.7	48	4.8	0.13	1.7	32	3.2	0			
NEVADA																				
Washoe	0.05	1.5	36	7.2	0.02	1.7	84	17	0				0.27	1.5	72	7.2	0			
Humboldt	0.01	1.5	52	10	0.02	1.7	84	17	0.01	1.5	22	4.4	0.27	1.5	72	7.2	0			
Elko	0.01	1.5	60	12	0.02	1.7	84	17	0.02	1.5	22	4.4	0.11	1.5	72	7.2	0			
White Pine-Lund/Prstn	0.1	1.7	36	7.2	0.06	1.7	60	12	0.15	1.7	100	10	0.10	1.7	3	0.6	0			
White Pine-Baker	0.1	1.7	36	7.2	0.06	1.7	60	12	0.15	1.7	100	10	0.40	1.7	3	0.3	0			
White Pine-Ely	0.07	1.5	36	7.2	0.06	1.7	60	12	0.15	1.5	100	10	0.04	1.5	5	1.0	0			
Lander-Battle Mountain	0.03	1.7	36	7.2	0.02	1.7	60	12	0.01	1.7	22	4.4	0.13	1.7	48	4.8	0			
Lander-Austin	0.05	1.7	36	7.2	0.02	1.7	60	12	0				0.27	1.7	48	4.8	0			
Eureka	0.05	1.7	36	7.2	0.02	1.7	60	12	0.01	1.7	100	20	0.07	1.7	48	9.6	0			
Pershing	0.04	1.7	48	9.6	0.02	1.7	84	17	0				0.40	1.7	72	7.2	0			
Churchill	0.1	1.7	36	7.2	0.02	1.7	84	17	0				0.27	1.7	72	7.2	0			
Ormsby	0.09	1.7	36	7.2	0.02	1.7	84	17	0				0.27	1.7	72	7.2	0			
Storey	0.09	1.7	36	7.2	0.01	1.7	96	19	0				0.27	1.7	72	7.2	0			
Lyon	0.09	1.7	36	7.2	0.01	1.7	96	19	0				0.20	1.7	72	7.2	0			
Douglas	0.09	1.7	36	7.2	0.01	1.7	80	16	0				0.12	1.7	72	7.2	0			
Mineral	0.01	1.7	48	9.6	0.01	1.7	80	16	0				0.11	1.7	72	7.2	0			

	BADGER				SIMON				HARRY				GRABLE				CLIMAX			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO																				
San Juan	0.3	1.7	32	3.2	2	1.7	40	4.0	3	1.5	10	1.0	0				0.31	1.5	22	2.2
McKinley	2	1.7	18	1.8	5	1.7	27	2.7	3	1.7	12	1.2	0				0.25	1.7	24	2.4
Valencia	2	1.7	18	1.8	3	1.7	27	2.7	2	1.7	11	1.1	0				0.13	1.7	24	2.4
Catron	1	1.7	20	2.0	0.5	1.7	30	3.0	0.2	1.7	12	1.2	0				0.06	1.7	24	4.8
Grant	0.1	1.7	24	4.8	0				0				0				0			
Hidalgo	0				0				0				0				0			
Rio Arriba	0.3	1.7	32	3.2	2	1.7	40	4.0	2	1.7	10	1.0	0				0.19	1.7	24	2.4
Los Alamos	0.8	1.7	28	2.8	2	1.7	40	4.0	2	1.7	10	1.0	0				0.19	1.7	24	2.4
Sandoval	1.5	1.7	21	2.1	4	1.7	36	3.6	3	1.7	11	1.1	0				0.19	1.7	24	2.4
Bernalillo	1.1	1.5	21	2.1	1.8	1.5	33	3.3	4	1.5	11	1.1	0				0.14	1.5	28	2.8
Socorro	1	1.7	24	2.4	0.5	1.7	36	3.6	1	1.7	16	1.6	0				0.06	1.7	28	5.6
Sierra	0.4	1.7	28	2.8	0				0.1	1.7	18	3.6	0				0			
Luna	0.05	1.7	26	5.2	0				0				0				0			
Dona Ana	0.05	1.7	28	5.6	0				0				0				0			
Taos	0.2	1.7	36	3.6	1	1.7	40	4.0	2	1.7	12	1.2	0				0.08	1.7	26	5.2
Santa Fe	0.8	1.7	24	2.4	4	1.7	38	3.8	2	1.7	11	1.1	0				0.06	1.7	28	5.6
Torrance	0.8	1.7	24	2.4	3	1.7	38	3.8	3	1.7	15	1.5	0				0.06	1.7	30	6.0
Lincoln	0.4	1.7	28	2.8	4	1.7	40	4.0	0.5	1.7	18	1.8	0				0.03	1.7	30	6.0
Otero	0.1	1.7	30	6.0	0				0.1	1.7	22	4.4	0				0			
Colfax	0.2	1.5	40	4.0	0.36	1.5	40	4.0	1.3	1.5	16	1.6	0				0.03	1.5	28	5.6
Mora	0.4	1.7	36	3.6	1	1.7	40	4.0	1	1.7	14	1.4	0				0.03	1.7	28	5.6
San Miguel	0.4	1.7	30	3.0	2	1.7	40	4.0	1	1.7	14	1.4	0				0.03	1.7	30	6.0
Guadalupe	0.4	1.7	28	2.8	3	1.7	40	4.0	1	1.7	15	1.5	0				0.03	1.7	30	6.0
De Baca	0.2	1.7	30	3.0	3	1.7	40	4.0	0.5	1.7	18	1.8	0				0.01	1.7	30	6.0
Chaves	0.2	1.5	32	3.2	5	1.5	40	4.0	0.17	1.5	20	2.0	0				0.01	1.5	36	7.2
Eddy	0.1	1.7	36	7.2	1	1.7	40	4.0	0.1	1.7	22	4.4	0				0			
Union	0.1	1.7	40	8.0	0.6	1.7	40	4.0	1	1.7	18	1.8	0				0.01	1.7	30	6.0
Harding	0.2	1.7	36	3.6	1	1.7	40	4.0	1	1.7	16	1.6	0				0.01	1.7	30	6.0
Quay	0.2	1.7	36	3.6	2.5	1.7	40	4.0	0.5	1.7	18	1.8	0				0.01	1.7	36	7.2
Curry	0.2	1.7	36	3.6	3	1.7	40	4.0	0.3	1.7	18	1.8	0				0.01	1.7	36	7.2
Roosevelt	0.2	1.7	36	3.6	3	1.7	40	4.0	0.2	1.7	20	2.0	0				0.01	1.7	36	7.2
Lea	0.1	1.7	36	7.2	1	1.7	40	4.0	0.1	1.7	22	4.4	0				0			
CALIFORNIA																				
Mono	0.05	1.7	24	4.8	0.01	1.7	24	4.8	0				0				0			
Inyo-Bishop	0.01	1.7	36	7.2	0.01	1.7	24	4.8	0				0				0			
Inyo-Furnace Creek	0.05	1.7	18	3.6	0.3	1.9	24	2.4	0				0				0			
San Bernardino	0.1	1.7	12	2.4	0.01	1.7	24	4.8	0				0				0			
Los Angeles	0				0.01	1.7	24	4.8	0				0				0			

	WASP				TESLA				TURK				HORNET				BEE/ESS			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH																				
Box Elder-Rosette	0				0				0.5	1.7	25	2.5	0				0			
Box Elder-Tremonton	0				0				0.5	1.7	25	2.5	0				0.02	1.7	60	12
Tooele-West	0				0				0.8	1.7	21	2.1	0				0.02	1.7	60	12
Tooele-East	0				0				0.8	1.7	21	2.1	0				0.03	1.7	60	12
Juab	0				0				1.5	1.7	20	2.0	0				0			
Millard	0				0.05	1.7	21	4.2	1.5	1.7	18	1.8	0				0			
Beaver	0				0.18	1.5	21	2.1	0.5	1.5	17	1.7	0.07	1.5	15	3.0	0.01	1.5	60	12
Iron-Cedar City	0				0.4	1.7	15	1.5	0.2	1.7	20	2.0	0.2	1.7	12	1.2	0			
Iron-Modena	0				0.3	1.9	14	1.4	0.1	1.7	20	4.0	0.3	1.7	10	1.0	0			
Iron-Parowan	0				0.3	1.9	18	1.8	0.3	1.7	21	2.1	0.2	1.7	13	1.3	0			
Cache	0				0				0.5	1.7	27	2.7	0				0.02	1.7	60	12
Rich	0				0				0.5	1.7	28	2.8	0				0.02	1.7	60	12
Weber	0				0				0.8	1.7	23	2.3	0				0.02	1.7	60	12
Morgan	0				0				1.3	1.7	24	2.4	0				0.02	1.7	60	12
Davis	0				0				1	1.7	23	2.3	0				0.02	1.7	60	12
Salt Lake	0				0				1.6	1.5	22	2.2	0				0.03	1.5	60	12
Summit	0				0				1.5	1.7	24	2.4	0				0.02	1.7	60	12
Daggett	0				0				1	1.7	29	2.9	0				0			
Utah	0				0				2	1.7	21	2.1	0				0.01	1.7	60	12
Wasatch	0				0				1.5	1.7	23	2.3	0				0.01	1.7	60	12
Duchesne	0				0				0.7	1.7	26	2.6	0				0			
Uintah	0				0				1	1.7	28	2.8	0				0			
Carbon	0				0				0.5	1.7	24	2.4	0				0			
Sanpete	0				0				0.5	1.7	22	2.2	0				0			
Sevier	0				0.15	1.9	24	2.4	0.5	1.5	22	2.2	0.05	1.7	18	3.6	0			
Emery	0				0.1	1.9	25	5.0	0.4	1.7	24	2.4	0.04	1.7	20	4.0	0			
Grand	0				0.1	1.9	30	6.0	0.8	1.7	26	2.6	0.02	1.7	23	4.6	0			
Piute	0				0.2	1.9	23	2.3	0.4	1.7	22	2.2	0.06	1.7	18	3.6	0			
Wayne	0				0.1	1.9	25	5.0	0.3	1.7	24	2.4	0.05	1.7	21	4.2	0			
Garfield	0				0.4	1.9	23	2.3	0.3	1.7	23	2.3	0.2	1.7	18	1.8	0			
Kane-Kanab	0				0.7	1.7	14	1.4	0.05	1.7	23	4.6	0.4	1.7	15	1.5	0.2	1.7	15	1.5
Kane-Orderville	0				1	1.7	15	1.5	0.1	1.7	23	4.6	0.2	1.7	14	1.4	0.1	1.7	15	3.0
San Juan	0				0.3	1.9	27	2.7	0.3	1.7	27	2.7	0.1	1.7	15	3.0	0.05	1.7	24	4.8
OREGON																				
Malheur	0				0				0				0				0			
Harney	0				0				0				0				0			

	WASP				TESLA				TURK				HORNET				BEE/ESS			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA																				
Mohave-Littlefield	0				0.3	1.9	8	0.8	0				0.29	1.5	10	1.0	0.76	1.5	10	1.0
Mohave-Kingman	0				0				0				0				0.14	1.5	8	0.8
Mohave-Moccasin	0				0.3	1.9	10	1.0	0				0.5	1.7	12	1.2	0.4	1.7	12	1.2
Coconino-Fredonia	0				0.3	1.9	12	1.2	0				0.5	1.7	15	1.5	0.3	1.7	14	1.4
Coconino-Rim/TubaCty	0				0				0				0.5	1.7	8	0.8	0.1	1.7	12	2.4
Coconino-Flag/Williams	0				0				0				0.5	1.5	9	0.9	0.07	1.5	12	2.4
Navajo	0				0				0.1	1.9	27	5.4	0.4	1.7	11	1.1	0			
Apache	0				0				0.2	1.9	29	2.9	0.3	1.7	12	1.2	0			
Yavapai	0				0				0				0				0.15	1.7	12	1.2
Gila	0				0				0				0				0.1	1.7	18	3.6
Yuma	0.80	1.5	8	0.8	0				0				0				0			
Maricopa	0				0				0				0				0.12	1.5	18	1.8
Pinal	0				0				0				0				0.1	1.7	18	3.6
Graham	0				0				0				0				0.07	1.7	24	4.8
Greenlee	0				0				0				0				0.05	1.7	24	4.8
Pima	0.01	1.5	12	2.4	0				0				0				0.07	1.5	18	3.6
Santa Cruz	0.01	1.7	12	2.4	0				0				0				0.07	1.7	24	4.8
Cochise	0				0				0				0				0.05	1.7	24	4.8
IDAHO																				
Bear Lake	0				0				0.05	1.7	27	5.4	0				0			
Caribou	0				0				0.01	1.7	28	5.6	0				0			
Bonneville	0				0				0				0				0			
Bingham	0				0				0				0				0			
Bannock	0				0				0.01	1.7	27	5.4	0				0			
Franklin	0				0				0.05	1.7	27	5.4	0				0			
Oneida	0				0				0.01	1.7	27	5.4	0				0			
Power	0				0				0				0				0			
Cassia	0				0				0				0				0			
Minidoka	0				0				0				0				0			
Lincoln	0				0				0				0				0			
Jerome	0				0				0				0				0			
Twin Falls	0				0				0				0				0			
Gooding	0				0				0				0				0			
Elmore	0				0				0				0				0			
Ada	0				0				0				0				0			
Canyon	0				0				0				0				0			
Owyhee	0				0				0				0				0			

	WASP				TESLA				TURK				HORNET				BEE/ESS			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO																				
Montezuma	0				0.1	1.9	32	6.4	0.3	1.7	31	3.1	0.1	1.7	12	2.4	0.01	1.7	60	12
La Plata	0				0.1	1.9	32	6.4	0.2	1.7	33	3.3	0.05	1.7	12	2.4	0.01	1.7	60	12
Dolores	0				0.2	1.9	31	3.1	0.3	1.7	33	3.3	0.1	1.7	12	2.4	0.01	1.7	60	12
San Juan	0				0.2	1.9	32	3.2	0.3	1.7	33	3.3	0.05	1.7	15	3.0	0.01	1.7	60	12
San Miguel	0				0.2	1.9	30	3.0	0.3	1.7	32	3.2	0.04	1.7	15	3.0	0.01	1.7	60	12
Ouray	0				0.2	1.9	31	3.1	0.3	1.7	33	3.3	0.02	1.7	18	3.6	0.01	1.7	60	12
Montrose	0				0.1	1.7	30	6.0	0.6	1.7	31	3.1	0.04	1.7	21	4.2	0.01	1.7	60	12
Delta	0				0.1	1.7	31	6.2	0.6	1.7	31	3.1	0.03	1.7	22	4.4	0.01	1.7	60	12
Mesa	0				0.08	1.5	31	6.2	1	1.5	29	2.9	0.04	1.5	25	5.0	0.01	1.5	60	12
Garfield	0				0.05	1.7	32	6.4	0.9	1.7	30	3.0	0.01	1.7	28	5.6	0.01	1.7	60	12
Rio Blanco	0				0.03	1.7	34	6.8	0.8	1.7	30	3.0	0				0.01	1.7	60	12
Moffat	0				0				0.7	1.7	30	3.0	0				0.01	1.7	60	12
WYOMING																				
Uinta	0				0				1	1.7	30	3.0	0				0.02	1.7	60	12
Sweetwater	0				0				0.8	1.7	32	3.2	0				0.02	1.7	60	12
Carbon	0				0				0.6	1.7	36	3.6	0				0			
Fremont	0				0				0.1	1.7	34	6.8	0				0			
Sublette	0				0				0.2	1.7	31	3.1	0				0			
Lincoln	0				0				0.1	1.7	30	6.0	0				0.03	1.7	60	12
NEVADA																				
Washoe	0				0				0				0				0			
Humboldt	0				0				0				0				0			
Elko	0				0				0				0				0.02	1.5	60	12
White Pine-Lund/Prstn	0				0				2.8	1.5	14	1.4	0.03	1.7	48	9.6	0			
White Pine-Baker	0				0				1.9	1.5	16	1.6	0.05	1.7	48	9.6	0			
White Pine-Ely	0				0				1.3	1.5	15	1.5	0.02	1.5	48	9.6	0			
Lander-Battle Mountain	0				0				0				0				0			
Lander-Austin	0				0				0				0				0			
Eureka	0				0				0.2	1.7	20	2.0	0				0			
Pershing	0				0				0				0				0			
Churchill	0				0				0				0				0			
Ormsby	0				0				0				0				0			
Storey	0				0				0				0				0			
Lyon	0				0				0				0				0			
Douglas	0				0				0				0				0			
Mineral	0				0				0				0				0			

