*Explosive Performance on the
Non-Proliferation Experiment*

Los Alamos
NATIONAL LABORATORY

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EXPLOSIVE PERFORMANCE
ON THE
NON-PROLIFERATION EXPERIMENT

by

Thomas O. McKown

ABSTRACT

The non-proliferation experiment, originally called the chemical kiloton experiment, was planned and executed by Lawrence Livermore National Laboratory to investigate the seismic yield relationship and distinguishing seismic signals between a nuclear event and a large mass conventional explosion. The Los Alamos National Laboratory planned and conducted experiments to further their studies of the source function for signals observed seismically. Since all investigations were contingent on the performance of the emplaced chemical explosive, an array of diagnostic measurements was fielded in the emplaced explosive. The CORTEX system was used to investigate the explosive initiation and to determine the detonation velocities in multiple levels and in numerous directions. A description of the CORTEX experiments fielded, a review of the data obtained and some interpretations of the data are reported.

INTRODUCTION

The Non-Proliferation Experiment (NPE) was planned and conducted by Lawrence Livermore National Laboratory, to compare the seismically produced signals of a large conventional explosive to those of a nuclear test. The global objectives of the test were to investigate whether there are seismically produced signals which may be used to differentiate a

large conventional explosion from a nuclear explosion and to calibrate the energy released to previous nuclear events. Consequently, the test was conducted on the Nevada Test Site (NTS) in the N-tunnel complex, the location of several previous underground nuclear tests (UGNT) and therefore in geologic media similar to those UGNTs. The same regional, national and international arrays of seismic instrumentation, typically deployed for an NTS event, were activated and augmented with a significant number of additional sites. The test was planned of sufficient magnitude to produce signals which could be seismically comparable to UGNTs.

The test consisted of approximately 2.9 million pounds of a 50-50 ammonium nitrate-fuel oil (ANFO) and emulsion blend* in a 15.2 m diameter, 5.2 m high right cylinder (the explosive chamber). Detonation occurred simultaneously at three locations along the axis. This will be described in greater detail later.

LOS ALAMOS PARTICIPATION

The Los Alamos National Laboratory (Los Alamos) group P-15 participated in the NPE to characterize the explosive performance and to characterize the time-dependent shock-wave evolution in the region around the explosive chamber. To achieve these objectives, an existing array of 20 accelerometer packages, deployed on several previous N-tunnel events, was supplemented with an additional four NPE specific packages. Twelve axially-symmetric magnetic (ASM) gauges for measuring particle velocity were fielded, ranging from approximately 7.2 m from the chamber axis (2.0 m outside the explosive chamber wall) to 64.0 m. Two ASM gauges were fielded within the explosive chamber, in the blasting agent. Combined with the detonation velocity of the blasting agent, the particle velocity measured with these two gauges will permit an in-situ determination of the equation-of-state of the actual blasting agent detonated. Twelve time-of-arrival (CORRTEX)** sensing elements were fielded in two regions of interest. Figures 1 and 2 show these sensing elements in four groups of three cables, fielded in the free-field and stemming regions, exterior to the explosive chamber (drill holes KH-1, KH-2 and KH-3 and the access drift). The instrumentation described above was fielded to characterize the shock-wave evolution in the region around the explosive chamber.

Within the explosive chamber the twelve CORRTEX sensing elements, entering through drill holes or the access drift, were arrayed to directly determine the burn velocity of the blasting agent on three principal levels and in six directions radial to the axis of detonation. These measurements will help characterize the explosive performance. The remainder of this paper will address this subject. The statements earlier of the larger objectives and the near-field instrumentation fielded by P-15 were provided to put these measurements into perspective and because those measurements and the experiment as a whole were driven by the explosive performance.

* Technically, this blend is classed as a blasting agent, not an explosive. However, both terms will be used, particularly "explosive" because it is shorter and its use is easier in, for example, "explosive chamber."

** See Appendix A for a brief description of the CORRTEX system.

Figure 1. Engineering site plan for the non-proliferation experiment.

Figure 2. CORRTEX instrumentation on the non-proliferation experiment.

EXPLOSIVE CHAMBER CORRTEX INSTRUMENTATION

The objective in the CORRTEX sensing element placement in the explosive chamber was to provide direct measurement (reduction and analysis without complicated geometric corrections) of the detonation velocity in approximately one quadrant of the chamber on three levels and in the middle level, covering approximately 240 degrees of the chamber.

A site plan for the NPE is shown in Figure 1. This engineering drawing shows the planned positions of the drill holes and access drift with respect to the explosive chamber within the N-tunnel complex. Figure 2 is an attempt to show the planned type and number of CORRTEX instruments in some perspective, but not to scale, with emphasis on the array of cables within the explosive chamber. Figures 3a, b and c show plan views, based on as-built survey information, of the lower, middle and upper levels respectively, with the cable designations and direction on each cable indicating the direction of burn from the chamber axis toward the cable exit from the chamber. Figures 1 and 2 combine to show for example, that cables designated K-1* (lower level), K-2 (middle level) and K-3 (upper level) exit the chamber together through the KH-1 drill hole. The other cables similarly join in groups of three to exit.

In the explosive chamber, the sensing elements were installed, under tension, on Kevlar rope messengers stretched across the chamber as shown in Figures 2 and 3. Sensing elements K-8 and K-9 were installed in the middle level on the same messengers as cables K-2 and K-5 respectively, but radial from the chamber axis in directions opposite to K-2 and K-5. All sensing elements with the exception of K-9 were installed "beyond" the axis of the chamber, resulting in a significant loss of cable on first crush. Figure 4 is a photograph of the explosive chamber taken just prior to the booster and detonator installation. The CORRTEX sensing elements are again indicated with their letter designation at the exit end toward which the cable will measure the burn of the blasting agent. The scaffolding was removed after the detonator-booster installation.

Appendix B contains the as-built diagrams of the twelve CORRTEX cables. Of particular interest are the cable types, the documented location of the chamber axis or center line for each cable and the last linear point or "wall" point on each cable, prior to exiting the explosive chamber. The chamber axis and wall location on each cable denote the position along the cable for these reference positions. The axis of the chamber was a taut steel aircraft cable anchored from back (ceiling) to invert (floor). Figure 4 identifies this installation. This location was referred to for survey purposes as the users working point (UWP) and was not actually coincident with the planned WP. (The planned WP was 0.177 m west and 0.061 m south of UWP, a distance of 0.178 m.) The documented position on each installed CORRTEX sensing element of the UWP is made with a normal from the sensing element to the UWP. This becomes the axis reference position (RD) for that cable. For example, on K-1, RD is 12.695 m. The documented "wall" position on K-1 is 24.768 m. Appendix B notes that the actual distance between these two positions on the cable is 8.055 m; the difference is due to

* The cable designations K-n and Kn are synonymous and will be used interchangeably.

Figure 3. Plan views of the as-built CORTEX sensing elements.

Figure 4. Photograph of the CORRTEx sensing element installation in the explosive chamber.

the installed loops in K-1. Similar observations could be made about the other cable installations.

Additional comments on the cable installation and subsequent survey are necessary. Again referencing Appendix B, in particular the diagram for K-1, two locations at the explosive chamber extremities of the sensing elements are denoted with numerals, specifically, #11 and #12. These were marked locations on the sensing elements or installation messengers and denoted survey locations. Each sensing element installation had similar locations marked at their chamber extremities, although since K-2 and K-8 share the same messenger, they also shared the same survey points but at opposite ends. Using the surveyed UWP at the elevation of each sensing element, the intersection of the line of each sensing element and a normal from the UWP (at that elevation) was computed, along with the distance of that point from the surveyed exit end of the cable (denoted D2) and the distance of the UWP steel cable (at that elevation) to the line of the sensing element (denoted $d(\text{UWP}, \text{Kn})$). Table 1 summarizes this installation information, where D1 denotes the documented distance from the exit end survey mark to the UWP normal. The D1, D2 difference is also shown and this indicates excellent agreement between the documented and surveyed positions. The data will therefore be referenced to the documented position of the UWP normal to each sensing element, the position previously denoted RD and shown on each installation diagram in Appendix B.

Table 1. Comparison of documented and surveyed installation points.

Cable Label	Distance exit end to UWP normal		D1 - D2 (m)	$d(\text{UWP}, \text{Kn})$ (m)
	Documented D1(m)	Survey D2(m)		
K1	8.055	8.060	-0.005	0.064
K2	7.890	7.874	0.016	0.149
K3	7.895	7.902	-0.007	0.163
K4	7.643	7.626	0.017	0.060
K5	7.610	7.589	0.021	0.047
K6	7.520	7.513	0.007	0.059
K7	7.450	7.436	0.014	0.117
K8	7.442	7.421	0.021	0.149
K9	7.261*	7.246	0.015	0.047
K10	7.527	7.525	0.002	0.245
K11	7.493	7.465	0.028	0.211
K12	7.269	7.268	0.001	0.124

* Projected since K9 does not extend to the UWP.

The only additional feature that requires comment was the route by which K-10, K-11 and K-12 exited the explosive chamber down the access drift. These three sensing elements were dressed along the chamber wall vertically and then around to the left rib (side, facing

toward WP) of the access drift. Before exiting, the three cables looped together back toward the chamber center about 0.60 m where they were anchored and run straight along the access drift left rib. Because of this loop back toward UWP, K-10, K-11 and K-12 were crushed at this location prior to the shock arrival at the chamber wall. This will be reflected in the data and results presented later.

DETONATORS AND TIMING

The UWP described above established the axis of the explosive chamber for the CORRTX installation and reference. It is necessary to examine the detonator and booster installation to later discuss the initiation of the blasting agent, the onset of crush of the CORRTX cables and some conclusions drawn from the CORRTX data. The burn of the blasting agent was initiated with Exploding BridgeWire (EBW) detonators embedded in 5 inch diameter (about 5.5 inch with casing), 6 inch long cylinders of pentolite high explosive. Figure 5 is an approximate sketch of the detonator-booster combination. Of significance may be the placement of the EBW centrally in the vertical direction but considerably off center in the radial direction.

Figures 6 and 7 are photographs of the boosters after installation. They were mounted on the UWP steel cable and, for reference, are numbered one through five from the bottom to top. Detonators one, three and five were the primary detonation system with two and four to be used only on failure of the primary system. Figure 7 is a close-up view of boosters one and two. Boosters three and five were installed in a "triangle" of CORRTX sensing elements. Due to a short detonator cable, booster one was installed adjacent to the K-4 sensing element but somewhat above K-1 and K-10.

Figure 5. Detonator-Booster Diagram

Figures 8a, b and c respectively are photographs of the lower, middle and upper CORRTX sensing element intersections (before booster emplacement and scaffolding removal) showing the position of the UWP steel cable within the intersections. Figures 9a, b and c (enlargements of 3a, b and c respectively) are survey based diagrams of the lower, middle and upper CORRTX sensing elements with the UWP and WP shown. A 5.5 inch diameter circle representing the booster at each level has been placed in each figure based on the photographs. Also shown are the normals from the UWP to each sensing element. The computed distance from UWP to each sensing element is presented in Table 1. Figures 6 and 7

are the only photos taken and no further documentation of the booster emplacement, and in particular the location of the detonators within the boosters, was made. This is believed to be significant to the blasting agent initiation as measured by the CORRTEX cables.

Figure 6. Photograph of the boosters in place in the explosive chamber.

Figure 7. Close-up photograph of boosters 1 and 2.

Detonation timing is summarized in Figure 10. The firing signal was sent from the Lawrence Livermore National Laboratory (LLNL) control room to the Capacitive Discharge Unit (CDU). From the CDU, simultaneous signals were sent to the EBW detonators and the red shack for distribution to experimenters. The time from CDU discharge to EBW detonation was $2.28 \mu\text{s}$ and the EBW detonation time was $4.542 \mu\text{s}$. The time from EBW detonation to the pentolite booster breakout for a centrally detonated booster is $5.08 \mu\text{s}$. Thus, for a detonator located as shown in Figure 5, the configuration for the NPE, the minimum booster breakout time is estimated to be $2.54 \mu\text{s}$. This time is the reference time for the blasting agent initiation and is referred to as the "minimum boost" time. The total CDU to "minimum boost" was $9.362 \mu\text{s}$ while the combined times from CDU to CORRTEX unit n (for K-n) was $3.701 + T(n)$, a net of $[3.701 + T(n)] - 9.362 \mu\text{s}$ to reference each CORRTEX data record to "minimum boost".

Figure 8. CORRTEx sensing element intersections, a) lower, b) middle and c) upper.

Figure 9. Detail diagrams of the CORRTX sensing element intersections with approximate booster locations and normals.

Figure 10. Diagram of the trigger signals with times.*

EXPLOSIVE EMPLACEMENT

The explosive was emplaced with two methods and a review of Figure 3 may assist in this explanation. The access drift connected to the explosive chamber between the installed K-4, K-5 and K-6 vertical location and the K-10, K-11 and K-12 vertical location, with the chamber invert about eight feet below the drift invert. A steel bulkhead with door formed the interface between the access drift and explosive chamber. The first method simply dumped the ANFO-emulsion blend from transport vehicles through the access drift bulkhead door. This resulted in a mound of explosive between sensing elements K-4 on the right and K-10 on the left. This mound did not flow like water, forming multiple uniform layers of explosive across the chamber, but rather a mass of viscous material, spreading across the chamber only under force of further material being dumped onto this pile. This "lava flow" (author's description) of material across the chamber covered the lower level of sensing elements only. It is to this emplacement description that we shall return later for a possible explanation of the K-1 results.

The second method of explosive emplacement, which filled the chamber to the back and covered the middle and upper sensing element levels, was through an auger system located in the access drift just outside the chamber bulkhead. The explosive was augured to a point just short (5 to 8 feet short) of the chamber axis, between K-5 and K-6 on the right and K-11 and K-12 on the left, dropped into the chamber and allowed to spread "radially" in all directions. The operation continued until visually, the chamber was full to the back. It has been suggested that the auguring process resulted in an increased mix of air into the ANFO-emulsion blend. The filled chamber remained in place for just over a week while stemming operations and final preparations took place.