	WASP				TESLA				TURK				HORNET				BEE/ESS			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO																				
San Juan	0				0				0.2	1.9	30	3.0	0.15	1.7	13	1.3	0			
McKinley	0				0				0				0.2	1.7	13	1.3	0			
Valencia	0				0				0				0.2	1.7	20	2.0	0.03	1.7	24	4.8
Catron	0				0				0				0.1	1.7	20	4.0	0.03	1.7	24	4.8
Grant	0				0				0				0				0.03	1.7	24	4.8
Hidalgo	0				0				0				0				0.03	1.7	24	4.8
Rio Arriba	0				0				0				0.1	1.7	24	4.8	0			
Los Alamos	0				0				0				0.1	1.7	24	4.8	0			
Sandoval	0				0				0				0.15	1.7	24	2.4	0.01	1.7	36	7.2
Bernalillo	0				0				0				0.08	1.5	24	4.8	0.03	1.5	36	7.2
Socorro	0				0				0				0.2	1.7	24	2.4	0.03	1.7	36	7.2
Sierra	0				0				0				0.1	1.7	24	4.8	0.02	1.7	36	7.2
Luna	0				0				0				0				0.03	1.7	30	6.0
Dona Ana	0				0				0				0				0.02	1.7	36	7.2
Taos	0				0				0				0.1	1.7	24	4.8	0			
Santa Fe	0				0				0				0.1	1.7	30	6.0	0.01	1.7	30	6.0
Torrance	0				0				0				0.1	1.7	30	6.0	0.01	1.7	40	8.0
Lincoln	0				0				0				0.15	1.7	30	3.0	0.01	1.7	40	8.0
Otero	0				0				0				0.05	1.7	30	6.0	0.01	1.7	40	8.0
Colfax	0				0				0				0.1	1.7	30	6.0	0.01	1.7	40	8.0
Mora	0				0				0				0.1	1.7	30	6.0	0.01	1.7	40	8.0
San Miguel	0				0				0				0.1	1.7	30	6.0	0.01	1.7	40	8.0
Guadalupe	0				0				0				0.1	1.7	36	7.2	0.01	1.7	40	8.0
De Baca	0				0				0				0.1	1.7	36	7.2	0.01	1.7	44	8.8
Chaves	0				0				0				0.14	1.5	36	3.6	0.01	1.5	44	8.8
Eddy	0				0				0				0.05	1.7	36	7.2	0.01	1.7	44	8.8
Union	0				0				0				0.1	1.7	36	7.2	0.01	1.7	48	9.6
Harding	0				0				0				0.1	1.7	36	7.2	0.01	1.7	44	8.8
Quay	0				0				0				0.1	1.7	36	7.2	0.01	1.7	48	9.6
Curry	0				0				0				0.1	1.7	36	7.2	0.01	1.7	48	9.6
Roosevelt	0				0				0				0.1	1.7	36	7.2	0.01	1.7	48	9.6
Lea	0				0				0				0.05	1.7	36	7.2	0.01	1.7	48	9.6
CALIFORNIA																				
Mono	0				0				0				0				0			
Inyo-Bishop	0				0				0				0				0			
Inyo-Furnace Creek	0				0				4	1.9	6	0.6	0				0			
San Bernardino	1.1	1.9	4	0.4	0				0				0				0			
Los Angeles	0				0				0				0				0			

	APPLEWASP				POST				MET				APPLE-II				ZUCCHINI			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH																				
Box Elder-Rosette	0.04	1.9	15	3.0	0.05	1.9	42	8.4	0.06	1.7	52	10	0.1	1.7	18	3.6	0.1	1.9	42	8.4
Box Elder-Tremonton	0.04	1.9	15	3.0	0.2	1.9	42	4.2	0.1	1.7	52	10	0.1	1.7	18	3.6	0.3	1.9	42	4.2
Tooele-West	0.03	1.9	12	2.4	0.1	1.9	34	6.8	0.1	1.7	48	9.6	0.4	1.5	16	1.6	0.2	1.9	36	3.6
Tooele-East	0.03	1.9	12	2.4	0.5	1.7	40	4.0	0.2	1.7	48	4.8	1	1.7	16	1.6	0.3	1.9	36	3.6
Juab	0.1	1.9	10	2.0	0.15	1.9	32	3.2	0.3	1.7	8	0.8	2	1.7	14	1.4	0.5	1.9	11	1.1
Millard	0.1	1.7	9	1.8	0.3	1.9	28	2.8	0.4	1.7	6	0.6	1	1.7	11	1.1	1	1.9	7	0.7
Beaver	0.3	1.5	7	0.7	0.13	1.9	26	2.6	5	1.7	6	0.6	0.12	1.5	11	1.1	0.8	1.7	5	0.5
Iron-Cedar City	1.2	1.5	6	0.6	0.1	1.9	22	4.4	0.1	1.7	5	1.0	0				2.3	1.5	4	0.4
Iron-Modena	0.9	1.5	5	0.5	0.1	1.9	22	4.4	1.1	1.5	4	0.4	0				0.1	1.7	4	0.8
Iron-Parowan	0.8	1.7	6	0.6	0.1	1.9	22	4.4	0.2	1.7	5	0.5	0				5.3	1.5	5	0.5
Cache	0.03	1.9	17	3.4	0.04	1.9	44	8.8	0.1	1.7	52	10	0.08	1.7	21	4.2	0.3	1.7	54	5.4
Rich	0.03	1.9	17	3.4	0.04	1.9	44	8.8	0.1	1.7	52	10	0.08	1.7	20	4.0	0.3	1.7	54	5.4
Weber	0.03	1.9	15	3.0	0.3	1.9	42	4.2	0.1	1.7	48	9.6	1.5	1.7	18	1.8	0.3	1.7	52	5.2
Morgan	0.03	1.7	15	3.0	0.4	1.9	42	4.2	0.2	1.7	48	4.8	1.5	1.7	18	1.8	0.3	1.7	50	5.0
Davis	0.03	1.7	15	3.0	0.4	1.7	42	4.2	0.2	1.7	48	4.8	1.5	1.7	16	1.6	0.3	1.7	50	5.0
Salt Lake	0.05	1.5	14	2.8	0.5	1.5	40	4.0	0.2	1.5	48	4.8	1.6	1.5	15	1.5	0.3	1.5	48	4.8
Summit	0.04	1.7	15	3.0	0.4	1.7	41	4.1	0.1	1.7	48	9.6	1.4	1.7	16	1.6	0.3	1.7	48	4.8
Daggett	0.05	1.9	17	3.4	0.2	1.9	44	4.4	0.1	1.7	48	9.6	3	1.7	20	2.0	0.3	1.7	48	4.8
Utah	0.1	1.9	13	2.6	0.35	1.9	38	3.8	0.2	1.7	44	4.4	3	1.7	14	1.4	0.5	1.7	48	4.8
Wasatch	0.04	1.9	14	2.8	0.4	1.9	40	4.0	0.1	1.7	48	9.6	3	1.7	15	1.5	0.3	1.7	40	4.0
Duchesne	0.04	1.9	15	3.0	0.3	1.9	42	4.2	0.1	1.7	24	4.8	3	1.7	17	1.7	0.3	1.7	32	3.2
Uintah	0.05	1.9	16	3.2	0.3	1.9	44	4.4	0.1	1.7	9	1.8	3	1.7	20	2.0	0.3	1.7	18	1.8
Carbon	0.04	1.9	15	3.0	0.2	1.9	40	4.0	0.1	1.7	9	1.8	0.3	1.9	19	1.9	0.3	1.7	10	1.0
Sanpete	0.1	1.7	12	2.4	0.1	1.9	36	7.2	0.1	1.7	7	1.4	0.3	1.9	18	1.8	0.7	1.5	9	0.9
Sevier	0.1	1.5	12	2.4	0.1	1.9	30	6.0	3	1.7	6	0.6	0.1	1.7	20	4.0	0.7	1.7	8	0.8
Emery	0.2	1.7	14	1.4	0.1	1.9	32	6.4	4	1.7	6	0.6	0.04	1.7	24	4.8	0.3	1.7	9	0.9
Grand	0.1	1.7	17	3.4	0.1	1.9	34	6.8	4	1.7	6	0.6	0.04	1.7	24	4.8	0.3	1.7	11	1.1
Piute	0.5	1.7	11	1.1	0.1	1.9	30	6.0	4	1.7	6	0.6	0.03	1.7	20	4.0	1	1.7	7	0.7
Wayne	0.3	1.7	13	1.3	0.1	1.9	33	6.6	1	1.7	7	0.7	0.02	1.7	23	4.6	0.2	1.7	8	0.8
Garfield	0.9	1.7	9	0.9	0.1	1.9	30	6.0	0.1	1.7	6	1.2	0				0.5	1.7	7	0.7
Kane-Kanab	0.4	1.7	7	0.7	0.05	1.9	28	5.6	0				0				0.1	1.7	7	1.4
Kane-Orderville	0.6	1.5	7	0.7	0.05	1.9	28	5.6	0				0				0.1	1.7	7	1.4
San Juan	0.2	1.9	18	1.8	0.05	1.9	34	6.8	0.01	1.7	18	3.6	0				0.2	1.7	10	1.0
OREGON																				
Malheur	0				0				0.01	1.7	60	12	0.01	1.7	60	12	0.3	1.7	40	4.0
Harney	0				0				0.01	1.7	60	12	0.01	1.7	60	12	0.3	1.7	40	4.0

	APPLEWASP				POST				MET				APPLE-II				ZUCCHINI			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA																				
Mohave-Littlefield	0.3	1.7	5	0.5	0.03	1.9	22	4.4	0				0				2.5	1.7	4	0.4
Mohave-Kingman	0.05	1.9	6	1.2	0.05	1.9	26	5.2	0				0				1	1.9	4	0.4
Mohave-Moccasin	0.4	1.7	7	0.7	0.05	1.9	22	4.4	0				0				0.1	1.7	5	1.0
Coconino-Fredonia	0.4	1.7	7	0.7	0.05	1.9	26	5.2	0				0				0.1	1.7	5	1.0
Coconino-Rim/TubaCty	0.2	1.7	8	0.8	0.03	1.9	26	5.2	0				0				0.05	1.7	7	1.4
Coconino-Flag/Williams	0.1	1.5	8	1.6	0.01	1.5	26	5.2	0				0				0.05	1.5	60	12
Navajo	0.1	1.9	12	2.4	0.02	1.9	30	6.0	0				0				0.1	1.7	11	2.2
Apache	0.2	1.9	15	1.5	0.02	1.9	34	6.8	0				0				0.15	1.7	12	1.2
Yavapai	0.05	1.7	12	2.4	0.02	1.7	24	4.8	0				0				0.04	1.7	72	14
Gila	0.05	1.7	15	3.0	0.01	1.7	48	9.6	0				0				0.03	1.7	72	14
Yuma	0				0				0				0				0.04	1.7	72	14
Maricopa	0.01	1.5	12	2.4	0.01	1.5	48	9.6	0				0				0.03	1.5	72	14
Pinal	0.01	1.7	15	3.0	0				0				0				0.02	1.7	72	14
Graham	0.03	1.7	15	3.0	0				0				0				0.02	1.7	72	14
Greenlee	0.03	1.7	15	3.0	0				0				0				0.02	1.7	72	14
Pima	0.01	1.5	15	3.0	0				0				0				0.01	1.5	72	14
Santa Cruz	0.01	1.7	15	3.0	0				0				0				0.01	1.7	72	14
Cochise	0.01	1.7	15	3.0	0				0				0				0.01	1.7	72	14
IDAHO																				
Bear Lake	0.03	1.7	18	3.6	0.03	1.9	42	8.4	0.06	1.7	54	11	0.06	1.7	20	4.0	0.1	1.7	56	11
Caribou	0.03	1.7	18	3.6	0				0.06	1.7	54	11	0.02	1.7	21	4.2	0.05	1.7	56	11
Bonneville	0.02	1.7	20	4.0	0				0.05	1.7	56	11	0.01	1.7	22	4.4	0.05	1.7	60	12
Bingham	0.06	1.7	17	3.4	0				0.06	1.7	58	12	0.01	1.7	22	4.4	0.05	1.7	58	12
Bannock	0.03	1.5	18	3.6	0				0.06	1.7	58	12	0.05	1.7	21	4.2	0.05	1.5	58	12
Franklin	0.03	1.7	18	3.6	0				0.06	1.7	58	12	0.06	1.7	21	4.2	0.05	1.7	58	12
Oneida	0.03	1.7	17	3.4	0				0.06	1.7	54	11	0.05	1.7	19	3.8	0.1	1.7	56	11
Power	0.04	1.7	17	3.4	0				0.06	1.7	56	11	0.02	1.7	21	4.2	0.05	1.7	58	12
Cassia	0.01	1.7	19	3.8	0				0.06	1.7	58	12	0.03	1.7	19	3.8	0.1	1.7	50	10
Minidoka	0.01	1.7	20	4.0	0				0.04	1.7	58	12	0.02	1.7	20	4.0	0.1	1.7	52	10
Lincoln	0.01	1.7	21	4.2	0				0.04	1.7	54	11	0.02	1.7	22	4.4	0.2	1.7	54	5.4
Jerome	0.01	1.7	22	4.4	0				0.04	1.7	48	9.6	0.02	1.7	22	4.4	0.2	1.7	52	5.2
Twin Falls	0.01	1.7	22	4.4	0				0.04	1.7	48	9.6	0.02	1.7	19	3.8	0.2	1.7	38	3.8
Gooding	0.01	1.7	22	4.4	0				0.04	1.7	44	8.8	0.02	1.7	24	4.8	0.2	1.7	38	3.8
Elmore	0.01	1.7	22	4.4	0				0.05	1.7	40	8.0	0.02	1.7	36	7.2	0.3	1.7	36	3.6
Ada	0.02	1.5	22	4.4	0				0.14	1.5	40	4.0	0.01	1.7	60	12	0.3	1.5	36	3.6
Canyon	0.01	1.7	22	4.4	0				0.05	1.7	40	8.0	0.01	1.7	60	12	0.3	1.7	36	3.6
Owyhee	0.01	1.7	22	4.4	0				0.03	1.7	48	9.6	0.02	1.7	30	6.0	0.3	1.7	34	3.4