* Timing, detonator, booster and explosive emplacement information was supplied by Ray Peabody, Sandia National Laboratory and event detonation/timing and firing engineer.

CORRTEX RECORDING SYSTEM

The CORRTEX recording system for the NPE included twelve CORRTEX recorders, each connected to a single CORRTEX sensing element. The recording units and associated trigger, power, communication and monitoring hardware were located underground in the slow alcove, approximately 1000 feet from the explosive chamber. The units were fielded in prepulsing mode with a 10 μ s pulse rate. Control and monitoring of the units and data retrieval was from the Los Alamos Control Point (CP) monitor room. All recorders were triggered by the red shack supplied trigger described earlier, and therefore reference timing is to the described "minimum boost." Details of the recording parameters, beyond those mentioned, may be obtained from the author or from the raw CORRTEX data records. All twelve units functioned properly and all data were retrieved and transmitted to the CP within minutes of the detonation.

CORRTEX DATA

Excellent explosive chamber data were recorded from ten of the twelve installed sensing elements. The K-10 sensing element (lower level, RDX1-50) went to an open termination at about the 26.3 m location on the sensing cable during the first pour of the stemming operations. K-10 was installed along the left rib of the access drift, linear from a point about 0.60 m inside the explosive chamber. The open termination indicates that the cable "tore" rather than crushed and the 26.3 m location places this point about 0.7 m into the sandbag region beyond the explosive chamber-access drift bulkhead. There is no explanation for this loss since K-11 and K-12 were together with K-10 in this location and were not damaged.

The K-1 (lower level, FSJ1-50) data are questionable. While data were recorded, the 2.0 m signature loop installed at 14.0 m in the sensing element (a 16.0 to 14.0 loop) appears as a 1.22 m discrete jump in the unadjusted data. The second loop is slightly distorted and the data to about the final 2.0 m in the explosive chamber are not linear. The K-1 data beyond the chamber wall were excellent, which permitted the complete data set to be reduced and may allow some results to be computed and some conclusions to be made regarding the explosive chamber data. K-1, K-4 and K-10 were the three sensing elements installed on the lower level. Only the results from the exit end of the K-1 data could therefore support the excellent K-4 data.

Appendix C contains listings of the explosive chamber records, with corrected cable propagation factors (PF ADJ) and with loop jumps still in the data. These listings are provided because they permit a study of the data with respect to the installed sensing element features, such as initial position of crush. In K-1 first crush occurred at 0.239 ms and at 12.520 m. Arrival at the "wall" for K-1 was at 1.379 ms and at 24.586 m (the last position before 24.768 m). These data listings may be compared directly with the installation diagrams provided in Appendix B. Figures 11, 12 and 13 are plots of the lower, middle and upper adjusted data sets. These are data with corrected cable propagation factors and their signature loops removed. The data are still referenced to their respective ends.

Figure 11. Lower level CORTEX data, adjusted but referenced to cable end.

Tables 2 and 3 summarize some relevant information. In Table 2, organized by installation level, the time with respect to "minimum boost" and position along the cable of first crush is listed for each cable, as is the RD and the difference, first crush data - RD. A negative difference indicates that first crush was "beyond" RD.

Table 2. Initial crush of explosive chamber sensing elements.

Level	Cable Label	Time (ms) Initial Crush	Location (m)** Initial Crush	RD	Difference
Lower	K-1	0.239	12.520	12.695	-0.175*
	K-4	0.019	14.210	14.206	+0.004
	K-10	N/A	N/A	7.445	N/A
Middle	K-2	0.168	12.409	12.202	+0.207
	K-5	0.015	12.500	12.601	-0.101
	K-11	0.009	9.383	9.492	-0.109
	K-7	0.127	10.281	10.309	-0.028
	K-8	0.174	7.045	6.912	+0.133
	K-9	N/A	N/A	-0.371	N/A
Upper	K-3	0.089	10.557	10.435	+0.122
	K-6	0.013	10.930	11.007	-0.077
	K-12	0.020	11.068	11.160	-0.092

* Possibly meaningless due to the questions with K-1.

** Position along the cable of first crush from cable end.

Figure 12. Middle level CORTEX data, adjusted but referenced to cable end.

Figure 13. Upper level CORRTEx data, adjusted but referenced to cable end.

As an aside, a close examination of some of this information is interesting and shows the level of detail to which the data may be subjected. Figure 14 will be useful in this discussion. From Figure 9 and Tables 1 and 2, Figure 14 may be constructed showing K-2 and K-8 in detail, installed on the same messenger but in opposite directions. The direction of burn is indicated by the arrows. First crush on K-2 is 0.207 m from RD toward the K-2 exit at 0.168 ms. Similarly, first crush on K-8 is 0.133 m from RD but at 0.174 ms.

Figure 14. Diagram of K2 and K8 first crush analysis.

Using linear extrapolation from this data point and its following point (not suggested as being highly accurate), a position of 0.059 m from RD at 0.168 ms for K-8 is estimated. This places the center of the explosion at 0.074 m from RD toward the K-2 exit. If the 5.5 inch (0.140 m) diameter booster were located as shown, a line passing through its center and normal to the line of K-2 and K-8 would intersect this line at 0.070 m from RD toward the K-2 exit. (A similar approach using linear interpolation on successive K-2 data points places the center of explosion at 0.079 m from RD toward the K-2 exit.) More sophisticated methods of analysis might be employed to pinpoint the center location more precisely, but the problem of non-centrally-detonated boosters and the lack of documentation of their installation will preclude carrying this much further. Comments on the advisability or necessity of this will be delayed to the conclusions section. Of significance however is that an examination of Tables 2 and 3, Appendices B and C and the associated figures, will show no major inconsistencies in the data with the possible exception of K-1, acknowledged as questionable.

Table 3 lists the time interval (10 μ s pulse rate) in which the detonation burn reached the exit position on each sensing element, grouped by exit path. There are again no major inconsistencies presented by this data. Examining the trio K-4, K-5 and K-6, the explosive burn reached the end location between 1.385 ms and 1.389 ms, or an average for these three sensing elements of 1.387 ms. Only the K-3 interval fails to overlap with the intervals of its two companion cables, K-1 and K-2, a minor discrepancy.

Table 3. Cable exit times at the drill holes or access drift.

Cable Label	Exit	Time interval at exit (ms)
K-1*	KH-1	1.439 - 1.449
K-2*	KH-1	1.438 - 1.448
K-3	KH-1	1.449 - 1.459
K-4	KH-2	1.379 - 1.389
K-5*	KH-2	1.385 - 1.395
K-6	KH-2	1.383 - 1.393
K-7	KH-3	1.367 - 1.377
K-8	KH-3	1.374 - 1.384
K-9	KH-3	1.370 - 1.380
K-10	Access	N/A
K-11	Access	1.219 - 1.229**
K-12	Access	1.210 - 1.220**

* A 2.0 m loop was installed in the sensing element at the chamber wall.

** The times shown here are for survey point 7, to which the cable looped back before exiting the explosive chamber.

RESULTS—DETONATION VELOCITIES

This presentation will not discuss high-order vs. low-order detonations, ideal vs. non ideal explosives, etc. This is a report of experimental results based on a described instrumentation plan and the report of some observed behaviors. The references will include several relevant sources or classical treatises on the subject of detonations.

A parameter of explosive performance is its detonation velocity. The blasting agent used on the NPE, ANFO-emulsion blend, required initiation, and the method used was described earlier. Initiation may result in an overdriven or underdriven detonation, an explosive burn accelerating or slowing to a steady-state detonation. On the NPE, the detonation required both time and distance from UWP to reach a constant velocity, and the interval over which analysis was performed had to be selected for each data record. Appendix D contains the time-dependent, shock locations for each data record, referenced to its RD, and Table 4 presents a summary of the detonation velocities computed by a linear least squares fit to the data, over the intervals indicated.

Because each data point in the selected interval is an independent measurement of the shock position and random noise, instrumentation error and explosive inconsistencies may enter into the data, a 90% confidence function is defined to further refine the computed detonation velocity. If a least squares generated linear function F models the steady-state detonation and if the position $X1$ is a normally distributed random variable for the corresponding time $T1$, then a 90% confidence interval ($Y1$, $Y2$) about $F(T1)$ can be determined, such that the assertion that the true position at time $T1$ will be contained between $Y1$ and $Y2$, will be correct 90% of the time. If $X1$ lies outside this confidence interval ($Y1$, $Y2$) for time $T1$, then the point ($T1$, $X1$) is rejected. Those points satisfying these conditions are then used to regenerate a least squares linear function and the process continues iteratively until no points are rejected. The resulting least squares generated linear function is defined to be the 90% confidence function.

The final column of Table 4 presents the results of computing the velocity, over the interval indicated, of the 90% confidence function. This value, the author believes, better represents the measured velocity of detonation by each CORRTX sensing element. The computed standard deviation for each method of determining velocity is also presented in Table 4. Figures 15, 16 and 17 show a plot of each CORRTX data set presented in the listings in Appendix D along with the 90% confidence function determined for that data set.

A return to the K-1 data is now necessary. Since the K-1 data beyond the explosive chamber were excellent and consistent with the K-2 and K-3 data, the correct propagation factor for K-1 could be determined. Using the subsequently adjusted data, removing 1.13 m and 1.88 m for the two data jumps and referencing the data to its "wall" or exit location rather than its RD, the final data set listed in Appendix D and plotted in Figure 15 was obtained. Certainly the linear detonation exhibited by the other data sets is not present in the K-1 data. This was unfortunate because of the additional loss of K-10 from the three lower level cables, leaving only K-4. However, an analysis on only the 0.250 ms of data prior to exiting the

explosive chamber yields a velocity of detonation of 7.119 m/ms, a value not inconsistent with the K-4 velocity of 7.162 m/ms. Final remarks with a possible explanation of what happened to K-1 will be presented in the following section.

Table 4. Computed detonation velocities from the CORRTEx data.

Level	Cable Label	Interval (ms)	Linear Least Squares Velocity (m/ms)	
			All Data	90% Confidence
Lower	K-1	1.10 - 1.35	7.122 ± 0.049	7.119 ± 0.046
	K-4	0.57 - 1.35	7.164 ± 0.010	7.162 ± 0.010
Middle	K-2	0.40 - 1.32	6.810 ± 0.018	6.857 ± 0.009
	K-5	0.50 - 1.33	6.885 ± 0.008	6.873 ± 0.004
	K-11	0.45 - 1.22	6.809 ± 0.009	6.802 ± 0.006
	K-7	0.40 - 1.31	6.772 ± 0.013	6.763 ± 0.006
	K-8	0.40 - 1.27	6.812 ± 0.015	6.723 ± 0.008
	K-9	0.50 - 1.23	6.731 ± 0.014	6.731 ± 0.012
Upper	K-3	0.35 - 1.34	6.448 ± 0.010	6.424 ± 0.007
	K-6	0.33 - 1.30	6.442 ± 0.008	6.427 ± 0.006
	K-12	0.40 - 1.21	6.491 ± 0.011	6.491 ± 0.011

In the middle level, the K-2 and K-5 90% confidence velocities of 6.857 m/ms and 6.873 m/ms are slightly higher than the 6.802 m/ms and 6.763 m/ms for K-11 and K-7 which are in turn higher than the K-8 and K-9 velocities of 6.723 m/ms and 6.731 m/ms. Is this real or imagined? More on this later, also. The three upper level velocities are rather consistent with an average value of 6.447 m/ms. Of course the progression from a lower level velocity of about 7.14 m/ms, to a middle level velocity between 6.73 and 6.87 m/ms and to an upper level velocity of about 6.45 m/ms is obviously a gradation of velocity associated with depth in the explosive chamber.

Finally, some observations about explosive initiation. The plots presented in Figures 15, 16 and 17 show that in several cases, K-11 for example, the initial burn velocity was low, accelerating to a constant velocity by about 0.450 ms and 1.75 m from RD, an indication of underinitiation. Although the times and distances vary, a similar situation exists for K-4, K-5, K-6, K-9 and K-12. The remaining four plots, K-2, K-3, K-7 and K-8 (excluding K-1) initially "hump", slowing slightly to a steady-state detonation velocity. Interestingly, K-2, K-3, K-7 and K-8 also show significantly longer times to first crush (Table 2).

The global objectives of the experiment were seismic and the shock induced into the chamber walls was the source of the signals observed. All evidence presented here indicate a complete and efficient explosive burn. Table 5 presents a final summary of information

Table 5. Times of detonation burn arrival at certain wall locations (Chamber Center at 6077.93 feet.)

Level	Location Designation /		Elevation (feet) /		Radial Distance (m) /		Arrival Time (ms)	
Lower	K-1(?)	KH-1*	K-4(u)	KH-2	K-10(n/a)			
	6072.26/7.134 1.39 ± 0.01	6073.56/8.453 1.45 ± 0.01	6072.32/7.223 1.38 ± 0.01	6072.80/7.754 1.39 ± 0.01	6072.01/7.595 N/A			
Middle	K-2(o)		K-5(u)		K-11(u)	K-7(o)**	K-8(u)**	K-9(u)**
	6078.01/7.442 1.34 ± 0.01		6078.02/7.246 1.33 ± 0.01		6078.07/7.423 1.31 ± 0.02	6078.18/7.296 1.30 ± 0.01	6077.87/7.867 1.27 ± 0.03	6078.25/7.589 1.23 ± 0.03
Extra							KH-3 6081.81/7.986 1.38 ± 0.01	
Upper	K-3(o)		K-6(u)		K-12(u)		Access drift	
	6084.16/7.413 1.34 ± 0.01		6083.76/7.239 1.33 ± 0.01		6083.97/7.084 1.27 ± 0.03		6083.97/6.925 1.31 ± 0.02	

* KH-1 recessed into chamber wall due to sloughing around the drill hole collar.

** K-7, K-8 and K-9 ran around the chamber circumference to KH-3.

Figure 15. Lower level plots of final CORTEX data with 90% confidence function.

Figure 16. Middle level plots of final CORRTX data with 90% confidence function.

Figure 16. Continued

Figure 16. Continued

Figure 17. Upper level plots of final CORRETEX data with 90% confidence function.