	APPLEWASP				POST				MET				APPLE-II				ZUCCHINI			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO																				
Montezuma	0.2	1.9	20	2.0	0.05	1.9	36	7.2	0				0.02	1.7	36	7.2	0.3	1.7	13	1.3
La Plata	0.2	1.9	21	2.1	0.05	1.9	36	7.2	0				0.01	1.7	36	7.2	0.3	1.7	15	1.5
Dolores	0.1	1.9	21	4.2	0.1	1.9	36	7.2	0				0.02	1.7	34	6.8	0.3	1.7	13	1.3
San Juan	0.02	1.9	22	4.4	0.1	1.9	36	7.2	0				0.01	1.7	32	6.4	0.3	1.7	14	1.4
San Miguel	0.05	1.9	22	4.4	0.1	1.9	36	7.2	0				0.02	1.7	30	6.0	0.3	1.7	13	1.3
Ouray	0.02	1.9	23	4.6	0.15	1.9	36	3.6	0				0.01	1.7	30	6.0	0.3	1.7	14	1.4
Montrose	0.09	1.9	21	4.2	0.2	1.9	36	3.6	1	1.9	9	0.9	0.02	1.7	28	5.6	0.3	1.7	13	1.3
Delta	0.02	1.7	22	4.4	0.15	1.7	36	3.6	4	1.7	8	0.8	0.02	1.7	28	5.6	0.3	1.7	13	1.3
Mesa	0.05	1.5	24	4.8	0.2	1.5	36	3.6	5	1.5	7	0.7	0.03	1.5	27	5.4	0.3	1.5	13	1.3
Garfield	0.06	1.7	24	4.8	0.2	1.7	38	3.8	4	1.7	8	0.8	1	1.7	22	2.2	0.3	1.7	13	1.3
Rio Blanco	0.05	1.9	20	4.0	0.3	1.9	40	4.0	2	1.7	11	1.1	3	1.7	21	2.1	0.3	1.7	18	1.8
Moffat	0.04	1.9	20	4.0	0.3	1.9	42	4.2	0.1	1.9	15	3.0	3	1.7	20	2.0	0.3	1.7	24	2.4
WYOMING																				
Uinta	0.04	1.9	17	3.4	0.35	1.9	44	4.4	0.1	1.7	54	11	0.3	1.7	18	1.8	0.3	1.7	52	5.2
Sweetwater	0.04	1.9	20	4.0	0.3	1.9	44	4.4	0.15	1.7	24	2.4	1.5	1.7	20	2.0	0.2	1.7	48	4.8
Carbon	0.02	1.9	22	4.4	0.2	1.9	44	4.4	0.2	1.7	18	1.8	2	1.7	21	2.1	0.6	1.7	40	4.0
Fremont	0.02	1.9	22	4.4	0.2	1.9	44	4.4	0.2	1.7	16	1.6	0.2	1.7	22	2.2	0.2	1.7	48	4.8
Sublette	0.03	1.9	22	4.4	0.1	1.9	44	8.8	0.04	1.7	60	12	0.06	1.7	21	4.2	0.1	1.7	52	10.4
Lincoln	0.04	1.9	18	3.6	0.1	1.9	42	8.4	0.05	1.7	58	12	0.07	1.7	20	4.0	0.2	1.7	54	5.4
NEVADA																				
Washoe	0				0				0.02	1.5	60	12	0.02	1.5	60	12	0.1	1.5	44	8.8
Humboldt	0				0				0.05	1.7	60	12	0.01	1.7	60	12	0.15	1.7	40	4.0
Elko	0.01	1.5	80	16	0				0.03	1.5	48	9.6	0.07	1.5	18	3.6	0.2	1.7	32	3.2
White Pine-Lund/Prstn	0.03	1.7	7	1.4	0.32	1.9	18	1.8	0.02	1.7	24	4.8	5.6	1.5	7	0.7	0.1	1.7	30	6.0
White Pine-Baker	0.03	1.7	8	1.6	0.2	1.9	18	1.8	0.02	1.7	24	4.8	2.9	1.5	9	0.9	0.1	1.7	30	6.0
White Pine-Ely	0.03	1.5	7	1.4	0.32	1.5	18	1.8	0.02	1.5	24	4.8	3.1	1.5	7	0.7	0.1	1.5	30	6.0
Lander-Battle Mountain	0				0				0.02	1.7	40	8.0	0.03	1.7	18	3.6	0.1	1.7	36	7.2
Lander-Austin	0				0				0.02	1.7	40	8.0	0.1	1.7	14	2.8	0.1	1.7	36	7.2
Eureka	0				0				0.02	1.7	30	6.0	0.57	1.5	7	0.7	0.1	1.7	36	7.2
Pershing	0				0				0.05	1.7	50	10	0.01	1.7	60	12	0.1	1.7	36	7.2
Churchill	0				0				0.03	1.7	50	10	0.03	1.7	48	9.6	0.1	1.7	36	7.2
Ormsby	0				0				0.02	1.7	60	12	0.02	1.7	60	12	0.1	1.7	36	7.2
Storey	0				0				0.02	1.7	60	12	0.02	1.7	60	12	0.1	1.7	36	7.2
Lyon	0				0				0.02	1.7	60	12	0.02	1.7	60	12	0.1	1.7	36	7.2
Douglas	0				0				0.02	1.7	60	12	0.02	1.7	60	12	0.1	1.7	36	7.2
Mineral	0				0				0.03	1.7	60	12	0.01	1.7	60	12	0.05	1.7	40	8.0

	APPLEWASP				POST				MET				APPLE-II				ZUCCHINI			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO																				
San Juan	0.2	1.7	15	1.5	0.02	1.7	36	7.2	0				0.03	1.7	36	7.2	0.2	1.7	15	1.5
McKinley	0.2	1.7	15	1.5	0.01	1.7	36	7.2	0				0.02	1.7	38	7.6	0.2	1.7	17	1.7
Valencia	0.2	1.7	15	1.5	0.02	1.7	50	10	0				0.02	1.7	50	10	0.15	1.7	72	7.2
Catron	0.2	1.7	15	1.5	0.01	1.7	50	10	0				0				0.05	1.7	72	14
Grant	0.03	1.7	15	3.0	0				0				0				0.02	1.7	72	14
Hidalgo	0				0				0				0				0.01	1.7	72	14
Rio Arriba	0.2	1.7	18	1.8	0.02	1.7	40	8.0	0				0.03	1.7	38	7.6	0.15	1.7	72	7.2
Los Alamos	0.2	1.7	18	1.8	0.02	1.7	40	8.0	0				0.03	1.7	38	7.6	0.15	1.7	72	7.2
Sandoval	0.2	1.7	18	1.8	0.02	1.7	50	10	0				0.03	1.7	44	8.8	0.15	1.7	72	7.2
Bernalillo	0.17	1.5	18	1.8	0.02	1.5	50	10	0				0.03	1.5	50	10	0.13	1.5	72	7.2
Socorro	0.2	1.7	18	1.8	0.01	1.7	58	12	0				0.02	1.7	56	11	0.05	1.7	72	14
Sierra	0.1	1.7	18	3.6	0				0				0				0.02	1.7	72	14
Luna	0.03	1.7	15	3.0	0				0				0				0.01	1.7	72	14
Dona Ana	0.03	1.7	18	3.6	0				0				0				0.01	1.7	72	14
Taos	0.2	1.7	18	1.8	0.02	1.7	48	9.6	0				0.05	1.7	38	7.6	0.15	1.7	72	7.2
Santa Fe	0.2	1.7	18	1.8	0.02	1.7	58	12	0				0.03	1.7	50	10	0.15	1.7	72	7.2
Torrance	0.2	1.7	21	2.1	0.01	1.7	58	12	0				0.03	1.7	56	11	0.1	1.7	72	14
Lincoln	0.2	1.7	21	2.1	0.01	1.7	65	13	0				0.01	1.7	52	10	0.2	1.7	72	7.2
Otero	0.08	1.7	21	4.2	0				0				0				0.1	1.7	72	14
Colfax	0.25	1.7	24	2.4	0.02	1.7	60	12	0				0.8	1.7	40	4.0	2	1.7	72	7.2
Mora	0.25	1.7	24	2.4	0.02	1.7	66	13	0				0.6	1.7	40	4.0	1.2	1.7	72	7.2
San Miguel	0.2	1.7	24	2.4	0.02	1.7	66	13	0				0.2	1.7	44	4.4	0.8	1.7	72	7.2
Guadalupe	0.2	1.7	24	2.4	0.02	1.7	66	13	0				0.1	1.7	44	8.8	0.4	1.7	72	7.2
De Baca	0.2	1.7	24	2.4	0.01	1.7	70	14	0				0.1	1.7	48	9.6	0.3	1.7	72	7.2
Chaves	0.22	1.5	24	2.4	0.01	1.5	70	14	0				0.07	1.5	52	10	0.2	1.5	72	7.2
Eddy	0.1	1.7	24	4.8	0				0				0.04	1.7	56	11	0.1	1.7	72	14
Union	0.3	1.7	28	2.8	0.01	1.7	70	14	0				0.8	1.7	40	4.0	2	1.7	72	7.2
Harding	0.3	1.7	28	2.8	0.01	1.7	70	14	0				0.7	1.7	40	4.0	1.2	1.7	72	7.2
Quay	0.2	1.7	28	2.8	0.01	1.7	70	14	0				0.5	1.7	44	4.4	0.8	1.7	72	7.2
Curry	0.2	1.7	28	2.8	0.01	1.7	70	14	0				0.3	1.7	48	4.8	0.4	1.7	72	7.2
Roosevelt	0.2	1.7	28	2.8	0.01	1.7	70	14	0				0.2	1.7	52	5.2	0.3	1.7	72	7.2
Lea	0.1	1.7	28	5.6	0				0				0.05	1.7	56	11	0.2	1.7	72	7.2
CALIFORNIA																				
Mono	0				0				0				0.3	1.7	10	1.0	0.05	1.7	48	9.6
Inyo-Bishop	0				0				0				0.5	1.7	8	0.8	0.05	1.7	48	9.6
Inyo-Furnace Creek	0				0.2	1.9	16	1.6	0				0.2	1.7	6	0.6	0.05	1.7	48	9.6
San Bernardino	0				0				0				0				0.05	1.7	48	9.6
Los Angeles	0				0				0				0				0.07	1.5	60	12

	BOLTZMANN				WILSON				PRISCILLA				HOOD				DIABLO			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH																				
Box Elder-Rosette	0.05	1.9	100	20	0				0				0.05	1.7	24	4.8	0.1	1.7	24	4.8
Box Elder-Tremonton	0.05	1.9	100	20	0.02	1.7	60	12	0				0.05	1.7	24	4.8	0.1	1.7	24	4.8
Tooele-West	0.1	1.9	100	20	0				0				0.06	1.7	18	3.6	0.5	1.7	24	2.4
Tooele-East	0.1	1.9	100	20	0.04	1.7	56	11	0				0.06	1.7	18	3.6	0.5	1.7	24	2.4
Juab	0.1	1.9	100	20	0				0				0.06	1.7	15	3.0	0.8	1.7	18	1.8
Millard	0.1	1.9	100	20	0.06	1.7	22	4.4	0				0.13	1.7	12	1.2	0.5	1.7	18	1.8
Beaver	0.05	1.9	100	20	0.24	1.9	20	2.0	0.06	1.5	10	2.0	0.06	1.7	11	2.2	0			
Iron-Cedar City	0.05	1.9	100	20	0.37	1.9	18	1.8	0.26	1.8	12	1.2	0				0			
Iron-Modena	0.05	1.9	100	20	0.49	1.9	17	1.7	0.64	1.9	9	0.9	0				0			
Iron-Parowan	0.05	1.9	100	20	0.24	1.9	19	1.9	0.25	1.9	13	1.3	0				0			
Cache	0.05	1.9	100	20	0				0				0.06	1.7	28	5.6	0.15	1.7	30	3.0
Rich	0.05	1.9	100	20	0.04	1.7	60	12	0				0.08	1.7	28	5.6	0.15	1.7	30	3.0
Weber	0.4	1.7	100	10	0.02	1.7	60	12	0				0.08	1.7	26	5.2	0.15	1.7	30	3.0
Morgan	0.4	1.7	100	10	0.05	1.7	56	11	0				0.10	1.7	26	2.6	0.2	1.7	30	3.0
Davis	0.4	1.7	100	10	0.02	1.7	56	11	0				0.10	1.7	24	2.4	0.2	1.7	24	2.4
Salt Lake	0.4	1.5	100	10	0.04	1.5	56	11	0				0.13	1.5	24	2.4	0.5	1.7	24	2.4
Summit	0.3	1.9	100	10	0.06	1.7	56	11	0				0.13	1.7	26	2.6	0.5	1.7	30	3.0
Daggett	0.1	1.9	100	20	0.12	1.7	30	3.0	0				0.13	1.7	28	2.8	0.2	1.7	32	3.2
Utah	0.4	1.9	100	10	0.12	1.7	22	2.2	0				0.15	1.7	18	1.8	1	1.7	24	2.4
Wasatch	0.3	1.9	100	10	0.12	1.7	24	2.4	0				0.13	1.7	20	2.0	0.8	1.7	30	3.0
Duchesne	0.3	1.9	100	10	0.12	1.7	25	2.5	0				0.06	1.7	24	4.8	0.4	1.7	36	3.6
Uintah	0.2	1.9	100	10	0.12	1.7	27	2.7	0				0.20	1.7	24	2.4	0.3	1.7	36	3.6
Carbon	0.2	1.9	100	10	0.13	1.7	23	2.3	0				0.1	1.7	17	3.4	0.2	1.7	30	3.0
Sanpete	0.1	1.9	100	20	0.12	1.7	21	2.1	0				0.1	1.7	14	2.8	0.5	1.7	24	2.4
Sevier	0.1	1.9	100	20	0.18	1.7	20	2.0	0				0.13	1.7	14	1.4	0.1	1.7	24	4.8
Emery	0.2	1.9	100	10	0.16	1.7	24	2.4	0				0.13	1.7	17	1.7	0.15	1.7	30	3.0
Grand	0.1	1.9	100	20	0.10	1.7	25	5.0	0				0.25	1.7	19	1.9	0.15	1.7	48	4.8
Piute	0.1	1.9	100	20	0.30	1.7	21	2.1	0.05	1.7	15	3.0	0.06	1.7	14	2.8	0			
Wayne	0.2	1.9	100	10	0.24	1.7	22	2.2	0.10	1.7	17	3.4	0.06	1.7	17	3.4	0			
Garfield	0.2	1.9	100	10	0.18	1.7	21	2.1	0.33	1.5	12	1.2	0				0			
Kane-Kanab	0.2	1.9	100	10	0				0.09	1.5	12	2.4	0				0			
Kane-Orderville	0.2	1.9	100	10	0				0.83	1.5	11	1.1	0				0			
San Juan	0.2	1.9	100	10	0.12	1.7	24	2.4	0.26	1.7	18	1.8	0				0			
OREGON																				
Malheur	0.05	1.7	18	3.6	0				0				0				0			
Harney	0.02	1.7	18	3.6	0				0				0				0			

	BOLTZMANN				WILSON				PRISCILLA				HOOD				DIABLO			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA																				
Mohave-Littlefield	0.05	1.9	80	16	0				0.13	1.7	7	0.7	0				0			
Mohave-Kingman	0.05	1.9	80	16	0				0				0				0			
Mohave-Moccasin	0.2	1.9	150	15	0				0.13	1.7	11	1.1	0				0			
Coconino-Fredonia	0.2	1.9	150	15	0				0.13	1.7	11	1.1	0				0			
Coconino-Rim/TubaCty	0.2	1.9	150	15	0				0				0				0			
Coconino-Flag/Williams	0.2	1.9	150	15	0				0				0				0			
Navajo	0.2	1.9	150	15	0				0.26	1.7	15	1.5	0				0			
Apache	0.2	1.9	150	15	0				0.38	1.7	18	1.8	0				0			
Yavapai	0.1	1.9	150	30	0				0				0.13	1.7	86	8.6	0			
Gila	0.2	1.9	150	15	0				0.13	1.9	100	10	0.50	1.7	86	8.6	0			
Yuma	0				0				0				0.13	1.7	90	9.0	0			
Maricopa	0.22	1.7	150	15	0				0.06	1.7	100	20	0.63	1.7	86	8.6	0			
Pinal	0.2	1.9	150	15	0				0.13	1.9	100	10	0.63	1.7	86	8.6	0			
Graham	0.2	1.9	150	15	0				0.26	1.9	100	10	0.50	1.7	86	8.6	0			
Greenlee	0.2	1.9	150	15	0				0.26	1.9	90	9.0	0.38	1.7	84	8.4	0			
Pima	0.17	1.5	150	15	0				0.23	1.5	100	10	2.4	1.5	86	8.6	0			
Santa Cruz	0.2	1.9	150	15	0				0.26	1.9	100	10	1.5	1.7	86	8.6	0			
Cochise	0.2	1.9	150	15	0				0.26	1.9	100	10	0.50	1.7	86	8.6	0			
IDAHO																				
Bear Lake	0.01	1.7	20	4.0	0				0				0				0.1	1.7	30	6.0
Caribou	0.01	1.7	20	4.0	0				0				0				0.1	1.7	30	6.0
Bonneville	0				0				0				0				0.08	1.7	36	7.2
Bingham	0.02	1.7	18	3.6	0				0				0				0.08	1.7	36	7.2
Bannock	0.04	1.7	18	3.6	0				0				0				0.1	1.7	30	6.0
Franklin	0.02	1.7	18	3.6	0				0				0				0.15	1.7	30	3.0
Oneida	0.06	1.7	16	3.2	0				0				0				0.1	1.7	30	6.0
Power	0.05	1.7	17	3.4	0				0				0				0.1	1.7	30	6.0
Cassia	0.06	1.7	16	3.2	0				0				0				0.08	1.7	30	6.0
Minidoka	0.06	1.7	17	3.4	0				0				0				0.05	1.7	30	6.0
Lincoln	0.06	1.7	18	3.6	0				0				0				0.03	1.7	30	6.0
Jerome	0.06	1.7	17	3.4	0				0				0				0.03	1.7	36	7.2
Twin Falls	0.06	1.7	15	3.0	0				0				0				0.03	1.7	36	7.2
Gooding	0.07	1.7	17	3.4	0				0				0				0.01	1.7	36	7.2
Elmore	0.08	1.7	18	3.6	0				0				0				0			
Ada	0.1	1.5	18	3.6	0				0				0				0			
Canyon	0.08	1.7	18	3.6	0				0				0				0			
Owyhee	0.1	1.7	18	3.6	0				0				0				0			

	BOLTZMANN				WILSON				PRISCILLA				HOOD				DIABLO			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO																				
Montezuma	0.2	1.9	100	10	0				0.13	1.7	21	2.1	0				0			
La Plata	0.2	1.9	100	10	0				0.13	1.7	22	2.2	0				0			
Dolores	0.1	1.9	100	20	0				0.06	1.7	24	4.8	0				0			
San Juan	0.1	1.9	100	20	0				0.06	1.7	24	4.8	0				0			
San Miguel	0.1	1.9	100	20	0.06	1.7	27	5.4	0				0.06	1.7	34	6.8	0			
Ouray	0.1	1.9	100	20	0.06	1.7	28	5.6	0				0.06	1.7	32	6.4	0			
Montrose	0.1	1.9	100	20	0.06	1.7	27	5.4	0				0.13	1.7	30	3.0	0.1	1.7	48	9.6
Delta	0.1	1.9	100	20	0.04	1.7	27	5.4	0				0.25	1.7	28	2.8	0.1	1.7	48	9.6
Mesa	0.08	1.5	100	20	0.04	1.5	27	5.4	0				0.25	1.5	26	2.6	0.15	1.5	48	4.8
Garfield	0.1	1.9	100	20	0.06	1.7	28	5.6	0				1.0	1.7	25	2.5	0.2	1.7	48	4.8
Rio Blanco	0.1	1.9	100	20	0.10	1.7	30	6.0	0				1.0	1.7	26	2.6	0.2	1.7	48	4.8
Moffat	0.1	1.9	100	20	0.12	1.7	36	3.6	0				0.25	1.7	32	3.2	0.3	1.7	36	3.6
WYOMING																				
Uinta	0				0.06	1.7	48	9.6	0				0.13	1.7	30	3.0	0.5	1.7	30	3.0
Sweetwater	0.1	1.9	150	30	0.12	1.7	48	4.8	0				0.25	1.7	32	3.2	0.5	1.7	36	3.6
Carbon	0.1	1.9	150	30	0.18	1.7	48	4.8	0				0.19	1.7	42	4.2	0.5	1.7	36	3.6
Fremont	0				0.12	1.7	60	6.0	0				0.04	1.7	40	8.0	0.5	1.7	36	3.6
Sublette	0				0.01	1.7	56	11	0				0.05	1.7	40	8.0	0.3	1.7	36	3.6
Lincoln	0				0.04	1.7	54	11	0				0.06	1.7	36	7.2	0.15	1.7	36	3.6
NEVADA																				
Washoe	3.4	1.5	15	1.5	0				0				0				0			
Humboldt	0.2	1.7	15	1.5	0				0				0				0			
Elko	0.2	1.7	12	1.2	0				0				0				0.05	1.7	24	4.8
White Pine-Lund/Prstn	0.08	1.7	8	1.6	0				0				0.12	1.5	8	0.8	3.4	1.5	12	1.2
White Pine-Baker	0.02	1.7	8	1.6	0				0				0.24	1.5	9	0.9	2.5	1.5	15	1.5
White Pine-Ely	0.07	1.7	8	1.6	0				0				0				1.2	1.7	14	1.4
Lander-Battle Mountain	0.5	1.7	9	0.9	0				0				0				0			
Lander-Austin	3.7	1.5	8	0.8	0				0				0				0			
Eureka	0.94	1.5	8	0.8	0				0				0				0			
Pershing	2	1.7	12	1.2	0				0				0				0			
Churchill	3.7	1.5	12	1.2	0				0				0				0			
Ormsby	3	1.7	14	1.4	0				0				0				0			
Storey	3	1.7	15	1.5	0				0				0				0			
Lyon	3.1	1.5	13	1.3	0				0				0				0			
Douglas	3	1.7	14	1.4	0				0				0				0			
Mineral	3.7	1.5	9	0.9	0				0				0				0			

	BOLTZMANN				WILSON				PRISCILLA				HOOD				DIABLO			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO																				
San Juan	0.2	1.9	200	20	0				0.26	1.9	21	2.1	0				0			
McKinley	0.2	1.9	200	20	0				0.38	1.9	22	2.2	0.13	1.9	100	10	0			
Valencia	0.2	1.9	200	20	0				0.26	1.9	30	3.0	0.75	1.9	80	8.0	0			
Catron	0.2	1.9	200	20	0				0.26	1.9	80	8.0	0.25	1.9	82	8.2	0			
Grant	0.2	1.9	200	20	0				0.26	1.9	90	9.0	0.25	1.9	82	8.2	0			
Hidalgo	0.2	1.9	200	20	0				0.26	1.9	90	9.0	0.25	1.9	82	8.2	0			
Rio Arriba	0.2	1.9	200	20	0				0.13	1.9	30	3.0	0.13	1.9	100	10	0			
Los Alamos	0.2	1.9	200	20	0				0.13	1.9	30	3.0	0.75	1.9	76	7.6	0			
Sandoval	0.2	1.9	200	20	0				0.26	1.9	30	3.0	0.75	1.9	76	7.6	0			
Bernalillo	0.2	1.5	200	20	0				0.27	1.5	30	3.0	1.0	1.7	76	7.6	0			
Socorro	0.2	1.9	200	20	0				0.26	1.9	80	8.0	0.25	1.9	80	8.0	0			
Sierra	0.2	1.9	200	20	0				0.26	1.9	90	9.0	0.25	1.9	80	8.0	0			
Luna	0.2	1.9	200	20	0				0.26	1.9	90	9.0	0.25	1.9	82	8.2	0			
Dona Ana	0.2	1.9	200	20	0				0.26	1.9	90	9.0	0.13	1.9	80	8.0	0			
Taos	0.2	1.9	200	20	0				0.13	1.9	40	4.0	0.75	1.9	72	7.2	0			
Santa Fe	0.2	1.9	200	20	0				0.26	1.9	40	4.0	1.0	1.9	74	7.4	0			
Torrance	0.2	1.9	200	20	0				0.26	1.9	60	6.0	1.0	1.9	76	7.6	0			
Lincoln	0.2	1.9	200	20	0				0.26	1.9	80	8.0	0.25	1.9	78	7.8	0			
Otero	0.2	1.9	200	20	0				0.26	1.9	80	8.0	0.13	1.9	80	8.0	0			
Colfax	0.2	1.9	200	20	0				0.13	1.9	40	4.0	1.0	1.9	72	7.2	0			
Mora	0.2	1.9	200	20	0				0.13	1.9	50	5.0	1.0	1.9	74	7.4	0			
San Miguel	0.2	1.9	200	20	0				0.26	1.9	50	5.0	1.0	1.9	74	7.4	0			
Guadalupe	0.2	1.9	200	20	0				0.26	1.9	60	6.0	0.75	1.9	74	7.4	0			
De Baca	0.2	1.9	200	20	0				0.26	1.9	60	6.0	0.38	1.9	76	7.6	0			
Chaves	0.2	1.9	200	20	0				0.26	1.9	70	7.0	0.13	1.9	76	7.6	0			
Eddy	0.2	1.9	200	20	0				0.26	1.9	70	7.0	0.13	1.9	78	7.8	0			
Union	0.2	1.9	200	20	0				0.13	1.9	50	5.0	1.0	1.9	72	7.2	0			
Harding	0.2	1.9	200	20	0				0.13	1.9	50	5.0	1.0	1.9	72	7.2	0			
Quay	0.2	1.9	200	20	0				0.26	1.9	60	6.0	0.75	1.9	72	7.2	0			
Curry	0.2	1.9	200	20	0				0.26	1.9	70	7.0	0.38	1.9	76	7.6	0			
Roosevelt	0.2	1.9	200	20	0				0.26	1.9	70	7.0	0.38	1.9	78	7.8	0			
Lea	0.2	1.9	200	20	0				0.26	1.9	70	7.0	0.13	1.9	78	7.8	0			
CALIFORNIA																				
Mono	0.03	1.7	12	2.4	0.12	1.7	13	1.3	0				0				0			
Inyo-Bishop	0.12	1.5	60	6.0	0.37	1.7	10	1.0	0				0				0			
Inyo-Furnace Creek	0.1	1.9	60	12	0				0				0				0			
San Bernardino	0.05	1.9	60	12	0				0				0				0			
Los Angeles	0.03	1.7	40	8.0	0				0				0.04	1.5	100	20	0			

	KEPLEROWEN				SHASTA				DOPPLER				SMOKY				GALILEO			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH																				
Box Elder-Rosette	0.3	36	36	3.6	0.5	1.7	36	3.6	0.12	1.9	24	2.4	0				0.1	1.7	60	12
Box Elder-Tremonton	0.3	1.7	18	1.8	0.5	1.7	36	3.6	0.50	1.9	24	2.4	0				0.3	1.7	60	6.0
Tooele-West	0.4	1.7	15	1.5	1	1.7	24	2.4	0.37	1.9	22	2.2	0				0.4	1.7	48	4.8
Tooele-East	0.2	1.7	15	1.5	0.5	1.7	24	2.4	0.62	1.9	24	2.4	0				0.4	1.7	60	6.0
Juab	0.05	1.7	15	3.0	0.4	1.7	24	2.4	0.62	1.9	21	2.1	0				0.3	1.7	48	4.8
Millard	0.05	1.7	12	2.4	0.2	1.7	20	2.0	0.25	1.9	24	2.4	0				0.5	1.7	48	4.8
Beaver	0				0				0				0.08	1.5	9	1.8	0.1	1.7	48	9.6
Iron-Cedar City	0				0				0				2	1.6	6	0.6	0			
Iron-Modena	0				0				0				0.57	1.5	4	0.4	0			
Iron-Parowan	0				0				0				0.4	1.5	11	1.1	0			
Cache	0.3	1.7	21	2.1	0.4	1.7	42	4.2	0.37	1.9	28	2.8	0				0.2	1.9	60	6.0
Rich	0.3	1.7	21	2.1	0.3	1.7	42	4.2	0.37	1.9	28	2.8	0				0.2	1.9	60	6.0
Weber	0.3	1.7	18	1.8	0.4	1.7	36	3.6	0.50	1.7	26	2.6	0				0.3	1.9	60	6.0
Morgan	0.2	1.7	18	1.8	0.4	1.7	36	3.6	0.50	1.7	26	2.6	0				0.4	1.9	60	6.0
Davis	0.3	1.7	18	1.8	0.4	1.7	36	3.6	0.62	1.7	25	2.5	0				0.4	1.7	60	6.0
Salt Lake	0.12	1.5	18	1.8	0.4	1.5	36	3.6	0.62	1.5	25	2.5	0				0.4	1.5	60	6.0
Summit	0.2	1.7	18	1.8	0.3	1.7	36	3.6	0.50	1.7	26	2.6	0				0.4	1.7	66	6.6
Daggett	0.1	1.7	21	4.2	0.3	1.7	48	4.8	0.50	1.9	30	3.0	3	1.7	28	2.8	0.3	1.9	72	7.2
Utah	0.05	1.7	18	3.6	0.5	1.7	36	3.6	1.2	1.9	25	2.5	0				0.5	1.9	60	6.0
Wasatch	0.05	1.7	18	3.6	0.2	1.7	36	3.6	0.87	1.9	26	2.6	0.1	1.7	27	5.4	0.4	1.9	66	6.6
Duchesne	0.03	1.7	18	3.6	0.2	1.7	42	4.2	0.62	1.9	30	3.0	0.5	1.7	27	2.7	0.3	1.9	72	7.2
Uintah	0				0.2	1.7	48	4.8	0.62	1.9	32	3.2	3	1.7	24	2.4	0.2	1.9	72	7.2
Carbon	0				0.1	1.7	42	8.4	0.37	1.9	30	3.0	0.5	1.9	24	2.4	0.1	1.9	72	14
Sanpete	0				0.1	1.7	36	7.2	0.50	1.9	24	2.4	0.2	1.7	21	2.1	0.1	1.9	66	13
Sevier	0				0				0.12	1.9	28	2.8	0.3	1.7	21	2.1	0.1	1.9	66	13
Emery	0				0				0				1	1.7	21	2.1	0.1	1.9	72	14
Grand	0				0				0				0.3	1.7	21	2.1	0.1	1.9	72	14
Piute	0				0				0				0.5	1.7	19	1.9	0.1	1.9	72	14
Wayne	0				0				0				1	1.9	19	1.9	0.1	1.9	72	14
Garfield	0				0				0				16	1.5	12	1.2	0			
Kane-Kanab	0				0				0				0.2	1.7	13	1.3	0			
Kane-Orderville	0				0				0				0.39	1.5	11	1.1	0			
San Juan	0				0				0				0				0.1	1.9	72	14
OREGON																				
Malheur	0.2	1.7	15	1.5	0				0				0				0			
Harney	0.1	1.7	15	3.0	0				0				0				0			