Figure 17. Continued

relative to the detonation front arrival at the chamber walls. For each location presented, the table contains the Nevada elevation in feet, the radial distance from UWP in meters and the best time or estimate of time available. Also indicated by each location identification is a "u" to identify a data record which underdetonated or a "o" for overdetonated. Some locations required projection over a known distance at the determined burn velocity, because the data record was cut off prior to arrival at the chamber wall. All data relative to the wall or exit location of the sensing elements were some inches inside the chamber walls and therefore the times presented in Table 5 have taken this into account. The uncertainties presented reflect the necessity to extrapolate times from some inner location to the chamber wall. Except for K-8 and K-9, all times generally fell between 1.3 ms and 1.4 ms.

CONCLUSIONS

Initiation

The primary detonation system with boosters one, three and five (a three-point axial detonation) initiated the explosive burn. The KH-2 drill hole cables K-4, K-5 and K-6 on the three installation levels, show first crush (Table 2) at 0.019 ms, 0.015 ms and 0.013 ms respectively. They were recorded on three separate commonly triggered CORRTX

recorders. An independent system cross-timing the receipt of triggers to each CORRTX recorder and the detonation trigger further confirmed the system timing.

The data show both underdetonation and overdetonation. Plots for K-4, K-5, K-6, K-9, K-11 and K-12 in Figures 15, 16 and 17 clearly show an accelerating explosive burn, reaching constant velocities by about 0.400 ms (K-6 at 0.330 ms and K-4 at 0.570 ms are the extremes.) The plots for K-2, K-3, K-7 and K-8 show the rapid breakout, rolling over at about 0.400 ms to a constant velocity, indicative of overdetonation. As noted earlier, these four sensing elements, and only these four elements excluding K-1, also exhibit delayed first crush. This delay could be due to a greater distance from the detonation points, but the photos in Figures 6 and 7 show the boosters against some CORRTX sensing elements, and the diagrams in Figure 9 along with the computed distances from UWP to each sensing element in Table 1 show minimal space for the boosters within the "triangles" of sensing elements. There is no guarantee however that these positions were absolutely maintained during explosive emplacement. Regardless, the rapid but delayed breakout evidenced by K-2, K-3, K-7 and K-8 cannot be due to distance from the boosters but rather to the booster detonation itself. The author suggests that perhaps this is one result of the non-centrally-detonated boosters. Because there is no documentation of exact detonator position in each booster with respect to any CORRTX sensing element, it can only be suggested that detonation on the short (minimal breakout) side of the booster resulted in underdetonation while booster burn of about three-fourths the booster diameter slightly delayed the ANFO initiation, but did so at "a higher order."

Steady-State Burn

All records, including K-1, show a constant detonation velocity from some point to their explosive chamber termination (to the last point on their installed linear path.) The computed velocities shown in Table 4 and their standard deviations support this conclusion.

Comparing data on the three levels also supports the conclusion of a gradation in velocity with depth in the emplaced explosive. This is consistent with an explosive density increasing with depth. A final remark on this later.

Do the data from the array in the middle level support a conclusion of asymmetric burn around the chamber? The middle level cables were arrayed around the chamber in the order listed in Table 4 where the 90% confidence velocities are decreasing from K-5 through K-8 and almost K-9. Whether these differences are significant must be left to explosive experts. The author will suggest however that consideration be given to the method of emplacement which emplaced the explosive between K-5 and K-11 on the middle level and K-6 and K-12 on the upper level. The upper level results would argue against any general conclusions based on the middle level results alone. The general decrease in detonation velocities from the "near" side to the "far" side is interesting.

K-1 Revisited

A final consideration of K-1 is speculation based on the delayed first crush of K-1, the general shape of the K-1 plot to about 1.0 ms and the description of the explosive emplacement. K-1

was installed across the explosive chamber in such a manner that the mound of explosive being emplaced would push directly against the sensing element and its messenger. A scenario whereby the sensing element was pushed away from booster #1 and the UWP, down, up or any direction away, and the loops relaxed under the tension is consistent with the observed data. Approximately one-half to two-thirds of the way from the chamber axis to the wall, K-1 was anchored vertically with a nylon rope from back to K-3, K-2, K-1 and invert. This vertical anchor could have maintained the outer portion of K-1 in place, permitting the reasonably consistent data obtained over the final two meters of sensing element. While other scenarios may be possible, lacking any observed evidence, the author proposes this explanation.

Concluding Remarks

It has been suggested that in order to model this experiment, density corrections on a centimeter scale with depth are necessary, to reflect the observed gradation of detonation velocity with depth. This seems excessive given the methods of explosive emplacement and the large uncertainties associated with detonator and booster emplacement which in turn affect absolute timing and absolute determination of the location of the axis of detonation. However, none of the uncertainties identified alters the computed velocities of detonation which are indicative of explosive performance. The explosive chamber is a far cry from the point-source modeling typically done for nuclear events and so it is hoped that the results presented here can be folded into subsequent modeling efforts and experiments. In some instances, we have applied a microscope to data from an experiment whose objectives were macroscopic, but having at least made these measurements, we can, with some assurance proceed to move out from the explosive chamber.

ACKNOWLEDGMENTS

The work reported here required the cooperation of many organizations and the assistance of many individuals. They all deserve thanks, but I would like to concentrate on those individuals whose efforts over the extended period of this experiment contributed to our success: locally to Randy Bos who, with all his other responsibilities, stepped in when I occasionally chose to step out and to Keith Alrick and Brad Wright who each took responsibility for various aspects of the ASM gauge planning, design, fielding and recording. While many participated in various stages of the sensing element and ASM gauge fielding as training exercises, including our colleagues from LLNL, the EG&G-NTS crew deserves special thanks. They stuck in there for the long haul and kept the systems functioning over the long delays. The engineers were Steve Becker, Tom Graves and Peter Frankiw with technicians R. X. (Mike) O'Connor, F. Scot Tibbits, Tim Simpson, Ron Leisy and Greg Mize. Thanks guys, the experiment was a great success, the data excellent and usually we had a good time in the process. Thanks also to J-6, EG&G-LAO, RSN, DNA, REECO and all the rest of the alphabet soup.

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APPENDIX A

Brief Description of the CORRTEX Recording System

The CORRTEX (continuous reflectometry for radius vs. time experiment) system was developed for determining the yield of a nuclear explosion by measuring the position of its shock front as a function of time. The system consists of a CORRTEX digital recorder, a length of 50 ohm coaxial cable (the sensing element), a coaxial jumper or transmission cable between the recorder and the installed sensing element, assorted trigger, communication, command-and-monitor hardware and the command, monitor, data acquisition and data retrieval software. A CORRTEX recorder is a Time Domain Reflectometry (TDR) based unit with a selectable discrete pulse rate (10 μ s to 98 μ s in 2 μ s increments). Upon receipt of a trigger (several different trigger modes are possible) the recorder stores in internal memory, 4049 two-way-transit-times (TWTT). The TWTT is measured by a windowed, voltage-threshold detection circuit, on the differentiated return pulse, with both the window time and threshold level set externally. Upon transfer or retrieval of the stored pulse time and TWTT data into a computer, this raw data may be converted to a time dependent cable length or position along the cable, knowing only the precrush full cable length and a previously measured velocity of propagation of a pulse in the sensing element.

The TWTT of the combined transmission cable and sensing element plus a short processing time of two to three microseconds determines the minimum pulse rate that may be selected. The expected duration of the expanding shock front may further limit the pulse rate since 4049 multiplied by the selected pulse rate is the total recording interval.

The sensing element is a key component of the CORRTEX system. While any 50 ohm coaxial cable may be used, the electrical quality of the cable, its physical characteristics that permit handling and installation in the predetonation environment, the expected peak pressure of the detonation shock front, the duration of the shock front or fronts to be recorded and, of course, the experiment objectives, all combine to determine the cable type or manufacture to

be built and installed. The sensing elements are cut to a planned length, marked in 1.0 ± 0.002 m increments, terminated with a connector at the recording end, terminated in a short at the down-hole/WP/detonation end and electrically checked and measured (the combined physical and electrical length provides the initial velocity of propagation or propagation factor for the data reduction). During the sensing element installation, geometric signatures may be placed in the sensing element, if possible, at known and documented locations so that a sequence of discrete signatures will appear in the data reduced with the initial propagation factor. These signatures permit the determination of the propagation factor of the cable at the time of the experiment, a dynamic calibration of the propagation factor. By effectively adjusting the propagation factor to require that the signatures appear in the data as installed along its length, and then removing any effect to the data due to these signatures, an adjusted data set providing the time dependent progression of the shock front along the path of the sensing element is produced. Depending on the installation path of the sensing element with respect to the shock front reference location (WP), the resulting adjusted data set may be geometrically converted to a radial position with respect to WP as a function of time.

APPENDIX B

As-Built CORRTEX Cable Diagrams

K-1, FSJ1-50

RD

24.768

24 23

14

12.695

5.353

21

17

16

1.302

2.293

6.030

7.287

8.055

15.205

#11

#12

Profile view of a part with dimensions and feature labels. The part is labeled K-2, FSJ1-50. The profile shows a horizontal line with several vertical features. The dimensions are as follows:

- Overall length: 15.325
- Distance from left face to center of feature 14: 7.890
- Distance from left face to center of feature 16: 7.786
- Distance from left face to center of feature 17: 6.800
- Distance from center of feature 14 to center of feature 16: 2.775
- Distance from center of feature 16 to center of feature 17: 1.781
- Distance from center of feature 14 to right face: 4.444
- Distance from left face to right face: 12.202

Feature labels include RD, 24, 23, 21, 14, 17, 16, #13, and #14.

K-3, FSJ4-50

RD

22.360 21 12 10.435 3.000

19 15 14 1.553 2.545 6.555 7.535 7.895 15.340

#15 #16

The diagram illustrates the physical layout of the K-3, FSJ4-50 antenna system. It shows a horizontal structure with various vertical elements and dimensions. Key dimensions include 22.360, 10.435, 3.000, 1.553, 2.545, 6.555, 7.535, 7.895, and 15.340. Components are labeled with numbers 12, 14, 15, 19, 21, and 22, and reference points #15 and #16. A vertical line is labeled RD.

APPENDIX C

CORRTEX Explosive Chamber Data, Velocity of Propagation Corrected and Referenced to Cable End

NPE			K-1 FSJ1-50 CX3 43			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0108	-0.0002	51	0.4891	13.9681	101	0.9891	19.5498
2	-0.0008	-0.0002	52	0.4991	14.0520	102	0.9991	19.6477
3	0.0092	-0.0002	53	0.5091	14.1289	103	1.0091	19.7247
4	0.0192	-0.0002	54	0.5191	14.1919	104	1.0191	19.8296
5	0.0292	-0.0002	55	0.5291	14.2618	105	1.0291	19.9415
6	0.0392	0.0068	56	0.5391	14.3108	106	1.0391	20.0814
7	0.0492	-0.0002	57	0.5491	14.3668	107	1.0491	20.1653
8	0.0592	-0.0002	58	0.5591	14.4297	108	1.0591	20.2842
9	0.0692	-0.0002	59	0.5691	14.5067	109	1.0691	20.4171
10	0.0792	-0.0002	60	0.5791	15.7167	110	1.0791	20.5151
11	0.0892	-0.0002	61	0.5891	15.7937	111	1.0891	20.5920
12	0.0992	-0.0002	62	0.5991	15.9056	112	1.0991	20.6829
13	0.1092	-0.0002	63	0.6091	16.0035	113	1.1091	20.7529
14	0.1192	-0.0002	64	0.6191	16.0874	114	1.1191	20.8368
15	0.1292	-0.0002	65	0.6291	16.1574	115	1.1291	20.9347
16	0.1392	-0.0002	66	0.6391	16.2343	116	1.1391	21.0187
17	0.1492	-0.0002	67	0.6491	16.3253	117	1.1491	21.0746
18	0.1592	-0.0002	68	0.6591	16.4302	118	1.1591	23.0261
19	0.1692	-0.0002	69	0.6691	16.5281	119	1.1691	23.1031
20	0.1792	-0.0002	70	0.6791	16.5981	120	1.1791	23.1730
21	0.1892	-0.0002	71	0.6891	16.6960	121	1.1891	23.2430
22	0.1992	-0.0002	72	0.6991	16.8079	122	1.1991	23.2919
23	0.2092	-0.0002	73	0.7091	16.8988	123	1.2091	23.3619
24	0.2192	-0.0002	74	0.7191	16.9967	124	1.2191	23.4108
25	0.2292	-0.0002	75	0.7291	17.0527	125	1.2291	23.4948
26	0.2391	12.5202	76	0.7391	17.1296	126	1.2391	23.5787
27	0.2491	12.6181	77	0.7491	17.2206	127	1.2491	23.6626
28	0.2591	12.6811	78	0.7591	17.3325	128	1.2591	23.7186
29	0.2691	12.7650	79	0.7691	17.4234	129	1.2691	23.7815
30	0.2791	12.8489	80	0.7791	17.4934	130	1.2791	23.8795
31	0.2891	12.9329	81	0.7891	17.5913	131	1.2891	23.9634
32	0.2991	12.9748	82	0.7991	17.7032	132	1.2991	24.0403
33	0.3091	13.0098	83	0.8091	17.7941	133	1.3091	24.1103
34	0.3191	13.0588	84	0.8191	17.8921	134	1.3191	24.1593
35	0.3291	13.1357	85	0.8291	17.9480	135	1.3291	24.2222
36	0.3391	13.1847	86	0.8391	18.0250	136	1.3391	24.2922
37	0.3491	13.2546	87	0.8491	18.1229	137	1.3491	24.3481
38	0.3591	13.2966	88	0.8591	18.2348	138	1.3591	24.4251
39	0.3691	13.3455	89	0.8691	18.3467	139	1.3691	24.5160
40	0.3791	13.3945	90	0.8791	18.4167	140	1.3791	24.5859
41	0.3891	13.4155	91	0.8891	18.5426	141	1.3891	25.5792
42	0.3991	13.4715	92	0.8991	18.6405	142	1.3991	25.6771
43	0.4091	13.5134	93	0.9091	18.7314	143	1.4091	25.7680
44	0.4191	13.5624	94	0.9191	18.7874	144	1.4191	25.8380
45	0.4291	13.6043	95	0.9291	18.8993	145	1.4291	25.9149
46	0.4391	13.6673	96	0.9391	18.9902	146	1.4391	25.9499
47	0.4491	13.7303	97	0.9491	19.1161	147	1.4490	28.0063
48	0.4591	13.8002	98	0.9591	19.2280	148	1.4590	28.0693
49	0.4691	13.8562	99	0.9691	19.3120	149	1.4690	28.1392
50	0.4791	13.9051	100	0.9791	19.4169	150	1.4790	28.1812