	KEPLEROWEN				SHASTA				DOPPLER				SMOKY				GALILEO			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA																				
Mohave-Littlefield	0				0				0				2.6	1.9	8	0.8	0			
Mohave-Kingman	0				0				0				0				0			
Mohave-Moccasin	0				0				0				0.2	1.7	10	1.0	0			
Coconino-Fredonia	0				0				0				0.15	1.7	12	1.2	0			
Coconino-Rim/TubaCty	0				0				0				0				0			
Coconino-Flag/Williams	0				0				0				0				0			
Navajo	0				0				0				0				0			
Apache	0				0				0				0				0			
Yavapai	0				0				0				0				0			
Gila	0				0				0				0				0			
Yuma	0				0				0				0				0			
Maricopa	0				0				0				0				0			
Pinal	0				0				0				0				0			
Graham	0				0				0				0				0			
Greenlee	0				0				0				0				0			
Pima	0				0				0				0				0			
Santa Cruz	0				0				0				0				0			
Cochise	0				0				0				0				0			
IDAHO																				
Bear Lake	0.3	1.7	18	1.8	0.2	1.7	42	4.2	0.25	1.9	30	3.0	0				0.2	1.9	72	7.2
Caribou	0.2	1.7	18	1.8	0.1	1.7	42	8.4	0.10	1.9	36	7.2	0				0.05	1.9	72	14
Bonneville	0.2	1.7	18	1.8	0.05	1.7	42	8.4	0.06	1.9	36	7.2	0				0.02	1.9	72	14
Bingham	0.2	1.7	18	1.8	0.05	1.7	42	8.4	0.05	1.9	36	7.2	0				0.03	1.9	72	14
Bannock	0.3	1.7	18	1.8	0.1	1.7	42	8.4	0.07	1.9	30	6.0	0				0.06	1.9	72	14
Franklin	0.3	1.7	18	1.8	0.1	1.7	42	8.4	0.25	1.9	30	3.0	0				0.2	1.9	72	7.2
Oneida	0.3	1.7	18	1.8	0.2	1.7	42	4.2	0.12	1.9	30	3.0	0				0.1	1.9	72	14
Power	0.3	1.7	18	1.8	0.1	1.7	42	8.4	0.06	1.9	30	6.0	0				0.05	1.9	72	14
Cassia	0.3	1.7	18	1.8	0.3	1.7	42	4.2	0.07	1.9	30	6.0	0				0			
Minidoka	0.3	1.7	18	1.8	0.1	1.7	42	8.4	0.02	1.9	30	6.0	0				0			
Lincoln	0.3	1.7	18	1.8	0.05	1.7	42	8.4	0.01	1.9	36	7.2	0				0			
Jerome	0.3	1.7	18	1.8	0.1	1.7	42	8.4	0.01	1.9	36	7.2	0				0			
Twin Falls	0.4	1.7	18	1.8	0.05	1.7	42	8.4	0.01	1.9	30	6.0	0				0			
Gooding	0.3	1.7	18	1.8	0				0				0				0			
Elmore	0.4	1.7	18	1.8	0				0				0				0			
Ada	0.4	1.5	18	1.8	0				0				0				0			
Canyon	0.3	1.7	18	1.8	0				0				0				0			
Owyhee	0.4	1.7	18	1.8	0				0				0				0			

	KEPLEROWEN				SHASTA				DOPPLER				SMOKY				GALILEO			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO																				
Montezuma	0				0				0				0				0			
La Plata	0				0				0				0				0			
Dolores	0				0				0				0				0.05	1.9	72	14
San Juan	0				0				0				0				0.05	1.9	72	14
San Miguel	0				0				0				0				0.1	1.9	72	14
Ouray	0				0				0				0				0.1	1.9	72	14
Montrose	0				0				0				0				0.15	1.9	72	7.2
Delta	0				0				0				0				0.15	1.7	72	7.2
Mesa	0				0				0				0				0.15	1.5	72	7.2
Garfield	0				0.05	1.7	48	9.6	0.12	1.9	37	3.7	0				0.15	1.7	72	7.2
Rio Blanco	0				0.1	1.7	48	9.6	0.25	1.9	37	3.7	0.3	1.7	27	2.7	0.2	1.9	72	7.2
Moffat	0				0.2	1.7	48	4.8	0.50	1.9	36	3.6	0.1	1.7	28	5.6	0.2	1.9	72	7.2
WYOMING																				
Uinta	0.2	1.7	24	2.4	0.3	1.7	42	4.2	0.37	1.9	30	3.0	0.5	1.7	32	3.2	0.3	1.9	72	7.2
Sweetwater	0.15	1.7	24	2.4	0.3	1.7	42	4.2	0.37	1.9	32	3.2	5	1.7	30	3.0	0.3	1.9	72	7.2
Carbon	0.15	1.7	24	2.4	0.2	1.7	48	4.8	0.37	1.9	38	3.8	2	1.7	35	3.5	0.2	1.9	72	7.2
Fremont	0.3	1.7	24	2.4	0.1	1.7	48	9.6	0.12	1.9	38	3.8	3	1.7	33	3.3	0.1	1.9	72	14
Subletie	0.2	1.7	24	2.4	0.2	1.7	48	4.8	0.12	1.9	36	3.6	1	1.7	33	3.3	0.2	1.9	72	7.2
Lincoln	0.2	1.7	24	2.4	0.2	1.7	48	4.8	0.25	1.9	34	3.4	0.8	1.7	34	3.4	0.2	1.9	72	7.2
NEVADA																				
Washoe	0.4	1.7	12	1.2	0				0				0				0			
Humboldt	0.1	1.7	12	2.4	0.2	1.5	10	1.0	0				0				0			
Elko	0.4	1.7	9	0.9	0.7	1.5	28	2.8	0.06	1.9	24	4.8	0				0.1	1.9	30	6.0
White Pine-Lund/Prstn.	0.57	1.7	6	0.6	4	1.5	11	1.1	1.0	1.5	11	1.1	0				0.5	1.9	24	2.4
White Pine-Baker	0.4	1.7	8	0.8	3	1.7	14	1.4	0.11	1.5	12	1.2	0				0.5	1.9	24	2.4
White Pine-Ely	0.34	1.5	8	0.8	3	1.5	13	1.3	0.48	1.5	14	1.4	0				0.5	1.9	24	2.4
Lander-Battle Mountain	0.2	1.7	9	0.9	0.2	1.7	36	3.6	0				0				0			
Lander-Austin	0.3	1.5	10	1.0	0.33	1.5	8	0.8	0				0				0			
Eureka	0.42	1.5	8	0.8	5.8	1.5	13	1.3	0				0				0.3	1.9	24	2.4
Pershing	0.4	1.7	12	1.2	0				0				0				0			
Churchill	1.4	1.5	15	1.5	0				0				0				0			
Ormsby	0.5	1.5	15	1.5	0				0				0				0			
Storey	0.4	1.7	15	1.5	0				0				0				0			
Lyon	0.8	1.5	15	1.5	0				0				0				0			
Douglas	0.6	1.7	16	1.6	0				0				0				0			
Mineral	2	1.7	15	1.5	0				0				0				0			

	KEPLEROWEN				SHASTA				DOPPLER				SMOKY				GALILEO			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO																				
San Juan	0				0				0				0				0			
McKinley	0				0				0				0				0			
Valencia	0				0				0				0				0			
Catron	0				0				0				0				0			
Grant	0				0				0				0				0			
Hidalgo	0				0				0				0				0			
Rio Arriba	0				0				0				0				0			
Los Alamos	0				0				0				0				0			
Sandoval	0				0				0				0				0			
Bernalillo	0				0				0				0				0			
Socorro	0				0				0				0				0			
Sierra	0				0				0				0				0			
Luna	0				0				0				0				0			
Dona Ana	0				0				0				0				0			
Taos	0				0				0				0				0			
Santa Fe	0				0				0				0				0			
Torrance	0				0				0				0				0			
Lincoln	0				0				0				0				0			
Otero	0				0				0				0				0			
Colfax	0				0				0				0				0			
Mora	0				0				0				0				0			
San Miguel	0				0				0				0				0			
Guadalupe	0				0				0				0				0			
De Baca	0				0				0				0				0			
Chaves	0				0				0				0				0			
Eddy	0				0				0				0				0			
Union	0				0				0				0				0			
Harding	0				0				0				0				0			
Quay	0				0				0				0				0			
Curry	0				0				0				0				0			
Roosevelt	0				0				0				0				0			
Lea	0				0				0				0				0			
CALIFORNIA																				
Mono	0.5	1.7	12	1.2	0				0				0				0			
Inyo-Bishop	1	1.5	12	1.2	0				0				0				0			
Inyo-Furnace Creek	0				0				0				10	1.9	5	0.5	0			
San Bernardino	0				0				0				0.5	1.9	9	0.9	0			
Los Angeles	0				0				0				0				0			

	WHEELRCOULMB				LAPLACE				FIZEAU				NEWTON				WHITNEY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH																				
Box Elder-Rosette	0.04	1.7	24	4.8	0				0				0.12	1.7	18	1.8	0.07	1.9	48	9.6
Box Elder-Tremonton	0.06	1.7	24	4.8	0				0				0.12	1.7	18	1.8	0.05	1.9	48	9.6
Tooele-West	0.06	1.7	24	4.8	0				0				0				0.1	1.9	48	9.6
Tooele-East	0.05	1.7	24	4.8	0				0				0.12	1.7	18	1.8	0.05	1.9	48	9.6
Juab	0.01	1.7	24	4.8	0				0				0.23	1.7	15	1.5	0			
Millard	0				0				0				0.12	1.7	12	1.2	0			
Beaver	0				0				0				0.12	1.7	12	1.2	0			
Iron-Cedar City	0				0				0				0				0			
Iron-Modena	0				0				0				0				0			
Iron-Parowan	0				0				0				0				0			
Cache	0.05	1.7	48	9.6	0				0				0.12	1.7	18	1.8	0.06	1.9	48	9.6
Rich	0.05	1.7	48	9.6	0				0				0.12	1.7	18	1.8	0.06	1.9	48	9.6
Weber	0.05	1.7	48	9.6	0				0				0.12	1.7	18	1.8	0.06	1.7	48	9.6
Morgan	0.05	1.7	48	9.6	0				0				0.12	1.7	18	1.8	0.05	1.7	48	9.6
Davis	0.05	1.7	48	9.6	0				0				0.12	1.7	18	1.8	0.06	1.7	48	9.6
Salt Lake	0.04	1.5	48	9.6	0				0				0.15	1.5	18	1.8	0.05	1.5	48	9.6
Summit	0.04	1.7	48	9.6	0				0				0.12	1.7	18	1.8	0.03	1.7	48	9.6
Daggett	0.05	1.7	60	12	0				0				0.07	1.7	21	4.2	0.01	1.9	51	10
Utah	0.02	1.7	48	9.6	0				0				0.12	1.7	18	1.8	0			
Wasatch	0.05	1.7	48	9.6	0				0				0.12	1.7	18	1.8	0.01	1.9	48	9.6
Duchesne	0.05	1.7	60	12	0				0				0.08	1.7	21	4.2	0.01	1.9	51	10
Uintah	0.06	1.7	72	14	0				0				0.07	1.7	21	4.2	0			
Carbon	0				0				0				0.07	1.7	18	3.6	0			
Sanpete	0				0				0				0.09	1.7	18	3.6	0			
Sevier	0				0				0				0.10	1.7	18	1.8	0			
Emery	0				0				0				0.07	1.7	21	4.2	0			
Grand	0.06	1.7	72	14	0				0				0.06	1.7	21	4.2	0			
Piute	0				0				0				0.09	1.7	18	3.6	0			
Wayne	0				0				0				0.06	1.7	21	4.2	0			
Garfield	0				0				0				0				0			
Kane-Kanab	0				0				0				0				0			
Kane-Orderville	0				0				0				0				0			
San Juan	0				0				0				0				0			
OREGON																				
Malheur	0				0				0				0.02	1.7	72	14	0.2	1.9	48	4.8
Harney	0				0				0				0.03	1.7	72	14	0.2	1.9	48	4.8