NPE			K-2 FSJ1-50 CX3 46			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0116	-0.0129	51	0.4883	16.2592	101	0.9883	19.6960
2	-0.0016	-0.0129	52	0.4983	16.3153	102	0.9983	19.7311
3	0.0084	-0.0059	53	0.5083	16.3714	103	1.0083	19.7942
4	0.0184	-0.0059	54	0.5183	16.4696	104	1.0183	19.8503
5	0.0284	0.0012	55	0.5283	16.5398	105	1.0283	19.9064
6	0.0384	-0.0059	56	0.5383	16.5959	106	1.0383	19.9765
7	0.0484	-0.0059	57	0.5483	16.6450	107	1.0483	20.0607
8	0.0584	-0.0059	58	0.5583	16.7221	108	1.0583	20.1449
9	0.0684	-0.0059	59	0.5683	16.8063	109	1.0683	20.2080
10	0.0784	-0.0059	60	0.5783	16.8764	110	1.0783	20.2641
11	0.0884	-0.0059	61	0.5883	16.9606	111	1.0883	20.3693
12	0.0984	-0.0059	62	0.5983	17.0167	112	1.0983	20.4465
13	0.1084	-0.0059	63	0.6083	17.0588	113	1.1083	20.5236
14	0.1184	-0.0059	64	0.6183	17.1149	114	1.1183	20.6078
15	0.1284	-0.0059	65	0.6283	17.1570	115	1.1283	20.6358
16	0.1384	-0.0059	66	0.6383	17.2271	116	1.1383	20.6919
17	0.1484	-0.0059	67	0.6483	17.3113	117	1.1483	20.7481
18	0.1584	-0.0059	68	0.6583	17.3814	118	1.1583	20.8042
19	0.1683	12.4086	69	0.6683	17.4656	119	1.1683	20.8743
20	0.1783	12.5489	70	0.6783	17.5217	120	1.1783	20.9655
21	0.1883	12.6260	71	0.6883	17.5918	121	1.1883	23.0626
22	0.1983	12.6822	72	0.6983	17.6760	122	1.1983	23.1468
23	0.2083	12.7383	73	0.7083	17.7602	123	1.2083	23.2309
24	0.2183	12.8224	74	0.7183	17.8303	124	1.2183	23.3011
25	0.2283	12.8926	75	0.7283	17.9145	125	1.2283	23.3291
26	0.2383	12.9627	76	0.7383	17.9355	126	1.2383	23.3993
27	0.2483	13.0188	77	0.7483	17.9986	127	1.2483	23.4414
28	0.2583	13.0609	78	0.7583	18.0407	128	1.2583	23.5115
29	0.2683	13.1451	79	0.7683	18.0968	129	1.2683	23.5957
30	0.2783	13.2152	80	0.7783	18.1670	130	1.2783	23.6658
31	0.2883	13.2853	81	0.7883	18.2652	131	1.2883	23.7500
32	0.2983	13.3415	82	0.7983	18.3423	132	1.2983	23.7921
33	0.3083	13.3976	83	0.8083	18.4125	133	1.3083	23.8622
34	0.3183	13.4467	84	0.8183	18.4756	134	1.3183	23.9604
35	0.3283	13.4958	85	0.8283	18.5878	135	1.3283	24.0446
36	0.3383	13.5308	86	0.8383	18.6579	136	1.3383	24.1287
37	0.3483	13.5729	87	0.8483	18.7281	137	1.3483	24.2199
38	0.3583	13.6080	88	0.8583	18.7982	138	1.3583	24.3251
39	0.3683	13.6781	89	0.8683	18.8333	139	1.3683	24.4794
40	0.3783	13.7623	90	0.8783	18.8964	140	1.3783	24.7109
41	0.3883	13.8324	91	0.8883	18.9525	141	1.3883	25.5525
42	0.3983	13.8885	92	0.8983	19.0086	142	1.3983	25.6577
43	0.4083	13.9376	93	0.9083	19.1068	143	1.4083	25.7700
44	0.4183	14.0008	94	0.9183	19.1770	144	1.4183	25.8401
45	0.4283	14.0989	95	0.9283	19.2611	145	1.4283	25.9102
46	0.4383	15.9927	96	0.9383	19.3172	146	1.4383	25.9804
47	0.4483	16.0628	97	0.9483	19.3804	147	1.4482	27.9723
48	0.4583	16.1189	98	0.9583	19.4715	148	1.4582	28.0424
49	0.4683	16.1610	99	0.9683	19.5557	149	1.4682	28.1126
50	0.4783	16.2171	100	0.9783	19.6258	150	1.4782	28.1827

NPE			K-3 FSJ4-50 CX3 40			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0109	0.0046	51	0.4891	14.8642	101	0.9891	18.0599
2	-0.0009	-0.0031	52	0.4991	14.9491	102	0.9991	18.1063
3	0.0091	0.0124	53	0.5091	14.9568	103	1.0091	18.1680
4	0.0191	0.0046	54	0.5191	14.9954	104	1.0191	18.2529
5	0.0291	-0.0108	55	0.5291	15.0572	105	1.0291	18.3224
6	0.0391	0.0201	56	0.5391	15.1112	106	1.0390	18.4150
7	0.0491	-0.0340	57	0.5491	15.2038	107	1.0490	18.4305
8	0.0591	0.0201	58	0.5591	15.2501	108	1.0590	18.5231
9	0.0691	-0.0108	59	0.5691	15.3351	109	1.0690	18.5926
10	0.0791	-0.0031	60	0.5791	15.4354	110	1.0790	18.6466
11	0.0891	10.5568	61	0.5891	15.4508	111	1.0890	18.7392
12	0.0991	10.6186	62	0.5991	15.5435	112	1.0990	18.8087
13	0.1091	10.7267	63	0.6091	15.5589	113	1.1090	18.8859
14	0.1191	10.7730	64	0.6191	15.6979	114	1.1190	18.9168
15	0.1291	10.8733	65	0.6291	15.7287	115	1.1290	18.9708
16	0.1391	10.9119	66	0.6391	15.8136	116	1.1390	19.0171
17	0.1491	10.9505	67	0.6491	15.8754	117	1.1490	21.0705
18	0.1591	11.0200	68	0.6591	15.9449	118	1.1590	21.1322
19	0.1691	11.0200	69	0.6691	15.9603	119	1.1690	21.1785
20	0.1791	11.0972	70	0.6791	16.0143	120	1.1790	21.3098
21	0.1891	11.0972	71	0.6891	16.0993	121	1.1890	21.3561
22	0.1991	11.1589	72	0.6991	16.1301	122	1.1990	21.4024
23	0.2091	11.2053	73	0.7091	16.2228	123	1.2090	21.4641
24	0.2191	11.2361	74	0.7191	16.2691	124	1.2190	21.5105
25	0.2291	11.3288	75	0.7291	16.3617	125	1.2290	21.5954
26	0.2391	11.3442	76	0.7391	16.4543	126	1.2390	21.6726
27	0.2491	11.4523	77	0.7491	16.4929	127	1.2490	21.7343
28	0.2591	11.4832	78	0.7591	16.5624	128	1.2590	21.8269
29	0.2691	11.5603	79	0.7691	16.6010	129	1.2690	21.8655
30	0.2791	11.5835	80	0.7791	16.7245	130	1.2790	21.9041
31	0.2891	11.6221	81	0.7891	16.7786	131	1.2890	21.9504
32	0.2991	11.7610	82	0.7991	16.8403	132	1.2990	22.0585
33	0.3091	11.7610	83	0.8091	16.9175	133	1.3090	22.1048
34	0.3191	11.8691	84	0.8191	16.9484	134	1.3190	22.1820
35	0.3291	11.9000	85	0.8291	17.0179	135	1.3290	22.2901
36	0.3391	11.9772	86	0.8391	17.0719	136	1.3390	22.3982
37	0.3491	12.0081	87	0.8491	17.1182	137	1.3490	22.6992
38	0.3591	13.9842	88	0.8591	17.1954	138	1.3590	23.0003
39	0.3691	14.1000	89	0.8691	17.2263	139	1.3690	23.4171
40	0.3791	14.1231	90	0.8791	17.3729	140	1.3790	23.8108
41	0.3891	14.2003	91	0.8891	17.3884	141	1.3890	25.5631
42	0.3991	14.2466	92	0.8991	17.5042	142	1.3990	25.6711
43	0.4091	14.3316	93	0.9091	17.5350	143	1.4090	25.7638
44	0.4191	14.4165	94	0.9191	17.5891	144	1.4190	25.8101
45	0.4291	14.4782	95	0.9291	17.7049	145	1.4290	25.8487
46	0.4391	14.5400	96	0.9391	17.7512	146	1.4390	25.9104
47	0.4491	14.5940	97	0.9491	17.8361	147	1.4490	25.9876
48	0.4591	14.6866	98	0.9591	17.8901	148	1.4590	26.0571
49	0.4691	14.7407	99	0.9691	17.9364	149	1.4690	26.0880
50	0.4791	14.8487	100	0.9791	17.9750	150	1.4790	26.1806

NPE			K-4 FSJ4-50 CX3 38			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0109	-0.0051	51	0.4891	15.8599	101	0.9891	21.2176
2	-0.0009	0.0103	52	0.4991	15.9061	102	0.9991	21.2793
3	0.0091	-0.0051	53	0.5091	15.9832	103	1.0091	21.3332
4	0.0191	14.2102	54	0.5191	16.0449	104	1.0191	21.3949
5	0.0291	14.2564	55	0.5291	17.9876	105	1.0291	21.4489
6	0.0391	14.2950	56	0.5391	18.0492	106	1.0391	21.5491
7	0.0491	14.3104	57	0.5491	18.1263	107	1.0491	21.6262
8	0.0591	14.3258	58	0.5591	18.1803	108	1.0591	21.7033
9	0.0691	14.3489	59	0.5691	18.2420	109	1.0691	21.7495
10	0.0791	14.3875	60	0.5791	18.2728	110	1.0791	21.8112
11	0.0891	14.4106	61	0.5891	18.3190	111	1.0891	21.9191
12	0.0991	14.4414	62	0.5991	18.3730	112	1.0991	22.0116
13	0.1091	14.4569	63	0.6091	18.4193	113	1.1091	22.0887
14	0.1191	14.4723	64	0.6191	18.4655	114	1.1191	24.1085
15	0.1291	14.4877	65	0.6291	18.5580	115	1.1291	24.1624
16	0.1391	14.5185	66	0.6391	18.6582	116	1.1391	24.2318
17	0.1491	14.5494	67	0.6491	18.7353	117	1.1491	24.2781
18	0.1591	14.5956	68	0.6591	18.7816	118	1.1591	24.3474
19	0.1691	14.6265	69	0.6691	18.8433	119	1.1691	24.4168
20	0.1791	14.6727	70	0.6791	18.9281	120	1.1791	24.4939
21	0.1891	14.7113	71	0.6891	19.0360	121	1.1891	24.5710
22	0.1991	14.7421	72	0.6991	19.1131	122	1.1991	24.6635
23	0.2091	14.7729	73	0.7091	19.1747	123	1.2091	24.7098
24	0.2191	14.8038	74	0.7191	19.2441	124	1.2191	24.7714
25	0.2291	14.8192	75	0.7291	19.2981	125	1.2291	24.8794
26	0.2391	14.8346	76	0.7391	19.3598	126	1.2391	24.9719
27	0.2491	14.8654	77	0.7491	19.4214	127	1.2491	25.0567
28	0.2591	14.9040	78	0.7591	19.4831	128	1.2591	25.1261
29	0.2691	14.9348	79	0.7691	19.5910	129	1.2691	25.1800
30	0.2791	14.9888	80	0.7791	19.6681	130	1.2791	25.2417
31	0.2891	15.0273	81	0.7891	19.7452	131	1.2891	25.3034
32	0.2991	15.0736	82	0.7991	19.7760	132	1.2991	25.3419
33	0.3091	15.1044	83	0.8091	19.8377	133	1.3091	25.4344
34	0.3191	15.1507	84	0.8191	19.9225	134	1.3191	25.5269
35	0.3291	15.1969	85	0.8291	20.0073	135	1.3291	25.6194
36	0.3391	15.2278	86	0.8391	20.0844	136	1.3391	25.6657
37	0.3491	15.2586	87	0.8491	20.1538	137	1.3491	25.7274
38	0.3591	15.2971	88	0.8591	20.2154	138	1.3591	25.7967
39	0.3691	15.3203	89	0.8691	20.2771	139	1.3691	25.8892
40	0.3791	15.3588	90	0.8791	20.3465	140	1.3791	25.9895
41	0.3891	15.3896	91	0.8891	20.3928	141	1.3891	26.0511
42	0.3991	15.4282	92	0.8991	20.4698	142	1.3991	26.1128
43	0.4091	15.4590	93	0.9091	20.5778	143	1.4091	26.1668
44	0.4191	15.4976	94	0.9191	20.6703	144	1.4191	26.2130
45	0.4291	15.5515	95	0.9291	20.7474	145	1.4291	26.2670
46	0.4391	15.6132	96	0.9391	20.7936	146	1.4391	26.2978
47	0.4491	15.6749	97	0.9491	20.9015	147	1.4491	26.3132
48	0.4591	15.7211	98	0.9591	21.0018	148	1.4591	26.3441
49	0.4691	15.7828	99	0.9691	21.0866	149	1.4691	26.4057
50	0.4791	15.8136	100	0.9791	21.1482	150	1.4791	26.4674

NPE			K-5 FSJ1-50 CX3 19			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0049	0.0062	51	0.4951	16.5871	101	0.9951	19.9810
2	0.0051	0.0133	52	0.5051	16.6295	102	1.0051	20.0376
3	0.0151	12.5002	53	0.5151	16.6861	103	1.0151	20.1083
4	0.0251	12.5497	54	0.5251	16.7568	104	1.0251	20.1790
5	0.0351	12.5992	55	0.5351	16.8558	105	1.0351	20.2356
6	0.0451	12.6345	56	0.5451	16.9194	106	1.0451	20.2921
7	0.0551	12.6557	57	0.5551	16.9618	107	1.0551	20.3770
8	0.0651	12.6982	58	0.5651	17.0113	108	1.0651	20.4618
9	0.0751	12.7194	59	0.5751	17.0891	109	1.0751	20.5325
10	0.0851	12.7477	60	0.5851	17.1739	110	1.0851	20.5891
11	0.0951	12.7760	61	0.5951	17.2376	111	1.0951	20.6457
12	0.1051	12.9032	62	0.6051	17.2941	112	1.1051	20.7517
13	0.1151	12.8254	63	0.6151	17.3507	113	1.1151	20.8224
14	0.1251	12.8537	64	0.6251	17.4214	114	1.1251	20.8790
15	0.1351	12.8820	65	0.6351	17.4780	115	1.1351	20.9497
16	0.1451	12.9244	66	0.6451	17.5345	116	1.1451	23.0073
17	0.1551	12.9527	67	0.6551	17.5911	117	1.1551	23.0639
18	0.1651	12.9810	68	0.6651	17.6901	118	1.1651	23.1770
19	0.1751	13.0093	69	0.6751	17.7820	119	1.1751	23.2477
20	0.1851	13.0376	70	0.6851	17.8386	120	1.1851	23.2901
21	0.1951	13.0800	71	0.6951	17.8952	121	1.1951	23.3467
22	0.2051	13.1224	72	0.7051	17.9800	122	1.2051	23.4315
23	0.2151	13.1790	73	0.7151	18.0790	123	1.2151	23.5093
24	0.2251	13.2285	74	0.7251	18.1356	124	1.2251	23.5800
25	0.2351	13.2780	75	0.7351	18.1921	125	1.2351	23.6366
26	0.2451	13.3063	76	0.7451	18.2416	126	1.2451	23.7002
27	0.2551	13.3416	77	0.7551	18.3123	127	1.2551	23.7709
28	0.2651	13.3699	78	0.7651	18.3972	128	1.2651	23.8275
29	0.2751	13.4194	79	0.7751	18.4396	129	1.2751	23.8841
30	0.2851	13.4760	80	0.7851	18.5103	130	1.2851	23.9689
31	0.2951	13.5396	81	0.7951	18.5952	131	1.2951	24.0396
32	0.3051	13.5820	82	0.8051	18.6800	132	1.3051	24.1245
33	0.3151	13.6315	83	0.8151	18.7507	133	1.3151	24.1810
34	0.3251	13.6739	84	0.8251	18.7931	134	1.3251	24.2871
35	0.3351	13.7164	85	0.8351	18.8638	135	1.3351	24.7043
36	0.3451	13.7729	86	0.8451	18.9558	136	1.3451	24.9022
37	0.3551	13.8295	87	0.8551	19.0335	137	1.3551	25.3265
38	0.3651	13.8719	88	0.8651	19.0830	138	1.3651	25.5103
39	0.3751	13.9143	89	0.8751	19.1467	139	1.3751	25.7224
40	0.3851	13.9568	90	0.8851	19.2174	140	1.3851	25.9841
41	0.3951	16.0073	91	0.8951	19.2881	141	1.3951	28.0487
42	0.4051	16.0568	92	0.9051	19.3447	142	1.4051	28.1053
43	0.4151	16.0992	93	0.9151	19.4012	143	1.4151	28.1618
44	0.4251	16.1840	94	0.9251	19.4719	144	1.4251	28.1972
45	0.4351	16.2477	95	0.9351	19.5709	145	1.4351	28.2396
46	0.4451	16.3113	96	0.9451	19.6416	146	1.4451	28.2962
47	0.4551	16.3679	97	0.9551	19.6840	147	1.4551	28.3245
48	0.4651	16.4174	98	0.9651	19.7477	148	1.4651	28.3669
49	0.4751	16.4739	99	0.9751	19.8537	149	1.4751	28.4093
50	0.4851	16.5305	100	0.9851	19.9174	150	1.4851	28.4517

NPE			K-6 FSJ1-50 CX3 35			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0073	-0.0035	51	0.4927	15.2538	101	0.9927	18.5091
2	0.0027	0.0035	52	0.5027	15.3317	102	1.0027	18.5728
3	0.0127	10.9300	53	0.5127	15.4237	103	1.0127	18.6436
4	0.0227	10.9654	54	0.5227	15.4803	104	1.0227	18.6860
5	0.0327	11.0007	55	0.5327	15.5228	105	1.0327	18.7497
6	0.0427	11.0432	56	0.5427	15.5864	106	1.0427	18.7922
7	0.0527	11.0857	57	0.5527	15.6572	107	1.0527	18.8559
8	0.0627	11.1281	58	0.5627	15.7421	108	1.0627	18.9408
9	0.0727	11.1635	59	0.5727	15.8129	109	1.0727	20.9931
10	0.0827	11.2130	60	0.5827	15.8624	110	1.0827	21.0780
11	0.0927	11.2484	61	0.5927	15.9261	111	1.0927	21.1558
12	0.1027	11.2980	62	0.6027	15.9827	112	1.1027	21.2407
13	0.1127	11.3263	63	0.6127	16.0464	113	1.1127	21.2974
14	0.1227	11.3758	64	0.6227	16.0889	114	1.1227	21.3681
15	0.1327	11.3970	65	0.6327	16.1526	115	1.1327	21.4247
16	0.1427	11.4324	66	0.6427	16.2163	116	1.1427	21.4813
17	0.1527	11.4678	67	0.6527	16.3083	117	1.1527	21.5097
18	0.1627	11.5103	68	0.6627	16.3720	118	1.1627	21.5733
19	0.1727	11.5456	69	0.6727	16.4144	119	1.1727	21.6653
20	0.1827	11.5740	70	0.6827	16.4781	120	1.1827	21.7503
21	0.1927	11.6235	71	0.6927	16.5772	121	1.1927	21.8069
22	0.2027	11.6801	72	0.7027	16.6621	122	1.2027	21.8423
23	0.2127	11.7226	73	0.7127	16.7400	123	1.2127	21.9130
24	0.2227	11.7721	74	0.7227	16.7966	124	1.2227	21.9909
25	0.2327	11.8287	75	0.7327	16.8461	125	1.2327	22.0758
26	0.2427	11.8712	76	0.7427	16.8886	126	1.2427	22.1466
27	0.2527	11.8995	77	0.7527	16.9523	127	1.2527	22.2102
28	0.2627	11.9490	78	0.7627	16.9947	128	1.2627	22.2810
29	0.2727	12.0127	79	0.7727	17.0513	129	1.2727	22.3235
30	0.2827	14.0367	80	0.7827	17.1221	130	1.2827	22.3872
31	0.2927	14.1145	81	0.7927	17.2070	131	1.2927	22.4296
32	0.3027	14.1428	82	0.8027	17.2636	132	1.3027	22.5075
33	0.3127	14.1923	83	0.8127	17.3132	133	1.3127	23.5053
34	0.3227	14.2490	84	0.8227	17.3627	134	1.3227	24.2483
35	0.3327	14.2843	85	0.8327	17.4547	135	1.3327	24.6234
36	0.3427	14.3339	86	0.8427	17.5325	136	1.3427	24.9206
37	0.3527	14.4046	87	0.8527	17.6175	137	1.3527	25.2391
38	0.3627	14.4754	88	0.8627	17.6741	138	1.3627	25.4868
39	0.3727	14.5320	89	0.8727	17.7448	139	1.3727	25.7415
40	0.3827	14.5816	90	0.8827	17.7944	140	1.3827	25.9397
41	0.3927	14.6240	91	0.8927	17.8439	141	1.3927	28.0485
42	0.4027	14.7089	92	0.9027	17.8864	142	1.4027	28.1122
43	0.4127	14.7868	93	0.9127	17.9571	143	1.4127	28.1618
44	0.4227	14.8575	94	0.9227	18.0279	144	1.4227	28.1971
45	0.4327	14.9212	95	0.9327	18.1128	145	1.4327	28.2396
46	0.4427	14.9849	96	0.9427	18.1694	146	1.4427	28.2962
47	0.4527	15.0345	97	0.9527	18.2119	147	1.4527	28.3528
48	0.4627	15.0911	98	0.9627	18.2685	148	1.4627	28.4165
49	0.4727	15.1406	99	0.9727	18.3605	149	1.4727	28.4731
50	0.4827	15.1831	100	0.9827	18.4313	150	1.4827	28.5156

NPE			K-7 FSJ1-50 CX3 28			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0033	-0.0177	51	0.4966	14.3683	101	0.9966	17.7399
2	0.0067	-0.0107	52	0.5066	14.4462	102	1.0066	17.8320
3	0.0167	0.0177	53	0.5166	14.5241	103	1.0166	17.8886
4	0.0267	0.0318	54	0.5266	14.5808	104	1.0266	17.9524
5	0.0367	0.0318	55	0.5366	14.6374	105	1.0366	18.0374
6	0.0467	0.0318	56	0.5466	14.6799	106	1.0466	20.0349
7	0.0567	0.0177	57	0.5566	14.7154	107	1.0566	20.0774
8	0.0667	0.0035	58	0.5666	14.7720	108	1.0666	20.1269
9	0.0767	-0.0248	59	0.5766	14.8216	109	1.0766	20.2190
10	0.0867	-0.0248	60	0.5866	14.8924	110	1.0866	20.2828
11	0.0967	-0.0107	61	0.5966	14.9845	111	1.0966	20.3819
12	0.1067	-0.0107	62	0.6066	15.0837	112	1.1066	20.4669
13	0.1167	0.0035	63	0.6166	15.1545	113	1.1166	20.5661
14	0.1266	10.2813	64	0.6266	15.2183	114	1.1266	20.6086
15	0.1366	10.3804	65	0.6366	15.2891	115	1.1366	20.6723
16	0.1466	10.4796	66	0.6466	15.3599	116	1.1466	20.7503
17	0.1566	10.5717	67	0.6566	15.4308	117	1.1566	20.7998
18	0.1666	10.6071	68	0.6666	15.4733	118	1.1666	20.8848
19	0.1766	10.6354	69	0.6766	15.5441	119	1.1766	20.9415
20	0.1866	10.6779	70	0.6866	15.5937	120	1.1866	21.0265
21	0.1966	10.7488	71	0.6966	15.6503	121	1.1966	21.0761
22	0.2066	10.8054	72	0.7066	15.7070	122	1.2066	21.1328
23	0.2166	10.8550	73	0.7166	15.7778	123	1.2166	21.1894
24	0.2266	10.9258	74	0.7266	15.8912	124	1.2266	21.2886
25	0.2366	10.9754	75	0.7366	15.9691	125	1.2366	21.3736
26	0.2466	11.0533	76	0.7466	16.0470	126	1.2466	21.4727
27	0.2566	12.9800	77	0.7566	16.0824	127	1.2566	21.5011
28	0.2666	13.0296	78	0.7666	16.1108	128	1.2666	21.5436
29	0.2766	13.0508	79	0.7766	16.1887	129	1.2766	21.6427
30	0.2866	13.1004	80	0.7866	16.2878	130	1.2866	21.7065
31	0.2966	13.1854	81	0.7966	16.3799	131	1.2966	21.7986
32	0.3066	13.2562	82	0.8066	16.4437	132	1.3066	21.9332
33	0.3166	13.3129	83	0.8166	16.5003	133	1.3166	22.6981
34	0.3266	13.3554	84	0.8266	16.5499	134	1.3266	22.8540
35	0.3366	13.4120	85	0.8366	16.6137	135	1.3366	23.5198
36	0.3466	13.4829	86	0.8466	16.6987	136	1.3466	23.6898
37	0.3566	13.5325	87	0.8566	16.7695	137	1.3566	23.8102
38	0.3666	13.5750	88	0.8666	16.8403	138	1.3666	23.9165
39	0.3766	13.6245	89	0.8766	16.9041	139	1.3766	24.0510
40	0.3866	13.6883	90	0.8866	16.9820	140	1.3866	24.1644
41	0.3966	13.7733	91	0.8966	17.0528	141	1.3966	24.2423
42	0.4066	13.8087	92	0.9066	17.1378	142	1.4066	24.3415
43	0.4166	13.8441	93	0.9166	17.2016	143	1.4166	24.4265
44	0.4266	13.8795	94	0.9266	17.2724	144	1.4266	24.5115
45	0.4366	13.9504	95	0.9366	17.3503	145	1.4366	24.5965
46	0.4466	14.0141	96	0.9466	17.3999	146	1.4466	24.6248
47	0.4566	14.1062	97	0.9566	17.4282	147	1.4566	24.6744
48	0.4666	14.1629	98	0.9666	17.4920	148	1.4666	24.7664
49	0.4766	14.2337	99	0.9766	17.5416	149	1.4766	24.8656
50	0.4866	14.2762	100	0.9866	17.6336	150	1.4866	24.9719