	WHEELRCOULMB				LAPLACE				FIZEAU				NEWTON				WHITNEY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA																				
Mohave-Littlefield	0				0.25	1.9	12	1.2	0				0				0			
Mohave-Kingman	0				0.25	1.9	12	1.2	0				0				0			
Mohave-Moccasin	0				0.06	1.9	13	2.6	0				0				0			
Coconino-Fredonia	0				0				0				0				0			
Coconino-Rim/TubaCty	0				1.00	1.9	15	1.5	0				0				0			
Coconino-Flag/Williams	0				1.00	1.9	15	1.5	0				0				0			
Navajo	0				0.50	1.9	18	1.8	0				0				0			
Apache	0				0.37	1.9	18	1.8	0				0				0			
Yavapai	0				0.06	1.7	18	3.6	0				0				0			
Gila	0				0.01	1.7	20	4.0	0				0				0			
Yuma	0				0				0				0				0			
Maricopa	0				0.01	1.7	20	4.0	0				0				0			
Pinal	0				0.01	1.7	20	4.0	0				0				0			
Graham	0				0				0				0				0			
Greenlee	0				0				0				0				0			
Pima	0				0.01	1.5	24	4.8	0				0				0			
Santa Cruz	0				0				0				0				0			
Cochise	0				0				0				0				0			
IDAHO																				
Bear Lake	0				0				0				0.09	1.7	60	12	0.1	1.9	69	14
Caribou	0				0				0				0.09	1.7	60	12	0.1	1.9	69	14
Bonneville	0				0				0				0.08	1.7	60	12	0.08	1.9	69	14
Bingham	0				0				0				0.09	1.7	60	12	0.08	1.9	69	14
Bannock	0				0				0				0.09	1.7	60	12	0.1	1.9	69	14
Franklin	0				0				0				0.12	1.7	60	6.0	0.1	1.9	69	14
Oneida	0				0				0				0.12	1.7	60	6.0	0.1	1.9	69	14
Power	0				0				0				0.12	1.7	60	6.0	0.1	1.9	69	14
Cassia	0				0				0				0.08	1.7	60	12	0.1	1.9	66	13
Minidoka	0				0				0				0.08	1.7	60	12	0.1	1.9	66	13
Lincoln	0				0				0				0.08	1.7	60	12	0.1	1.9	66	13
Jerome	0				0				0				0.07	1.7	60	12	0.1	1.9	66	13
Twin Falls	0				0				0				0.05	1.7	60	12	0.1	1.9	63	13
Gooding	0				0				0				0.07	1.7	60	12	0.1	1.9	63	13
Elmore	0				0				0				0.07	1.7	60	12	0.15	1.7	60	6.0
Ada	0				0				0				0.07	1.5	60	12	0.18	1.5	60	6.0
Canyon	0				0				0				0.05	1.7	60	12	0.2	1.7	60	6.0
Owyhee	0				0				0				0.03	1.7	60	12	0.2	1.9	60	6.0

	WHEELRCOULMB				LAPLACE				FIZEAU				NEWTON				WHITNEY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO																				
Montezuma	0.06	1.7	72	14	0				0				0				0			
La Plata	0.06	1.7	72	14	0				0				0				0			
Dolores	0.06	1.7	72	14	0				0				0				0			
San Juan	0.06	1.7	72	14	0				0				0				0			
San Miguel	0.06	1.7	72	14	0				0				0				0			
Ouray	0.06	1.7	72	14	0				0				0				0			
Montrose	0.06	1.7	72	14	0				0				0				0			
Delta	0.06	1.7	72	14	0				0				0.03	1.7	30	6.0	0			
Mesa	0.06	1.5	72	14	0				0				0.06	1.5	30	6.0	0			
Garfield	0.06	1.7	72	14	0				0				0.06	1.7	30	6.0	0			
Rio Blanco	0.06	1.7	72	14	0				0				0.06	1.7	30	6.0	0			
Moffat	0.05	1.7	72	14	0				0				0.06	1.7	30	6.0	0			
WYOMING																				
Uinta	0.04	1.7	72	14	0				0				0.09	1.7	30	6.0	0.05	1.9	72	14
Sweetwater	0.04	1.7	72	14	0				0				0.08	1.7	30	6.0	0.05	1.9	72	14
Carbon	0.04	1.7	72	14	0				0				0.06	1.7	30	6.0	0.04	1.9	72	14
Fremont	0.04	1.7	72	14	0				0				0.07	1.7	30	6.0	0.05	1.9	72	14
Sublette	0.04	1.7	72	14	0				0				0.09	1.7	30	6.0	0.05	1.9	72	14
Lincoln	0.01	1.7	72	14	0				0				0.08	1.7	30	6.0	0.06	1.9	72	14
NEVADA																				
Washoe	0.09	1.7	12	2.4	0				0.5	1.7	12	1.2	0				0.5	1.7	15	1.5
Humboldt	0.06	1.7	18	3.6	0				0				0				0.3	1.9	24	2.4
Elko	0.06	1.7	24	4.8	0				0				0				0.2	1.9	24	2.4
White Pine-Lund/Prstn	0.01	1.7	4	0.8	0				0				0.06	1.7	6	1.2	0			
White Pine-Baker	0.01	1.7	4	0.8	0				0				0.11	1.5	6	0.6	0			
White Pine-Ely	0.01	1.7	4	0.8	0				0				0.06	1.7	7	1.4	0			
Lander-Battle Mountain	0.06	1.7	12	2.4	0				0				0				0.4	1.7	15	1.5
Lander-Austin	0.09	1.7	16	3.2	0				0				0				0.9	1.5	12	1.2
Eureka	0.01	1.7	8	1.6	0				0				0				0			
Pershing	0.07	1.7	15	3.0	0				0				0				0.6	1.7	18	1.8
Churchill	0.09	1.7	12	2.4	0				0.2	1.7	12	1.2	0				1	1.7	15	1.5
Ormsby	0.09	1.7	12	2.4	0				0.5	1.7	12	1.2	0				0.5	1.7	15	1.5
Storey	0.09	1.7	12	2.4	0				0.5	1.7	12	1.2	0				0.5	1.7	15	1.5
Lyon	0.09	1.7	12	2.4	0				0.5	1.7	12	1 2	0				0.5	1.7	15	1.5
Douglas	0.09	1.7	12	2.4	0				0.5	1.7	12	1.2	0				0.5	1.7	15	1.5
Mineral	0.12	1.7	12	1.2	0				0.76	1.5	9	0 9	0				1	1.5	15	1.5

	WHEELRCOULMB				LAPLACE				FIZEAU				NEWTON				WHITNEY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO																				
San Juan	0.02	1.7	72	14	0.06	1.7	24	4.8	0				0				0			
McKinley	0				0.37	1.7	30	3.0	0				0				0			
Valencia	0				0.37	1.7	30	3.0	0				0				0			
Catron	0				0.25	1.7	30	3.0	0				0				0			
Grant	0				0				0				0				0			
Hidalgo	0				0				0				0				0			
Rio Arriba	0				0.06	1.7	36	7.2	0				0				0			
Los Alamos	0				0.12	1.7	36	3.6	0				0				0			
Sandoval	0				0.25	1.7	36	3.6	0				0				0			
Bernalillo	0				0.27	1.5	36	3.6	0				0				0			
Socorro	0				0.25	1.7	40	4.0	0				0				0			
Sierra	0				0.06	1.7	40	8.0	0				0				0			
Luna	0				0				0				0				0			
Dona Ana	0				0				0				0				0			
Taos	0				0.06	1.7	40	8.0	0				0				0			
Santa Fe	0				0.25	1.7	40	4.0	0				0				0			
Torrance	0				0.19	1.7	40	4.0	0				0				0			
Lincoln	0				0.12	1.7	40	4.0	0				0				0			
Otero	0				0.06	1.7	42	8.4	0				0				0			
Colfax	0				0.06	1.7	44	8.8	0				0				0			
Mora	0				0.12	1.7	44	4.4	0				0				0			
San Miguel	0				0.12	1.7	44	4.4	0				0				0			
Guadalupe	0				0.12	1.7	44	4.4	0				0				0			
De Baca	0				0.12	1.7	44	4.4	0				0				0			
Chaves	0				0.12	1.7	46	4.6	0				0				0			
Eddy	0				0.06	1.7	48	9.6	0				0				0			
Union	0				0.06	1.7	48	9.6	0				0				0			
Harding	0				0.12	1.7	48	4.8	0				0				0			
Quay	0				0.06	1.7	48	9.6	0				0				0			
Curry	0				0.06	1.7	48	9.6	0				0				0			
Roosevelt	0				0.06	1.7	48	9.6	0				0				0			
Lea	0				0.06	1.7	48	9.6	0				0				0			
CALIFORNIA																				
Mono	0.12	1.7	15	1.5	0				0.3	1.7	15	1.5	0				0.5	1.9	15	1.5
Inyo-Bishop	0.04	1.7	17	3.4	0				0				0				0.34	1.5	13	1.3
Inyo-Furnace Creek	0				0				0				0				0			
San Bernardino	0				0				0				0				0			
Los Angeles	0				0				0				0				0			

	CHARLESTON				MORGAN				SEDAN				SMALLBOY				PIN STRIPE			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH																				
Box Elder-Rosette	0.36	1.7	84	8.4	0				0				0				0			
Box Elder-Tremonton	0.36	1.7	84	8.4	0				0.1	1.7	24	4.8	0.01	1.7	24	4.8	0.01	1.9	15	3.0
Tooele-West	0.36	1.7	84	8.4	0				0.02	1.7	24	4.8	0				0			
Tooele-East	0.36	1.7	84	8.4	0				0.2	1.7	24	2.4	0.05	1.7	24	4.8	0.01	1.9	15	3.0
Juab	0.12	1.7	84	8.4	0				0				0.1	1.7	20	4.0	0.02	1.7	12	2.4
Millard	0.12	1.7	84	8.4	0				0				0.2	1.5	25	2.5	0.05	1.7	10	2.0
Beaver	0.12	1.7	84	8.4	0.18	1.5	4	0.4	0				0.05	1.7	21	4.2	0.3	1.7	8	0.8
Iron-Cedar City	0.12	1.7	84	8.4	0.18	1.7	4	0.4	0				0				0			
Iron-Modena	0.12	1.7	84	8.4	0.25	1.7	4	0.4	0				0.17	1.5	13	1.3	0			
Iron-Parowan	0.12	1.7	84	8.4	0.18	1.7	4	0.4	0				0.06	1.5	19	3.8	0			
Cache	0.36	1.7	84	8.4	0				0.02	1.7	26	5.2	0.01	1.7	24	4.8	0.01	1.9	15	3.0
Rich	0.36	1.7	84	8.4	0				0.03	1.7	26	5.2	0.03	1.7	26	5.2	0.01	1.9	15	3.0
Weber	0.36	1.7	84	8.4	0				0.1	1.7	24	4.8	0.03	1.7	24	4.8	0.01	1.9	15	3.0
Morgan	0.36	1.7	84	8.4	0				0.1	1.7	24	4.8	0.05	1.7	24	4.8	0.01	1.9	15	3.0
Davis	0.36	1.7	84	8.4	0				0.1	1.7	24	4.8	0.05	1.7	24	4.8	0.01	1.9	15	3.0
Salt Lake	0.39	1.5	84	8.4	0				0.1	1.7	24	4.8	0.05	1.7	24	4.8	0.01	1.9	15	3.0
Summit	0.24	1.7	84	8.4	0				0				0.1	1.7	26	5.2	0.01	1.9	15	3.0
Daggett	0.12	1.7	84	8.4	0				0				0.08	1.7	28	5.6	0			
Utah	0.24	1.7	84	8.4	0				0				0.1	1.7	22	4.4	0.01	1.7	14	2.8
Wasatch	0.24	1.7	84	8.4	0				0				0.5	1.7	22	2.2	0.01	1.9	14	2.8
Duchesne	0.12	1.7	84	8.4	0				0				1.5	1.7	26	2.6	0			
Uintah	0.12	1.7	84	8.4	0				0				0.1	1.7	28	5.6	0			
Carbon	0.12	1.7	84	8.4	0				0				0.1	1.7	26	5.2	0			
Sanpete	0.12	1.7	84	8.4	0				0				0.15	1.7	22	2.2	0.1	1.9	12	2.4
Sevier	0.12	1.7	84	8.4	0.06	1.7	8	1.6	0				0.12	1.7	21	2.1	0.2	1.7	10	1.0
Emery	0.12	1.7	84	8.4	0.06	1.7	8	1.6	0				0.14	1.7	23	2.3	0			
Grand	0.12	1.7	84	8.4	0.01	1.7	12	2.4	0				0				0			
Piute	0.12	1.7	84	8.4	0.12	1.7	8	0.8	0				0.02	1.7	20	4.0	0.1	1.9	7	1.4
Wayne	0.12	1.7	84	8.4	0.12	1.7	8	0.8	0				0				0			
Garfield	0.12	1.7	84	8.4	0.12	1.7	8	0.8	0				0				0			
Kane-Kanab	0.12	1.7	84	8.4	0.06	1.7	12	2.4	0				0				0.02	1.9	120	24
Kane-Orderville	0.12	1.7	84	8.4	0.12	1.5	12	1.2	0				0				0			
San Juan	0.12	1.7	84	8.4	0.12	1.7	16	1.6	0				0				0			
OREGON																				
Malheur	0.12	1.7	60	6.0	0				0				0				0			
Harney	0.12	1.7	60	6.0	0				0				0				0			

	CHARLESTON				MORGAN				SEDAN				SMALLBOY				PIN STRIPE			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA																				
Mohave-Littlefield	0.12	1.9	96	9.6	0.06	1.7	6	1.2	0				0				0			
Mohave-Kingman	0.12	1.9	96	9.6	0				0				0				0			
Mohave-Moccasin	0.12	1.9	96	9.6	0.06	1.7	7	1.4	0				0				0			
Coconino-Fredonia	0.12	1.9	96	9.6	0.06	1.7	12	2.4	0				0				0.02	1.7	120	24
Coconino-Rim/TubaCty	0.12	1.9	96	9.6	0.06	1.9	12	2.4	0				0				0			
Coconino-Flag/Williams	0.12	1.9	96	9.6	0.06	1.9	12	2.4	0				0				0			
Navajo	0.12	1.9	96	9.6	0.12	1.7	15	1.5	0				0				0			
Apache	0.12	1.9	96	9.6	0.12	1.7	15	1.5	0				0				0			
Yavapai	0.12	1.9	96	9.6	0				0				0				0			
Gila	0.12	1.9	96	9.6	0				0				0				0			
Yuma	0.12	1.9	96	9.6	0				0				0				0			
Maricopa	0.12	1.9	96	9.6	0				0				0				0			
Pinal	0.12	1.9	96	9.6	0				0				0				0			
Graham	0.12	1.9	96	9.6	0				0				0				0			
Greenlee	0.12	1.9	96	9.6	0				0				0				0			
Pima	0.08	1.5	96	19	0				0				0				0			
Santa Cruz	0.12	1.9	96	9.6	0				0				0				0			
Cochise	0.12	1.9	96	9.6	0				0				0				0			
IDAHO																				
Bear Lake	0.24	1.7	60	6.0	0				0				0				0.01	1.9	18	3.6
Caribou	0.24	1.7	60	6.0	0				0				0				0.01	1.9	18	3.6
Bonneville	0.24	1.7	60	6.0	0				0				0				0.01	1.9	18	3.6
Bingham	0.24	1.7	60	6.0	0				0				0				0			
Bannock	0.24	1.7	60	6.0	0				0				0				0			
Franklin	0.24	1.7	60	6.0	0				0				0				0.01	1.9	18	3.6
Oneida	0.24	1.7	60	6.0	0				0				0				0			
Power	0.24	1.7	60	6.0	0				0				0				0			
Cassia	0.24	1.7	60	6.0	0				0				0				0			
Minidoka	0.24	1.7	60	6.0	0				0				0				0			
Lincoln	0.24	1.7	60	6.0	0				0				0				0			
Jerome	0.24	1.7	60	6.0	0				0				0				0			
Twin Falls	0.24	1.7	60	6.0	0				0				0				0			
Gooding	0.24	1.7	60	6.0	0				0				0				0			
Elmore	0.24	1.7	60	6.0	0.05	1.7	84	17	0				0				0			
Ada	0.19	1.5	60	6.0	0.05	1.5	84	17	0				0				0			
Canyon	0.12	1.7	60	6.0	0.04	1.7	84	17	0				0				0			
Owyhee	0.24	1.7	60	6.0	0.05	1.7	84	17	0				0				0			