NPE			K-8 FSJ4-50 CX3 06			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0060	0.0017	51	0.4939	10.9988	101	0.9939	14.3356
2	0.0040	-0.0060	52	0.5039	11.0450	102	1.0039	14.3665
3	0.0140	0.0017	53	0.5139	11.1067	103	1.0139	14.4435
4	0.0240	0.0017	54	0.5239	11.1452	104	1.0239	14.5360
5	0.0340	0.0017	55	0.5339	11.2223	105	1.0339	14.5977
6	0.0440	0.0017	56	0.5439	11.2685	106	1.0439	14.6901
7	0.0540	0.0017	57	0.5539	11.3610	107	1.0539	14.7672
8	0.0640	0.0017	58	0.5639	11.3995	108	1.0639	14.8289
9	0.0740	0.0017	59	0.5739	11.4534	109	1.0739	14.9367
10	0.0840	0.0017	60	0.5839	11.5151	110	1.0839	14.9984
11	0.0940	0.0017	61	0.5939	11.5999	111	1.0939	17.0098
12	0.1040	-0.0060	62	0.6039	11.6692	112	1.1039	17.0637
13	0.1140	0.0017	63	0.6139	11.7540	113	1.1139	17.1408
14	0.1240	-0.0137	64	0.6239	11.8079	114	1.1239	17.2024
15	0.1340	0.0017	65	0.6339	11.8850	115	1.1339	17.2795
16	0.1440	0.0017	66	0.6439	11.9775	116	1.1439	17.3412
17	0.1540	0.0017	67	0.6539	12.0314	117	1.1539	17.4028
18	0.1640	0.0017	68	0.6639	12.0700	118	1.1639	17.4876
19	0.1740	7.0454	69	0.6739	12.1470	119	1.1739	17.5878
20	0.1840	7.1687	70	0.6839	12.1933	120	1.1839	17.6648
21	0.1940	7.2457	71	0.6939	12.2549	121	1.1939	17.7419
22	0.2040	7.3228	72	0.7039	12.3320	122	1.2039	17.8189
23	0.2140	7.3999	73	0.7139	12.3936	123	1.2139	17.9114
24	0.2240	7.4461	74	0.7239	12.4399	124	1.2239	17.9731
25	0.2340	7.5078	75	0.7339	12.5169	125	1.2339	18.0193
26	0.2440	7.5540	76	0.7439	12.5940	126	1.2439	18.0810
27	0.2540	7.6311	77	0.7539	12.6711	127	1.2539	18.1812
28	0.2640	7.6927	78	0.7639	12.7635	128	1.2639	18.2505
29	0.2740	7.7698	79	0.7739	12.8252	129	1.2739	20.5624
30	0.2840	7.8237	80	0.7839	12.9177	130	1.2839	20.9169
31	0.2940	7.8931	81	0.7939	12.9947	131	1.2939	21.2714
32	0.3040	7.9547	82	0.8039	13.0487	132	1.3039	22.1500
33	0.3140	8.0318	83	0.8139	13.0872	133	1.3139	22.6894
34	0.3240	8.0780	84	0.8239	13.1489	134	1.3239	23.0439
35	0.3339	10.0201	85	0.8339	13.2259	135	1.3339	23.4600
36	0.3439	10.0586	86	0.8439	13.2722	136	1.3439	23.5988
37	0.3539	10.1125	87	0.8539	13.3646	137	1.3539	23.7683
38	0.3639	10.1434	88	0.8639	13.4109	138	1.3639	23.9070
39	0.3739	10.2050	89	0.8739	13.4725	139	1.3739	23.9841
40	0.3839	10.2667	90	0.8839	13.5650	140	1.3839	24.0766
41	0.3939	10.3437	91	0.8939	13.6421	141	1.3939	24.1844
42	0.4039	10.3823	92	0.9039	13.7037	142	1.4039	24.2461
43	0.4139	10.4362	93	0.9139	13.7731	143	1.4139	24.3232
44	0.4239	10.4824	94	0.9239	13.8579	144	1.4239	24.4311
45	0.4339	10.5672	95	0.9339	13.9503	145	1.4339	24.5235
46	0.4439	10.6366	96	0.9439	13.9889	146	1.4439	24.6160
47	0.4539	10.7136	97	0.9539	14.0582	147	1.4539	24.7008
48	0.4639	10.7753	98	0.9639	14.1.99	148	1.4639	24.8010
49	0.4739	10.8446	99	0.9739	14.1661	149	1.4739	24.8780
50	0.4839	10.9063	100	0.9839	14.2432	150	1.4839	24.9397

NPE			K-9 FSJ4-50 CX3 01			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0101	-0.0104	51	0.4899	4.0012	101	0.9898	9.2472
2	-0.0001	-0.0027	52	0.4999	4.0629	102	0.9998	9.3320
3	0.0099	-0.0104	53	0.5099	4.1246	103	1.0098	9.4092
4	0.0199	-0.0027	54	0.5199	4.1863	104	1.0198	9.4786
5	0.0299	-0.0027	55	0.5299	4.2249	105	1.0298	9.5403
6	0.0399	0.0050	56	0.5399	4.2635	106	1.0398	9.6097
7	0.0499	0.0050	57	0.5499	4.3329	107	1.0498	9.7177
8	0.0599	0.0050	58	0.5599	4.4024	108	1.0598	9.7872
9	0.0699	0.0359	59	0.5699	4.4795	109	1.0698	9.8412
10	0.0799	0.0667	60	0.5799	4.5489	110	1.0798	9.9338
11	0.0899	0.0976	61	0.5899	4.6184	111	1.0898	9.9878
12	0.0999	0.1284	62	0.5999	4.6492	112	1.0998	10.0572
13	0.1099	0.1670	63	0.6099	4.7418	113	1.1098	10.1035
14	0.1199	0.1979	64	0.6199	4.8344	114	1.1198	10.1652
15	0.1299	0.2210	65	0.6299	4.9038	115	1.1298	10.2115
16	0.1399	0.2596	66	0.6399	4.9655	116	1.1398	10.3041
17	0.1499	0.2827	67	0.6499	5.0195	117	1.1498	10.3658
18	0.1599	0.3059	68	0.6599	5.0658	118	1.1598	10.4584
19	0.1699	0.3290	69	0.6699	5.1275	119	1.1698	10.5355
20	0.1799	0.3676	70	0.6799	5.1738	120	1.1798	10.5586
21	0.1899	0.4062	71	0.6899	5.2355	121	1.1898	10.6435
22	0.1999	0.4602	72	0.6999	5.3050	122	1.1998	10.7206
23	0.2099	0.5065	73	0.7099	5.3898	123	1.2098	10.8055
24	0.2199	0.5528	74	0.7199	5.4593	124	1.2198	10.8749
25	0.2299	0.5836	75	0.7299	5.5287	125	1.2298	10.9752
26	0.2399	0.6222	76	0.7399	5.5827	126	1.2398	12.0553
27	0.2499	0.6685	77	0.7499	5.6444	127	1.2498	13.6214
28	0.2599	0.7070	78	0.7599	5.7756	128	1.2598	14.1460
29	0.2699	0.7842	79	0.7699	5.8219	129	1.2698	20.4411
30	0.2799	0.8613	80	0.7799	5.8990	130	1.2798	20.7420
31	0.2899	0.9153	81	0.7899	5.9607	131	1.2898	21.0506
32	0.2999	0.9693	82	0.7999	6.0301	132	1.2998	21.6600
33	0.3099	1.0233	83	0.8099	6.0996	133	1.3098	22.5858
34	0.3199	3.0292	84	0.8199	6.1613	134	1.3198	22.9098
35	0.3299	3.0909	85	0.8299	6.1999	135	1.3298	23.3881
36	0.3399	3.1372	86	0.8399	6.2693	136	1.3398	23.5732
37	0.3499	3.1834	87	0.8499	6.3310	137	1.3498	23.7507
38	0.3599	3.2297	88	0.8599	6.4005	138	1.3598	23.8895
39	0.3699	3.2760	89	0.8699	6.4776	139	1.3698	23.9744
40	0.3799	3.3146	90	0.8799	6.5393	140	1.3798	24.0438
41	0.3899	3.3763	91	0.8899	6.5933	141	1.3898	24.1596
42	0.3999	3.4380	92	0.8999	6.6782	142	1.3998	24.2598
43	0.4099	3.5152	93	0.9099	6.7708	143	1.4098	24.3447
44	0.4199	3.5615	94	0.9199	6.8710	144	1.4198	24.4141
45	0.4299	3.6077	95	0.9299	6.9173	145	1.4298	24.5299
46	0.4399	3.6618	96	0.9399	6.9945	146	1.4398	24.6379
47	0.4499	3.7158	97	0.9498	9.0157	147	1.4498	24.7150
48	0.4599	3.8006	98	0.9598	9.0851	148	1.4598	24.7999
49	0.4699	3.8778	99	0.9698	9.1391	149	1.4698	24.8770
50	0.4799	3.9549	100	0.9798	9.1854	150	1.4798	24.9387

NPE			K-11 FSJ1-50 CX3 27			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0109	0.0000	51	0.4891	13.4279	101	0.9890	16.8328
2	-0.0009	0.0000	52	0.4991	13.4990	102	0.9990	16.8684
3	0.0091	9.3832	53	0.5091	13.5700	103	1.0090	16.9537
4	0.0191	9.4471	54	0.5191	13.6411	104	1.0190	16.9750
5	0.0291	9.4827	55	0.5291	13.6909	105	1.0290	17.0958
6	0.0391	9.4969	56	0.5391	13.7478	106	1.0390	17.1527
7	0.0491	9.5538	57	0.5491	13.8188	107	1.0490	17.2451
8	0.0591	9.5538	58	0.5591	13.9112	108	1.0590	17.3020
9	0.0691	9.5822	59	0.5691	13.9681	109	1.0690	17.3588
10	0.0791	9.6035	60	0.5791	14.0392	110	1.0790	17.4228
11	0.0891	9.6320	61	0.5891	14.1032	111	1.0890	17.5152
12	0.0991	9.6462	62	0.5991	14.1529	112	1.0990	17.5934
13	0.1091	9.6888	63	0.6091	14.2311	113	1.1090	17.6503
14	0.1191	9.7030	64	0.6191	14.2667	114	1.1190	17.7214
15	0.1291	9.7315	65	0.6291	14.3378	115	1.1290	17.7711
16	0.1391	9.7599	66	0.6391	14.4159	116	1.1390	17.8493
17	0.1491	9.7883	67	0.6491	14.5084	117	1.1490	17.9062
18	0.1591	9.8523	68	0.6591	14.5723	118	1.1590	17.9773
19	0.1691	9.8879	69	0.6691	14.6150	119	1.1690	20.0458
20	0.1791	9.9305	70	0.6791	14.6861	120	1.1790	20.1027
21	0.1891	9.9803	71	0.6891	14.7714	121	1.1890	20.1880
22	0.1991	10.0087	72	0.6991	14.8567	122	1.1990	20.2591
23	0.2091	10.0371	73	0.7091	14.9135	123	1.2090	20.3444
24	0.2191	10.0727	74	0.7191	15.0131	124	1.2190	20.4013
25	0.2291	10.1082	75	0.7291	15.0202	125	1.2290	25.0502
26	0.2391	10.1651	76	0.7391	15.1197	126	1.2390	25.1284
27	0.2491	10.1935	77	0.7491	15.1765	127	1.2490	25.1995
28	0.2591	10.2575	78	0.7591	15.2050	128	1.2590	25.2421
29	0.2691	10.3144	79	0.7691	15.2761	129	1.2690	25.3416
30	0.2791	10.3570	80	0.7791	15.3827	130	1.2790	25.4127
31	0.2891	10.3926	81	0.7891	15.4609	131	1.2890	25.4838
32	0.2991	10.4352	82	0.7991	15.5035	132	1.2990	25.5194
33	0.3091	10.4708	83	0.8091	15.5817	133	1.3090	25.6047
34	0.3191	10.5276	84	0.8191	15.6386	134	1.3190	25.6615
35	0.3291	10.5845	85	0.8291	15.7310	135	1.3290	25.7397
36	0.3391	10.6271	86	0.8391	15.8092	136	1.3390	25.8108
37	0.3491	10.6982	87	0.8491	15.8590	137	1.3490	25.8606
38	0.3591	10.7409	88	0.8591	15.9229	138	1.3590	25.9316
39	0.3691	10.8120	89	0.8691	15.9869	139	1.3690	25.9316
40	0.3791	10.8688	90	0.8791	16.0580	140	1.3790	25.9814
41	0.3891	10.9186	91	0.8891	16.1149	141	1.3890	26.0241
42	0.3991	10.9612	92	0.8991	16.1931	142	1.3990	26.0667
43	0.4091	11.0110	93	0.9091	16.2713	143	1.4090	26.0951
44	0.4191	13.0511	94	0.9191	16.3494	144	1.4190	26.1378
45	0.4291	13.0938	95	0.9290	16.3992	145	1.4290	26.1804
46	0.4391	13.1506	96	0.9390	16.4490	146	1.4390	26.2231
47	0.4491	13.2004	97	0.9490	16.5343	147	1.4490	26.2515
48	0.4591	13.2502	98	0.9590	16.6125	148	1.4590	26.3013
49	0.4691	13.2999	99	0.9690	16.6907	149	1.4690	26.3368
50	0.4791	13.3568	100	0.9790	16.7617	150	1.4790	26.3510

NPE			K-12 RDX4-50 CX3 03			PF ADJ ONLY		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	-0.0096	-0.1305	51	0.4903	15.3474	101	0.9903	18.6593
2	0.0004	-0.1380	52	0.5003	15.3852	102	1.0003	18.7424
3	0.0104	-0.1229	53	0.5103	15.4760	103	1.0103	18.7802
4	0.0204	11.0678	54	0.5203	15.5516	104	1.0203	18.8256
5	0.0304	11.1131	55	0.5303	15.6574	105	1.0303	18.8861
6	0.0404	11.1283	56	0.5403	15.7255	106	1.0403	18.9164
7	0.0504	11.1585	57	0.5503	15.7860	107	1.0503	20.9881
8	0.0604	11.1736	58	0.5603	15.8616	108	1.0603	21.0789
9	0.0704	11.2039	59	0.5703	15.9070	109	1.0703	21.1318
10	0.0804	11.2341	60	0.5803	15.9523	110	1.0803	21.1772
11	0.0904	11.2795	61	0.5903	15.9901	111	1.0903	21.2377
12	0.1004	11.3248	62	0.6003	16.0431	112	1.1003	21.3284
13	0.1104	11.3702	63	0.6103	16.1036	113	1.1103	21.4040
14	0.1204	11.4080	64	0.6203	16.2019	114	1.1203	21.5023
15	0.1304	11.4383	65	0.6303	16.2623	115	1.1303	21.5704
16	0.1403	11.4685	66	0.6403	16.3228	116	1.1403	21.6687
17	0.1503	11.4912	67	0.6503	16.3682	117	1.1503	21.7140
18	0.1603	11.5214	68	0.6603	16.4589	118	1.1603	21.7745
19	0.1703	11.5592	69	0.6703	16.5497	119	1.1703	21.8048
20	0.1803	11.6349	70	0.6803	16.6253	120	1.1803	21.8501
21	0.1903	11.6802	71	0.6903	16.6858	121	1.1903	21.8955
22	0.2003	11.7558	72	0.7003	16.7463	122	1.2003	21.9862
23	0.2103	11.8088	73	0.7103	16.8294	123	1.2103	22.0618
24	0.2203	11.8541	74	0.7203	16.8899	124	1.2203	25.0183
25	0.2303	11.9071	75	0.7303	16.9353	125	1.2303	25.0410
26	0.2403	11.9751	76	0.7403	16.9655	126	1.2403	25.0939
27	0.2503	12.0054	77	0.7503	17.0109	127	1.2503	25.1695
28	0.2603	14.0318	78	0.7603	17.1092	128	1.2603	25.2829
29	0.2703	14.0620	79	0.7703	17.1848	129	1.2703	25.3812
30	0.2803	14.0923	80	0.7803	17.2378	130	1.2803	25.4342
31	0.2903	14.1376	81	0.7903	17.2982	131	1.2903	25.5249
32	0.3003	14.1981	82	0.8003	17.3360	132	1.3003	25.5854
33	0.3103	14.2889	83	0.8103	17.4041	133	1.3103	25.6459
34	0.3203	14.3493	84	0.8203	17.5024	134	1.3203	25.6610
35	0.3303	14.3872	85	0.8303	17.5931	135	1.3303	25.7064
36	0.3403	14.4401	86	0.8403	17.6687	136	1.3403	25.7517
37	0.3503	14.5384	87	0.8503	17.7368	137	1.3503	25.8425
38	0.3603	14.5989	88	0.8603	17.7973	138	1.3603	25.8878
39	0.3703	14.6745	89	0.8703	17.8729	139	1.3703	25.9332
40	0.3803	14.7350	90	0.8803	17.9107	140	1.3803	25.9710
41	0.3903	14.8030	91	0.8903	17.9485	141	1.3903	26.0013
42	0.4003	14.8938	92	0.9003	17.9939	142	1.4003	26.0315
43	0.4103	14.9240	93	0.9103	18.0695	143	1.4103	26.0920
44	0.4203	14.9543	94	0.9203	18.1451	144	1.4203	26.1374
45	0.4303	14.9996	95	0.9303	18.2132	145	1.4303	26.1978
46	0.4403	15.0299	96	0.9403	18.2510	146	1.4403	26.2357
47	0.4503	15.0828	97	0.9503	18.3190	147	1.4503	26.2735
48	0.4603	15.1660	98	0.9603	18.4173	148	1.4603	26.3188
49	0.4703	15.2491	99	0.9703	18.5005	149	1.4703	26.3491
50	0.4803	15.2945	100	0.9803	18.5837			

APPENDIX D

**Final CORRTEx Explosive Chamber Data,
Completely Adjusted and Referenced to
the Users Working Point**

NPE			K-1 FSJ1-50 CX3 43			PF ADJ & JUMPS REM		
1	X(I)	Y(I)	1	X(I)	Y(I)	1	X(I)	Y(I)
1	0.2391	-1.1649	51	0.7391	2.3146	101	1.2391	6.8836
2	0.2491	-1.0669	52	0.7491	2.4055	102	1.2491	6.9676
3	0.2591	-1.0040	53	0.7591	2.5174	103	1.2591	7.0235
4	0.2691	-0.9201	54	0.7691	2.6084	104	1.2691	7.0865
5	0.2791	-0.8361	55	0.7791	2.6783	105	1.2791	7.1844
6	0.2891	-0.7522	56	0.7891	2.7762	106	1.2891	7.2684
7	0.2991	-0.7102	57	0.7991	2.8882	107	1.2991	7.3453
8	0.3091	-0.6752	58	0.8091	2.9791	108	1.3091	7.4152
9	0.3191	-0.6263	59	0.8191	3.0770	109	1.3191	7.4642
10	0.3291	-0.5493	60	0.8291	3.1330	110	1.3291	7.5272
11	0.3391	-0.5004	61	0.8391	3.2099	111	1.3391	7.5971
12	0.3491	-0.4304	62	0.8491	3.3078	112	1.3491	7.6531
13	0.3591	-0.3885	63	0.8591	3.4197	113	1.3591	7.7300
14	0.3691	-0.3395	64	0.8691	3.5317	114	1.3691	7.8209
15	0.3791	-0.2905	65	0.8791	3.6016	115	1.3791	7.8909
16	0.3891	-0.2696	66	0.8891	3.7275			
17	0.3991	-0.2136	67	0.8991	3.8254			
18	0.4091	-0.1716	68	0.9091	3.9164			
19	0.4191	-0.1227	69	0.9191	3.9723			
20	0.4291	-0.0807	70	0.9291	4.0842			
21	0.4391	-0.0178	71	0.9391	4.1752			
22	0.4491	0.0452	72	0.9491	4.3011			
23	0.4591	0.1151	73	0.9591	4.4130			
24	0.4691	0.1711	74	0.9691	4.4969			
25	0.4791	0.2201	75	0.9791	4.6018			
26	0.4891	0.2830	76	0.9891	4.7347			
27	0.4991	0.3670	77	0.9991	4.8327			
28	0.5091	0.4439	78	1.0091	4.9096			
29	0.5191	0.5068	79	1.0191	5.0145			
30	0.5291	0.5768	80	1.0291	5.1264			
31	0.5391	0.6258	81	1.0391	5.2663			
32	0.5491	0.6817	82	1.0491	5.3503			
33	0.5591	0.7447	83	1.0591	5.4692			
34	0.5691	0.8216	84	1.0691	5.6021			
35	0.5791	0.9017	85	1.0791	5.7000			
36	0.5891	0.9786	86	1.0891	5.7769			
37	0.5991	1.0905	87	1.0991	5.8679			
38	0.6091	1.1885	88	1.1091	5.9378			
39	0.6191	1.2724	89	1.1191	6.0218			
40	0.6291	1.3423	90	1.1291	6.1197			
41	0.6391	1.4193	91	1.1391	6.2036			
42	0.6491	1.5102	92	1.1491	6.2596			
43	0.6591	1.6151	93	1.1591	6.3311			
44	0.6691	1.7131	94	1.1691	6.4080			
45	0.6791	1.7830	95	1.1791	6.4780			
46	0.6891	1.8809	96	1.1891	6.5479			
47	0.6991	1.9928	97	1.1991	6.5969			
48	0.7091	2.0838	98	1.2091	6.6668			
49	0.7191	2.1817	99	1.2191	6.7158			
50	0.7291	2.2377	100	1.2291	6.7997			

NPE			K-2 FSJ1-50 CX3 46			PF ADJ & GS REM		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	0.1683	24.6106	51	0.6783	27.7237	101	1.1783	31.1675
2	0.1783	24.7509	52	0.6883	27.7938	102	1.1883	31.2646
3	0.1883	24.8280	53	0.6983	27.8780	103	1.1983	31.3488
4	0.1983	24.8842	54	0.7083	27.9622	104	1.2083	31.4329
5	0.2083	24.9403	55	0.7183	28.0323	105	1.2183	31.5031
6	0.2183	25.0244	56	0.7283	28.1165	106	1.2283	31.5311
7	0.2283	25.0946	57	0.7383	28.1375	107	1.2383	31.6013
8	0.2383	25.1647	58	0.7483	28.2006	108	1.2483	31.6434
9	0.2483	25.2208	59	0.7583	28.2427	109	1.2583	31.7135
10	0.2583	25.2629	60	0.7683	28.2988	110	1.2683	31.7977
11	0.2683	25.3471	61	0.7783	28.3690	111	1.2783	31.8678
12	0.2783	25.4172	62	0.7883	28.4672	112	1.2883	31.9520
13	0.2883	25.4873	63	0.7983	28.5443	113	1.2983	31.9941
14	0.2983	25.5435	64	0.8083	28.6145	114	1.3083	32.0642
15	0.3083	25.5996	65	0.8183	28.6776	115	1.3183	32.1624
16	0.3183	25.6487	66	0.8283	28.7898	116	1.3283	32.2466
17	0.3283	25.6978	67	0.8383	28.8599			
18	0.3383	25.7328	68	0.8483	28.9301			
19	0.3483	25.7749	69	0.8583	29.0002			
20	0.3583	25.8100	70	0.8683	29.0353			
21	0.3683	25.8801	71	0.8783	29.0984			
22	0.3783	25.9643	72	0.8883	29.1545			
23	0.3883	26.0344	73	0.8983	29.2106			
24	0.3983	26.0905	74	0.9083	29.3088			
25	0.4083	26.1396	75	0.9183	29.3790			
26	0.4183	26.2028	76	0.9283	29.4631			
27	0.4383	26.1947	77	0.9383	29.5192			
28	0.4483	26.2648	78	0.9483	29.5824			
29	0.4583	26.3209	79	0.9583	29.6735			
30	0.4683	26.3630	80	0.9683	29.7577			
31	0.4783	26.4191	81	0.9783	29.8278			
32	0.4883	26.4612	82	0.9883	29.8980			
33	0.4983	26.5173	83	0.9983	29.9331			
34	0.5083	26.5734	84	1.0083	29.9962			
35	0.5183	26.6716	85	1.0183	30.0523			
36	0.5283	26.7418	86	1.0283	30.1084			
37	0.5383	26.7979	87	1.0383	30.1785			
38	0.5483	26.8470	88	1.0483	30.2627			
39	0.5583	26.9241	89	1.0583	30.3469			
40	0.5683	27.0083	90	1.0683	30.4100			
41	0.5783	27.0784	91	1.0783	30.4661			
42	0.5883	27.1626	92	1.0883	30.5713			
43	0.5983	27.2187	93	1.0983	30.6485			
44	0.6083	27.2608	94	1.1083	30.7256			
45	0.6183	27.3169	95	1.1183	30.8098			
46	0.6283	27.3590	96	1.1283	30.8378			
47	0.6383	27.4291	97	1.1383	30.8939			
48	0.6483	27.5133	98	1.1483	30.9501			
49	0.6583	27.5834	99	1.1583	31.0062			
50	0.6683	27.6676	100	1.1683	31.0763			

NPE			K-3 FSJ4-50 CX3 40			PF ADJ & GS REM		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	0.0891	0.1218	51	0.5891	3.0158	101	1.0890	6.3042
2	0.0991	0.1836	52	0.5991	3.1085	102	1.0990	6.3737
3	0.1091	0.2917	53	0.6091	3.1239	103	1.1090	6.4509
4	0.1191	0.3380	54	0.6191	3.2629	104	1.1190	6.4818
5	0.1291	0.4383	55	0.6291	3.2937	105	1.1290	6.5358
6	0.1391	0.4769	56	0.6391	3.3786	106	1.1390	6.5821
7	0.1491	0.5155	57	0.6491	3.4404	107	1.1490	6.6355
8	0.1591	0.5850	58	0.6591	3.5099	108	1.1590	6.6972
9	0.1691	0.5850	59	0.6691	3.5253	109	1.1690	6.7435
10	0.1791	0.6622	60	0.6791	3.5793	110	1.1790	6.8748
11	0.1891	0.6622	61	0.6891	3.6643	111	1.1890	6.9211
12	0.1991	0.7239	62	0.6991	3.6951	112	1.1990	6.9674
13	0.2091	0.7703	63	0.7091	3.7878	113	1.2090	7.0291
14	0.2191	0.8011	64	0.7191	3.8341	114	1.2190	7.0754
15	0.2291	0.8938	65	0.7291	3.9267	115	1.2290	7.1604
16	0.2391	0.9092	66	0.7391	4.0193	116	1.2390	7.2376
17	0.2491	1.0173	67	0.7491	4.0579	117	1.2490	7.2993
18	0.2591	1.0482	68	0.7591	4.1274	118	1.2590	7.3919
19	0.2691	1.1253	69	0.7691	4.1660	119	1.2690	7.4305
20	0.2791	1.1485	70	0.7791	4.2895	120	1.2790	7.4691
21	0.2891	1.1871	71	0.7891	4.3436	121	1.2890	7.5154
22	0.2991	1.3260	72	0.7991	4.4053	122	1.2990	7.6235
23	0.3091	1.3260	73	0.8091	4.4825	123	1.3090	7.6698
24	0.3191	1.4341	74	0.8191	4.5134	124	1.3190	7.7470
25	0.3291	1.4650	75	0.8291	4.5829	125	1.3290	7.8551
26	0.3391	1.5422	76	0.8391	4.6369	126	1.3390	7.9632
27	0.3491	1.5731	77	0.8491	4.6832			
28	0.3591	1.5492	78	0.8591	4.7604			
29	0.3691	1.6650	79	0.8691	4.7913			
30	0.3791	1.6881	80	0.8791	4.9379			
31	0.3891	1.7653	81	0.8891	4.9534			
32	0.3991	1.8116	82	0.8991	5.0692			
33	0.4091	1.8966	83	0.9091	5.1000			
34	0.4191	1.9815	84	0.9191	5.1541			
35	0.4291	2.0432	85	0.9291	5.2699			
36	0.4391	2.1050	86	0.9391	5.3162			
37	0.4491	2.1590	87	0.9491	5.4011			
38	0.4591	2.2516	88	0.9591	5.4551			
39	0.4691	2.3057	89	0.9691	5.5014			
40	0.4791	2.4137	90	0.9791	5.5400			
41	0.4891	2.4292	91	0.9891	5.6249			
42	0.4991	2.5141	92	0.9991	5.6713			
43	0.5091	2.5218	93	1.0091	5.7330			
44	0.5191	2.5604	94	1.0191	5.8179			
45	0.5291	2.6222	95	1.0291	5.8874			
46	0.5391	2.6762	96	1.0390	5.9800			
47	0.5491	2.7688	97	1.0490	5.9955			
48	0.5591	2.8151	98	1.0590	6.0881			
49	0.5691	2.9001	99	1.0690	6.1576			
50	0.5791	3.0004	100	1.0790	6.2116			