	CHARLESTON				MORGAN				SEDAN				SMALLBOY				PIN STRIPE			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO																				
Montezuma	0.12	1.7	96	9.6	0.12	1.7	12	1.2	0				0				0			
La Plata	0.12	1.7	96	9.6	0.12	1.7	12	1.2	0				0				0			
Dolores	0.12	1.7	96	9.6	0.09	1.7	12	2.4	0				0				0			
San Juan	0.12	1.7	96	9.6	0.09	1.7	12	2.4	0				0				0			
San Miguel	0.12	1.7	96	9.6	0.06	1.7	12	2.4	0				0				0			
Ouray	0.12	1.7	96	9.6	0.05	1.7	12	2.4	0				0				0			
Montrose	0.12	1.7	96	9.6	0.04	1.7	12	2.4	0				0				0			
Delta	0.12	1.7	96	9.6	0.01	1.7	12	2.4	0				0				0			
Mesa	0.12	1.7	96	9.6	0.01	1.5	12	2.4	0				0				0			
Garfield	0.12	1.7	96	9.6	0.01	1.7	12	2.4	0				0				0			
Rio Blanco	0.12	1.7	96	9.6	0.02	1.7	12	2.4	0				0.03	1.7	30	6.0	0			
Moffat	0.12	1.7	96	9.6	0.04	1.7	12	2.4	0				0.05	1.7	30	6.0	0			
WYOMING																				
Uinta	0.36	1.7	96	9.6	0				0				0.03	1.7	30	6.0	0.01	1.9	15	3.0
Sweetwater	0.36	1.7	96	9.6	0				0				0.05	1.7	30	6.0	0			
Carbon	0.24	1.7	96	9.6	0.05	1.7	24	4.8	0				0.01	1.7	32	6.4	0			
Fremont	0.24	1.7	96	9.6	0				0				0.01	1.7	32	6.4	0			
Sublette	0.24	1.7	96	9.6	0				0				0				0			
Lincoln	0.30	1.7	96	9.6	0				0.05	1.7	27	5.4	0.02	1.7	32	6.4	0.01	1.9	18	3.6
NEVADA																				
Washoe	0				0				0				0				0			
Humboldt	0.12	1.7	18	1.8	0				0				0				0			
Elko	0.24	1.7	18	1.8	0				0				0				0			
White Pine-Lund/Prstn	0.12	1.7	12	1.2	0				1.3	1.5	8	0.8	0				0			
White Pine-Baker	0.12	1.7	12	1.2	0				1	1.7	9	0.9	0				0			
White Pine-Ely	0.12	1.7	12	1.2	0				0.7	1.5	9	0.9	0				0			
Lander-Battle Mountain	0.06	1.7	6	1.2	0				0				0				0			
Lander-Austin	0.06	1.7	6	1.2	0				0				0				0			
Eureka	0.06	1.7	6	1.2	0				0.03	1.7	9	1.8	0				0			
Pershing	0				0				0				0				0			
Churchill	0				0				0				0				0			
Ormsby	0				0				0				0				0			
Storey	0				0				0				0				0			
Lyon	0				0				0				0				0			
Douglas	0				0				0				0				0			
Mineral	0				0				0				0				0			

	CHARLESTON				MORGAN				SEDAN				SMALLBOY				PIN STRIPE			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO																				
San Juan	0.12	1.9	96	9.6	0.12	1.7	18	1.8	0				0				0			
McKinley	0.12	1.9	96	9.6	0.12	1.7	18	1.8	0				0				0			
Valencia	0.12	1.9	96	9.6	0				0				0				0			
Catron	0.12	1.9	96	9.6	0				0				0				0			
Grant	0.12	1.9	96	9.6	0				0				0				0			
Hidalgo	0.12	1.9	96	9.6	0				0				0				0			
Rio Arriba	0.12	1.9	96	9.6	0				0				0				0			
Los Alamos	0.12	1.9	96	9.6	0				0				0				0			
Sandoval	0.12	1.9	96	9.6	0				0				0				0			
Bernalillo	0.23	1.5	96	9.6	0				0				0				0			
Socorro	0.12	1.9	96	9.6	0				0				0				0			
Sierra	0.12	1.9	96	9.6	0				0				0				0			
Luna	0.12	1.9	96	9.6	0				0				0				0			
Dona Ana	0.12	1.9	96	9.6	0				0				0				0			
Taos	0.12	1.9	96	9.6	0				0				0				0			
Santa Fe	0.12	1.9	96	9.6	0				0				0				0			
Torrance	0.12	1.9	96	9.6	0				0				0				0			
Lincoln	0.12	1.9	96	9.6	0				0				0				0			
Otero	0.12	1.9	96	9.6	0				0				0				0			
Colfax	0.12	1.9	96	9.6	0				0				0				0			
Mora	0.12	1.9	96	9.6	0				0				0				0			
San Miguel	0.12	1.9	96	9.6	0				0				0				0			
Guadalupe	0.12	1.9	96	9.6	0				0				0				0			
De Baca	0.12	1.9	96	9.6	0				0				0				0			
Chaves	0.12	1.9	96	9.6	0				0				0				0			
Eddy	0.12	1.9	96	9.6	0				0				0				0			
Union	0.12	1.9	96	9.6	0				0				0				0			
Harding	0.12	1.9	96	9.6	0				0				0				0			
Quay	0.12	1.9	96	9.6	0				0				0				0			
Curry	0.12	1.9	96	9.6	0				0				0				0			
Roosevelt	0.12	1.9	96	9.6	0				0				0				0			
Lea	0.12	1.9	96	9.6	0				0				0				0			
CALIFORNIA																				
Mono	0				0				0				0				0			
Inyo-Bishop	0				0				0				0				0			
Inyo-Furnace Creek	0				0				0				0				0.01	1.7	36	7.2
San Bernardino	0				0				0				0				0.01	1.7	36	7.2
Los Angeles	0				0				0				0				0			

	SCHOONER				BANEBERRY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
UTAH								
Box Elder-Rosette	0.02	1.9	11	2.2	0.01	1.5	32	6.4
Box Elder-Tremonton	0.02	1.9	11	2.2	0.01	1.7	32	6.4
Tooele-West	0.03	1.9	10	2.0	0.01	1.5	28	5.6
Tooele-East	0.05	1.9	10	2.0	0.01	1.7	30	6.0
Juab	0.12	1.5	10	1.0	0			
Millard	0.2	1.5	9	0.9	0			
Beaver	0.1	1.7	9	1.8	0			
Iron-Cedar City	0				0			
Iron-Modena	0				0			
Iron-Parowan	0				0			
Cache	0.02	1.9	12	2.4	0.01	1.5	32	6.4
Rich	0.01	1.9	12	2.4	0.01	1.7	32	6.4
Weber	0.03	1.9	11	2.2	0.01	1.7	32	6.4
Morgan	0.03	1.9	12	2.4	0.01	1.7	32	6.4
Davis	0.03	1.9	11	2.2	0.01	1.7	32	6.4
Salt Lake	0.04	1.9	11	2.2	0.02	1.5	32	6.4
Summit	0.03	1.9	12	2.4	0.01	1.5	32	6.4
Daggett	0.02	1.9	13	2.6	0			
Utah	0.2	1.7	11	1.1	0.01	1.7	30	6.0
Wasatch	0.07	1.9	11	2.2	0			
Duchesne	0.05	1.9	12	2.4	0			
Uintah	0.03	1.9	12	2.4	0			
Carbon	0.1	1.7	11	2.2	0			
Sanpete	0.2	1.7	10	1.0	0			
Sevier	0.1	1.7	10	2.0	0			
Emery	0.04	1.9	11	2.2	0			
Grand	0.03	1.9	12	2.4	0			
Piute	0.05	1.7	10	2.0	0			
Wayne	0.02	1.9	11	2.2	0			
Garfield	0				0			
Kane-Kanab	0				0			
Kane-Orderville	0				0			
San Juan	0				0			
OREGON								
Malheur	0				0			
Harney	0				0			

	SCHOONER				BANEBERRY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
ARIZONA								
Mohave-Littlefield	0				0			
Mohave-Kingman	0				0			
Mohave-Moccasin	0				0			
Coconino-Fredonia	0				0			
Coconino-Rim/TubaCty	0				0			
Coconino-Flag/Williams	0				0			
Navajo	0				0			
Apache	0				0			
Yavapai	0				0			
Gila	0				0			
Yuma	0				0			
Maricopa	0				0			
Pinal	0				0			
Graham	0				0			
Greenlee	0				0			
Pima	0				0			
Santa Cruz	0				0			
Cochise	0				0			
IDAHO								
Bear Lake	0.01	1.9	12	2.4	0			
Caribou	0.01	1.9	13	2.6	0.01	1.7	48	9.6
Bonneville	0.01	1.9	13	2.6	0.02	1.5	48	9.6
Bingham	0.01	1.9	13	2.6	0			
Bannock	0.01	1.9	12	2.4	0			
Franklin	0.01	1.9	12	2.4	0.01	1.5	48	9.6
Oneida	0.01	1.9	12	2.4	0			
Power	0.01	1.9	12	2.4	0			
Cassia	0.01	1.9	12	2.4	0			
Minidoka	0.01	1.9	12	2.4	0			
Lincoln	0.01	1.9	12	2.4	0			
Jerome	0.01	1.9	12	2.4	0			
Twin Falls	0.01	1.9	12	2.4	0			
Gooding	0.01	1.9	13	2.6	0			
Elmore	0.01	1.9	13	2.6	0			
Ada	0.01	1.9	14	2.8	0.01	1.5	48	9.6
Canyon	0.01	1.9	14	2.8	0.01	1.7	48	9.6
Owyhee	0.01	1.9	13	2.6	0.01	1.7	48	9.6

	SCHOONER				BANEBERRY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
COLORADO								
Montezuma	0				0			
La Plata	0				0			
Dolores	0				0			
San Juan	0				0			
San Miguel	0				0			
Ouray	0				0			
Montrose	0				0			
Delta	0				0			
Mesa	0.01	1.9	13	2.6	0			
Garfield	0.01	1.9	13	2.6	0			
Rio Blanco	0.01	1.9	13	2.6	0			
Moffat	0.01	1.9	13	2.6	0			
WYOMING								
Uinta	0.01	1.9	13	2.6	0			
Sweetwater	0.01	1.9	13	2.6	0			
Carbon	0				0			
Fremont	0				0			
Sublette	0				0			
Lincoln	0.01	1.9	13	2.6	0			
NEVADA								
Washoe	0				0.01	1.5	24	4.8
Humboldt	0.01	1.9	11	2.2	0.04	1.5	28	5.6
Elko	0.03	1.9	10	2.0	0.01	1.5	28	5.6
White Pine-Lund/Prstn	0.49	1.5	8	0.8	0.02	1.5	14	2.8
White Pine-Baker	0.2	1.7	8	0.8	0.02	1.5	16	3.2
White Pine-Ely	0.1	1.5	8	1.6	0.03	1.5	16	3.2
Lander-Battle Mountain	0.02	1.7	8	1.6	0.01	1.5	21	4.2
Lander-Austin	0.01	1.7	7	1.4	0.04	1.7	14	2.8
Eureka	0.06	1.5	7	1.4	0.04	1.7	14	2.8
Pershing	0.01	1.9	10	2.0	0.01	1.5	24	4.8
Churchill	0.01	1.9	9	1.8	0.01	1.5	21	4.2
Ormsby	0				0.01	1.7	24	4.8
Storey	0				0.01	1.7	24	4.8
Lyon	0				0.01	1.7	24	4.8
Douglas	0				0.01	1.7	24	4.8
Mineral	0				0.02	1.7	14	2.8

	SCHOONER				BANEBERRY			
	H12	GSD	TOA	ASD	H12	GSD	TOA	ASD
NEW MEXICO								
San Juan	0				0			
McKinley	0				0			
Valencia	0				0			
Catron	0				0			
Grant	0				0			
Hidalgo	0				0			
Rio Arriba	0				0			
Los Alamos	0				0			
Sandoval	0				0			
Bernalillo	0				0			
Socorro	0				0			
Sierra	0				0			
Luna	0				0			
Dona Ana	0				0			
Taos	0				0			
Santa Fe	0				0			
Torrance	0				0			
Lincoln	0				0			
Otero	0				0			
Colfax	0				0			
Mora	0				0			
San Miguel	0				0			
Guadalupe	0				0			
De Baca	0				0			
Chaves	0				0			
Eddy	0				0			
Union	0				0			
Harding	0				0			
Quay	0				0			
Curry	0				0			
Roosevelt	0				0			
Lea	0				0			
CALIFORNIA								
Mono	0				0			
Inyo-Bishop	0				0			
Inyo-Furnace Creek	0				0			
San Bernardino	0				0			
Los Angeles	0				0			

APPENDIX B

ALBUQUERQUE SOIL-SAMPLE-ANALYSIS RESULTS

As part of the original Phase-III sampling program, five soil samples were collected in Albuquerque, New Mexico. Sampling sites were located in the older section of town that was well established by the early 1950s. Three of these samples were analyzed during the course of the original Phase-II/Phase-III program. These three samples all exhibited much higher concentrations of $^{239+240}Pu$ than would have been expected based on data for samples in other areas of New Mexico, southwestern Colorado, or western Arizona, although the ^{137}Cs concentrations were not higher than expected. The Pu results were also inconsistent with levels expected from the NTS plus global fallout based on data from the HASL gummed-film site in Albuquerque. These results were also inconsistent with the Pu activity in soil samples collected during the 1950s at other sites in Albuquerque. The isotopic ratio of the Pu in these samples clearly indicated a source of Pu other than global fallout.

The anomalous levels of Pu in these samples were flagged by the ORERP QA procedures (McArthur and Miller, 1989). Several actions were instituted by ORERP scientists to confirm the validity of the data and then determine, if possible, the source of the anomalous Pu. It was particularly important to determine whether or not the anomalous Pu was related to NTS testing, and what the implications with respect to potential health effects were, if any.

The first action taken by ORERP scientists was to confirm the original analyses and the representativeness of the three samples. Additional aliquots of each sample were reanalyzed and each of the five Albuquerque sites was resampled. The original soil samples from the two sites sampled in 1982 that had not been analyzed for Pu were also analyzed along with the new samples. The results of these actions confirmed the original data and indicated that all five sites appeared to exhibit anomalous levels of Pu. ORERP scientists then decided, after consultation with and in cooperation with personnel from the DOE Albuquerque Field Office (DOE/AL), to sample a large number of sites throughout the metropolitan Albuquerque area to define the extent of the apparent anomalous deposition (Runkel, 1990). Concurrently, an investigation was instituted by DOE/AL to determine whether the apparent Pu contamination might have resulted from any accidental release occurring in the Albuquerque area as opposed to fallout from a nuclear weapons test.

As part of this extended sampling and analysis program, 33 sites were sampled in Albuquerque during 1987. Five of these sites were resamples of the sites originally sampled earlier. In addition, soils collected by EML scientists in 1955 to 1958 at two other Albuquerque sites were also reanalyzed. The results of all the analyses of soil collected in Albuquerque are summarized in Table B-1. The locations of the sites are shown in Figure B-1. Note that the sampling was concentrated in the downtown or older areas of Albuquerque after initial results from sites in the outlying areas indicated no anomalous Pu activity.

The presence of anomalous Pu in soil from a given site was indicated by at least one of the following flags (see Table B-1): (a) an abnormally low $^{238}Pu/^{239}Pu$ activity ratio compared to that usually seen in soils containing only global or global plus NTS fallout (unfortunately, this ratio generally had a large statistical counting error, particularly for the lower total Pu values); (b) an abnormally low $^{240}Pu/^{239}Pu$ atom ratio compared to that expected from global fallout and even compared to that generally seen at sites much closer to the NTS and which experienced significant fallout (the average ratio for sites judged non-contaminated was about 0.15); (c) a total Pu inventory significantly above 1.5 nCi/m^2; and (d) the absence of ^{137}Cs significantly in excess of that expected from global plus NTS fallout. Averaging the results from all sites where none of these criteria were met gave estimates of global plus NTS ^{137}Cs and Pu of approximately 57 and approximately 1.5 nCi/m^2, respectively, as normal for Albuquerque. This is consistent with our expectations for this area based on the gummed-film results and results of soil analyses at other non-Albuquerque sites. Our best estimate of the separate global and NTS Cs inventories as of 1983 are 50 and 7 nCi/m^2, respectively. This estimate is based on the average annual precipitation, the measured R_s in apparently non-contaminated soils, and the expected approximate NTS Cs/Pu inferred from our CDB estimates in neighboring counties. After correcting for decay, this implies NTS Cs and Pu depositions of 11±~3 and ~0.2 nCi/m^2, respectively, as typical for the Albuquerque area. These estimates are strongly supported by the gummed-film estimate of 11 for Albuquerque, as well as the measured Cs and Pu in the EML 1957 and 1958 samples. (Table 7 shows an estimated cumulative Cs deposition in Bernalillo County of 11±2 nCi/m^2 from the CDB exposure-rate estimates.)

Using the above criteria, we judged nine sites to definitely exhibit the presence of anomalous Pu. Two other sites may also be slightly contaminated (Table B-1). Anomalous Pu levels ranged from approximately 0.1 to approximately 20 nCi/m^2. None of these sites exhibit anomalous Cs, i.e., significantly above that expected from global plus NTS fallout (taking into account the typical ±8% sampling error). Thus, it is extremely unlikely that the source of the anomalous Pu was testing at the NTS. Similarly,

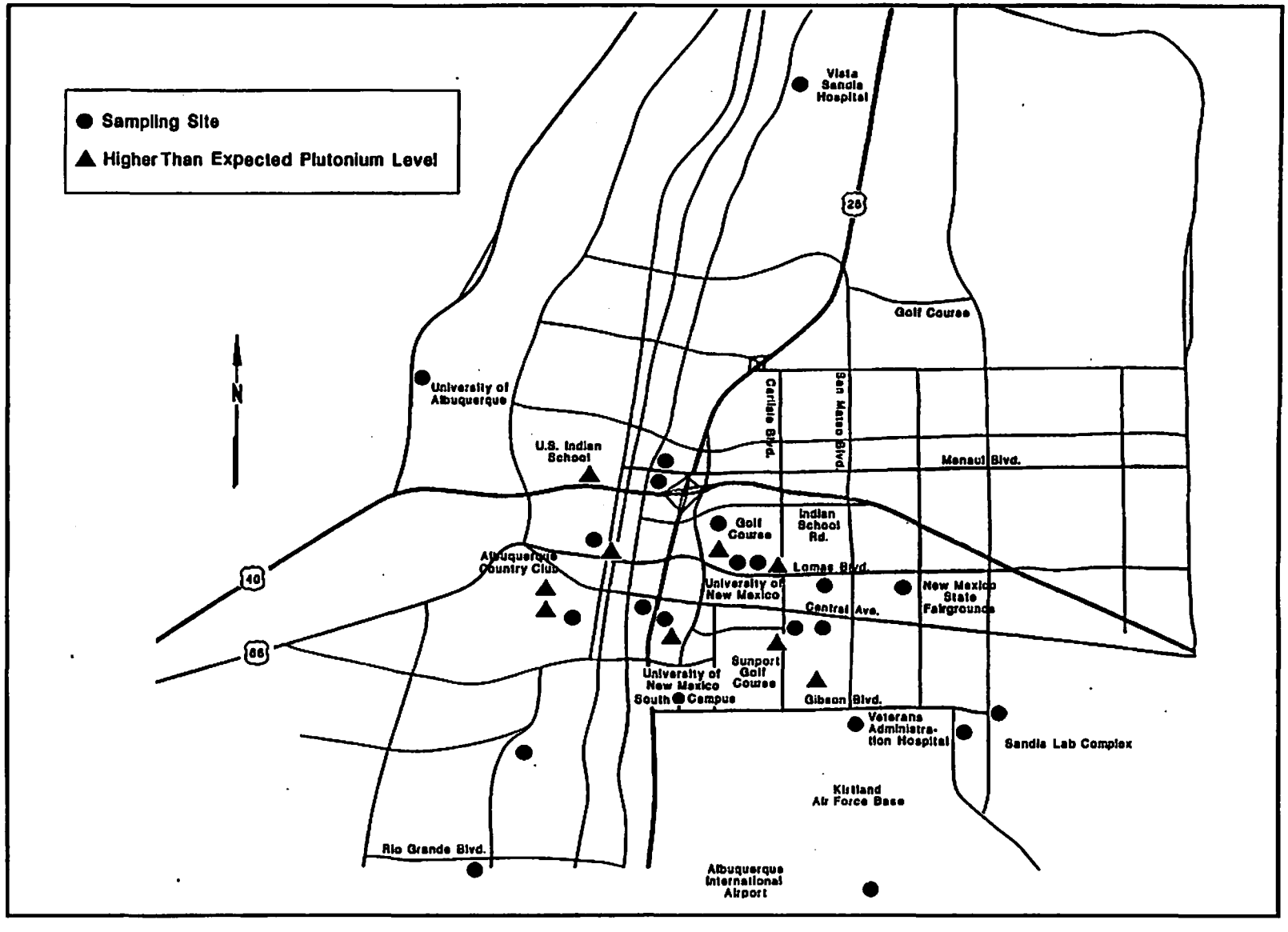


Figure B-1. Sampling locations in Albuquerque, New Mexico.

measurements of Cs/Pu in soils collected downwind from the TRINITY site (Douglas, 1978) indicate that again any Pu from TRINITY would have been accompanied by several times as much Cs. TRINITY was also eliminated as a possible source of the anomalous Pu because the isotopic ratios of $^{238}Pu/^{239}Pu$ in the contaminated soils are much lower than existed for TRINITY Pu. The expected ratio was determined from measurements made on soils collected downwind from the TRINITY site which were highly contaminated by TRINITY fallout (Douglas, 1978). A thorough review by DOE/AL personnel, of both the classified and unclassified literature, of all reported potential accidental releases of radionuclides in the Albuquerque area failed to identify any credible sources of potential Pu contamination (Runkel, 1990). The DOE/AL review and investigation included possible releases from the many military installations in the Albuquerque area.

The anomalous Pu appears to be present only at sites in the central business district. Not all sites in this area are contaminated, even though all are reportedly undisturbed since the 1940s. Furthermore, there is no clear pattern to the magnitude or geographic distribution of the contamination. This suggests the contamination pathway was unlikely to have been from an airborne source. It is interesting that all but one of the contaminated sites were public or quasi-public. (However, the site exhibiting the greatest contamination was a private residence.) Although the surface soil for some of the contaminated sites exhibited enhanced uranium as well, this was found to be unrelated to the excess Pu. The enhanced uranium was attributed to the application of phosphate-based fertilizers containing uranium with specific activity much higher than that of typical soil. This excess uranium was also present at other non-Pu contaminated sites. Its presence does suggest a possible mechanism for how the anomalous Pu got to these sites, as well as an explanation for the spotty contamination pattern. Apparently, treated sewage sludge is presently and has been historically used as fertilizer on many properties in this area. Although tests showed the sludge used now is not contaminated, it is possible that it was at the time the soil contamination occurred, presumably (based on the Pu isotopic ratios) in the 1940s or early 1950s. (The contamination is assumed to have occurred during this period because the isotopic ratios of Pu in the most highly contaminated samples suggest a very low $^{240}Pu/^{239}Pu$ ratio for the anomalous Pu, which is characteristic of Pu produced very early in the U.S. weapons research program.)

It is important to emphasize that the levels of anomalous Pu are quite small and present no increased health risks to the population, neither now nor when the contamination occurred. This is particularly true since the evidence indicates no other radioisotopes were deposited along with this Pu. The lack of any associated Cs, along with the small amounts of ^{238}Pu and ^{240}Pu relative to ^{239}Pu, essentially eliminate the possibility that the

origin of this Pu was from any fission event, and in particular from either NTS or TRINITY fallout.

Because of the low annual precipitation in Albuquerque, and thus correspondingly relatively low global fallout, the total Pu, even at the most contaminated sites, is generally only a few times that of soils in the eastern United States, which average about 2 nCi/m^2. The total Pu is also less than that in many sites close to the NTS (see Table 3), and is many times lower than that considered to be of any concern by regulatory authorities.

Because the Pu in these soils was determined not to be present as a result of either NTS or TRINITY fallout, and since the levels clearly present no health risks, both ORERP and DOE/AL scientists have decided that any further investigation into the origin of the anomalous Pu in Albuquerque is not warranted.

During the course of the investigation into this anomaly in Albuquerque, ORERP scientists, at the request of DOE/AL personnel, decided to extend the ORERP Phase-II sampling program to all areas of New Mexico and Arizona. Originally only northern Arizona and northwestern New Mexico were included in the Phase-II study region. One rationale behind this decision was to assure that the anomalous Pu found in Albuquerque was indeed confined to just that city. However, a more important reason was that data in Appendix A show that some areas of New Mexico received NTS fallout depositions comparable to those received in counties much closer to the NTS. Thus, it was logical to incorporate these areas into the ORERP County Database.

Table B-1. Albuquerque soil-analysis summary.[a]

SAMPLE ID NUMBER	Cs [b,c]	Pu [c]	Cs/Pu [d]	R_s [e]	$^{238}Pu/^{239}Pu$ [d]	Excess Pu [c]
AQ01	61	1.2	50	0.166	-	0
EML, 1958	16±1 [f]	0.2	-	0.144	-	0
EML, 1955	~3 [f]	0.1	-	-	-	0
EML, 1956	11±3 [f]	0.3	-	-	-	0
EML, 1957	~16	-	-	-	-	0
AQ02	56	1.4	40	-	-	0
AQ03	58	1.3	45	-	-	0
AQ05	51	4.7	11	-	0.016	3.2
FM31	59	3.5	17	0.060	-	2.0
AQ04	50	2.7	18	0.070	0.022	1.2
AQ06	62	3.5	18	~0.070	0.020	2.0
FM32	63	5.3	12	-	-	-
AQ07	67	8.7	8	~0.050	-	7.2
FM35	71	10.2	7	0.040	0.012	8.6
AQ08	73	4.6	16	-	0.022	3.1
FM33	84	4.5	19	~0.060	0.023	3.0
AQ09	62	5.6	11	0.052	0.018	4.1
FM34	74	6.3	12	-	-	4.8
AQ10	49	1.2	41	-	0.030	0
AQ11	58	1.3	45	0.152	0.040	0
AQ12	55	1.3	42	0.145	0.040	0

Table B-1. Albuquerque soil-analysis summary[a] (continued).

SAMPLE ID NUMBER	Cs [b,c]	Pu [c]	Cs/Pu [d]	R_s [e]	$^{238}Pu/^{239}Pu$ [d]	Excess Pu [c]
AQ13	61	1.6	37	0.145	0.040	0
AQ14	62	1.5	40	0.148	0.050	0
AQ15	54	1.2	46	0.154	0.020	0
AQ26	62	1.4	44	-	0.050	0
AQ16-1	61	~21	3	0.016	0.006	~20
AQ16-2 [g]	61	~10	6	-	-	-
AQ17	49	1.2	42	0.148	0.040	0
AQ18	56	1.3	42	0.152	0.060	0
AQ19	77	1.8	42	0.146	0.040	0
AQ20	52	1.2	42	0.151	0.070	0
AQ21	60	1.3	45	0.142	0.130 [h]	0
AQ22	24 [h]	0.6 [h]	40	-	0.040	0
AQ23	57	1.5	37	0.143	0.030	0
AQ24	53	1.5	35	0.120	0.020	>0
AQ25	50	3.8	13	0.108	0.008	2.3
AQ27	64	1.3	49	0.154	0.030	0
AQ28	75	1.5	51	0.077 [h]	0.040	0.2
AQ29	61	1.4	45	0.158	0.050	0

Table B-1. Albuquerque soil-analysis summary[a] (continued).

SAMPLE ID NUMBER	Cs [b,c]	Pu [c]	Cs/Pu [d]	R_s [e]	$^{238}Pu/^{239}Pu$ [d]	Excess Pu [c]
AQ30	24 [h]	0.6 [h]	41	-	-	
AQ31	56	1.9	29	0.118	0.040	0.4
AQ32	55	1.2	47	0.141	0.030	0
AQ33	71	4.8	15	0.058	0.020	3.3

[a] Samples from the same site are grouped together.
[b] As of January 1, 1983.
[c] Deposition density nCi/m^2.
[d] Activity ratio.
[e] Atom ratio of the sample.
[f] As of the sampling date.
[g] Second aliquot of the same soil sample analyzed.
[h] Data or site are suspect.

GLOSSARY

AEC	U.S. Atomic Energy Commission
CDB	County Database
DAAG	Dose Assessment Advisory Group to ORERP
Deposition density	Activity deposited per unit surface area
DOE	U.S. Department of Energy
DOE/AL	DOE Albuquerque Field Office
DOE/NV	DOE Nevada Field Office
EML	DOE Environmental Measurements Laboratory
GM	Geometric mean
GSD	Geometric standard deviation
H+12	Twelve hours post-detonation
HASL	AEC Health and Safety Laboratory, the predecessor of EML
Inventory	Activity currently present per unit surface area
Kriging	A mathematical interpolation technique
nCi	A nanocurie, one-billionth (10^{-9}) of a curie
NOAA	National Oceanic and Aeronautics Administration
NTS	Nevada Test Site
ORERP	Offsite Radiation Exposure Review Project
PHS	U.S. Public Health Service
R	$^{240}Pu/^{239}Pu$ atom ratio
R′	$^{241}Pu/^{239}Pu$ atom ratio
REECo	Reynolds Electrical & Engineering Company, Inc.

GLOSSARY

Safety experiments	Tests carried out to assess the stability of nuclear devices to accidental high explosive detonations
SD	Standard deviation
TDB	Town Database
TOA	Time of initial arrival of fallout
UCLA	University of California, Los Angeles
WSNSO	Weather Service Nuclear Support Office, Las Vegas

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