NPE			K-4 FSJ4-50 CX3 38			PF ADJ & GS REM		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	0.0191	0.0042	51	0.5391	1.8432	101	1.0391	5.3431
2	0.0291	0.0504	52	0.5491	1.9203	102	1.0491	5.4202
3	0.0391	0.0890	53	0.5591	1.9743	103	1.0591	5.4973
4	0.0491	0.1044	54	0.5691	2.0360	104	1.0691	5.5435
5	0.0591	0.1198	55	0.5791	2.0668	105	1.0791	5.6052
6	0.0691	0.1429	56	0.5891	2.1130	106	1.0891	5.7131
7	0.0791	0.1815	57	0.5991	2.1670	107	1.0991	5.8056
8	0.0891	0.2046	58	0.6091	2.2133	108	1.1091	5.8827
9	0.0991	0.2354	59	0.6191	2.2595	109	1.1191	5.9025
10	0.1091	0.2509	60	0.6291	2.3520	110	1.1291	5.9564
11	0.1191	0.2663	61	0.6391	2.4522	111	1.1391	6.0258
12	0.1291	0.2817	62	0.6491	2.5293	112	1.1491	6.0721
13	0.1391	0.3125	63	0.6591	2.5756	113	1.1591	6.1414
14	0.1491	0.3434	64	0.6691	2.6373	114	1.1691	6.2108
15	0.1591	0.3896	65	0.6791	2.7221	115	1.1791	6.2879
16	0.1691	0.4205	66	0.6891	2.8300	116	1.1891	6.3650
17	0.1791	0.4667	67	0.6991	2.9071	117	1.1991	6.4575
18	0.1891	0.5053	68	0.7091	2.9687	118	1.2091	6.5038
19	0.1991	0.5361	69	0.7191	3.0381	119	1.2191	6.5654
20	0.2091	0.5669	70	0.7291	3.0921	120	1.2291	6.6734
21	0.2191	0.5978	71	0.7391	3.1538	121	1.2391	6.7659
22	0.2291	0.6132	72	0.7491	3.2154	122	1.2491	6.8507
23	0.2391	0.6286	73	0.7591	3.2771	123	1.2591	6.9201
24	0.2491	0.6594	74	0.7691	3.3850	124	1.2691	6.9740
25	0.2591	0.6980	75	0.7791	3.4621	125	1.2791	7.0357
26	0.2691	0.7288	76	0.7891	3.5392	126	1.2891	7.0974
27	0.2791	0.7828	77	0.7991	3.5700	127	1.2991	7.1359
28	0.2891	0.8213	78	0.8091	3.6317	128	1.3091	7.2284
29	0.2991	0.8676	79	0.8191	3.7165	129	1.3191	7.3209
30	0.3091	0.8984	80	0.8291	3.8013	130	1.3291	7.4134
31	0.3191	0.9447	81	0.8391	3.8784	131	1.3391	7.4597
32	0.3291	0.9909	82	0.8491	3.9478	132	1.3491	7.5213
33	0.3391	1.0218	83	0.8591	4.0094	133	1.3591	7.5907
34	0.3491	1.0526	84	0.8691	4.0711			
35	0.3591	1.0911	85	0.8791	4.1405			
36	0.3691	1.1143	86	0.8891	4.1868			
37	0.3791	1.1528	87	0.8991	4.2638			
38	0.3891	1.1836	88	0.9091	4.3718			
39	0.3991	1.2222	89	0.9191	4.4643			
40	0.4091	1.2530	90	0.9291	4.5414			
41	0.4191	1.2916	91	0.9391	4.5876			
42	0.4291	1.3455	92	0.9491	4.6955			
43	0.4391	1.4072	93	0.9591	4.7958			
44	0.4491	1.4689	94	0.9691	4.8806			
45	0.4591	1.5151	95	0.9791	4.9422			
46	0.4691	1.5768	96	0.9891	5.0116			
47	0.4791	1.6076	97	0.9991	5.0733			
48	0.4891	1.6539	98	1.0091	5.1272			
49	0.4991	1.7001	99	1.0191	5.1889			
50	0.5091	1.7772	100	1.0291	5.2429			

NPE			K-5 FSJ1-50 CX3 19			PF ADJ & GS REM		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	0.0151	-0.1008	51	0.5151	2.0851	101	1.0151	5.5073
2	0.0251	-0.0513	52	0.5251	2.1558	102	1.0251	5.5780
3	0.0351	-0.0018	53	0.5351	2.2548	103	1.0351	5.6346
4	0.0451	0.0335	54	0.5451	2.3184	104	1.0451	5.6911
5	0.0551	0.0547	55	0.5551	2.3608	105	1.0551	5.7760
6	0.0651	0.0972	56	0.5651	2.4103	106	1.0651	5.8608
7	0.0751	0.1184	57	0.5751	2.4881	107	1.0751	5.9315
8	0.0851	0.1467	58	0.5851	2.5729	108	1.0851	5.9881
9	0.0951	0.1750	59	0.5951	2.6366	109	1.0951	6.0447
10	0.1051	0.3022	60	0.6051	2.6931	110	1.1051	6.1507
11	0.1151	0.2244	61	0.6151	2.7497	111	1.1151	6.2214
12	0.1251	0.2527	62	0.6251	2.8204	112	1.1251	6.2780
13	0.1351	0.2810	63	0.6351	2.8770	113	1.1351	6.3487
14	0.1451	0.3234	64	0.6451	2.9335	114	1.1451	6.4063
15	0.1551	0.3517	65	0.6551	2.9901	115	1.1551	6.4629
16	0.1651	0.3800	66	0.6651	3.0891	116	1.1651	6.5760
17	0.1751	0.4083	67	0.6751	3.1810	117	1.1751	6.6467
18	0.1851	0.4366	68	0.6851	3.2376	118	1.1851	6.6891
19	0.1951	0.4790	69	0.6951	3.2942	119	1.1951	6.7457
20	0.2051	0.5214	70	0.7051	3.3790	120	1.2051	6.8305
21	0.2151	0.5780	71	0.7151	3.4780	121	1.2151	6.9083
22	0.2251	0.6275	72	0.7251	3.5346	122	1.2251	6.9790
23	0.2351	0.6770	73	0.7351	3.5911	123	1.2351	7.0356
24	0.2451	0.7053	74	0.7451	3.6406	124	1.2451	7.0992
25	0.2551	0.7406	75	0.7551	3.7113	125	1.2551	7.1699
26	0.2651	0.7689	76	0.7651	3.7962	126	1.2651	7.2265
27	0.2751	0.8184	77	0.7751	3.8386	127	1.2751	7.2831
28	0.2851	0.8750	78	0.7851	3.9093	128	1.2851	7.3679
29	0.2951	0.9386	79	0.7951	3.9942	129	1.2951	7.4386
30	0.3051	0.9810	80	0.8051	4.0790	130	1.3051	7.5235
31	0.3151	1.0305	81	0.8151	4.1497	131	1.3151	7.5800
32	0.3251	1.0729	82	0.8251	4.1921	132	1.3251	7.6861
33	0.3351	1.1154	83	0.8351	4.2628			
34	0.3451	1.1719	84	0.8451	4.3548			
35	0.3551	1.2285	85	0.8551	4.4325			
36	0.3651	1.2709	86	0.8651	4.4820			
37	0.3751	1.3133	87	0.8751	4.5457			
38	0.3851	1.3558	88	0.8851	4.6164			
39	0.3951	1.4063	89	0.8951	4.6871			
40	0.4051	1.4558	90	0.9051	4.7437			
41	0.4151	1.4982	91	0.9151	4.8002			
42	0.4251	1.5830	92	0.9251	4.8709			
43	0.4351	1.6467	93	0.9351	4.9699			
44	0.4451	1.7103	94	0.9451	5.0406			
45	0.4551	1.7669	95	0.9551	5.0830			
46	0.4651	1.8164	96	0.9651	5.1467			
47	0.4751	1.8729	97	0.9751	5.2527			
48	0.4851	1.9295	98	0.9851	5.3164			
49	0.4951	1.9861	99	0.9951	5.3800			
50	0.5051	2.0285	100	1.0051	5.4366			

	NPE		K-6	FSJ1-50	CX3 35		PF ADJ & GS REM		
I	X(I)	Y(I)		I	X(I)	Y(I)	I	X(I)	Y(I)
1	0.0127	-0.0770		51	0.5127	2.4167	101	1.0127	5.6366
2	0.0227	-0.0416		52	0.5227	2.4733	102	1.0227	5.6790
3	0.0327	-0.0063		53	0.5327	2.5158	103	1.0327	5.7427
4	0.0427	0.0362		54	0.5427	2.5794	104	1.0427	5.7852
5	0.0527	0.0787		55	0.5527	2.6502	105	1.0527	5.8489
6	0.0627	0.1211		56	0.5627	2.7351	106	1.0627	5.9338
7	0.0727	0.1565		57	0.5727	2.8059	107	1.0727	5.9861
8	0.0827	0.2060		58	0.5827	2.8554	108	1.0827	6.0710
9	0.0927	0.2414		59	0.5927	2.9191	109	1.0927	6.1488
10	0.1027	0.2910		60	0.6027	2.9757	110	1.1027	6.2337
11	0.1127	0.3193		61	0.6127	3.0394	111	1.1127	6.2904
12	0.1227	0.3688		62	0.6227	3.0819	112	1.1227	6.3611
13	0.1327	0.3900		63	0.6327	3.1456	113	1.1327	6.4177
14	0.1427	0.4254		64	0.6427	3.2093	114	1.1427	6.4743
15	0.1527	0.4608		65	0.6527	3.3013	115	1.1527	6.5027
16	0.1627	0.5033		66	0.6627	3.3650	116	1.1627	6.5663
17	0.1727	0.5386		67	0.6727	3.4074	117	1.1727	6.6583
18	0.1827	0.5670		68	0.6827	3.4711	118	1.1827	6.7433
19	0.1927	0.6165		69	0.6927	3.5702	119	1.1927	6.7999
20	0.2027	0.6731		70	0.7027	3.6551	120	1.2027	6.8353
21	0.2127	0.7156		71	0.7127	3.7330	121	1.2127	6.9060
22	0.2227	0.7651		72	0.7227	3.7896	122	1.2227	6.9839
23	0.2327	0.8217		73	0.7327	3.8391	123	1.2327	7.0688
24	0.2427	0.8642		74	0.7427	3.8816	124	1.2427	7.1396
25	0.2527	0.8925		75	0.7527	3.9453	125	1.2527	7.2032
26	0.2627	0.9420		76	0.7627	3.9877	126	1.2627	7.2740
27	0.2727	1.0057		77	0.7727	4.0443	127	1.2727	7.3165
28	0.2827	1.0297		78	0.7827	4.1151	128	1.2827	7.3802
29	0.2927	1.1075		79	0.7927	4.2000	129	1.2927	7.4226
30	0.3027	1.1358		80	0.8027	4.2566	130	1.3027	7.5005
31	0.3127	1.1853		81	0.8127	4.3062			
32	0.3227	1.2420		82	0.8227	4.3557			
33	0.3327	1.2773		83	0.8327	4.4477			
34	0.3427	1.3269		84	0.8427	4.5255			
35	0.3527	1.3976		85	0.8527	4.6105			
36	0.3627	1.4684		86	0.8627	4.6671			
37	0.3727	1.5250		87	0.8727	4.7378			
38	0.3827	1.5746		88	0.8827	4.7874			
39	0.3927	1.6170		89	0.8927	4.8369			
40	0.4027	1.7019		90	0.9027	4.8794			
41	0.4127	1.7798		91	0.9127	4.9501			
42	0.4227	1.8505		92	0.9227	5.0209			
43	0.4327	1.9142		93	0.9327	5.1058			
44	0.4427	1.9779		94	0.9427	5.1624			
45	0.4527	2.0275		95	0.9527	5.2049			
46	0.4627	2.0841		96	0.9627	5.2615			
47	0.4727	2.1336		97	0.9727	5.3535			
48	0.4827	2.1761		98	0.9827	5.4243			
49	0.4927	2.2468		99	0.9927	5.5021			
50	0.5027	2.3247		100	1.0027	5.5658			

NPE			K-7 FSJ1-50 CX3 28			PF ADJ & GS REM		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	0.1266	-0.0277	51	0.6366	2.9801	101	1.1366	6.3633
2	0.1366	0.0714	52	0.6466	3.0509	102	1.1466	6.4413
3	0.1466	0.1706	53	0.6566	3.1218	103	1.1566	6.4908
4	0.1566	0.2627	54	0.6666	3.1643	104	1.1666	6.5758
5	0.1666	0.2981	55	0.6766	3.2351	105	1.1766	6.6325
6	0.1766	0.3264	56	0.6866	3.2847	106	1.1866	6.7175
7	0.1866	0.3689	57	0.6966	3.3413	107	1.1966	6.7671
8	0.1966	0.4398	58	0.7066	3.3980	108	1.2066	6.8238
9	0.2066	0.4964	59	0.7166	3.4688	109	1.2166	6.8804
10	0.2166	0.5460	60	0.7266	3.5822	110	1.2266	6.9796
11	0.2266	0.6168	61	0.7366	3.6601	111	1.2366	7.0646
12	0.2366	0.6664	62	0.7466	3.7380	112	1.2466	7.1637
13	0.2566	0.6710	63	0.7566	3.7734	113	1.2566	7.1921
14	0.2666	0.7206	64	0.7666	3.8018	114	1.2666	7.2346
15	0.2766	0.7418	65	0.7766	3.8797	115	1.2766	7.3337
16	0.2866	0.7914	66	0.7866	3.9788	116	1.2866	7.3975
17	0.2966	0.8764	67	0.7966	4.0709	117	1.2966	7.4896
18	0.3066	0.9472	68	0.8066	4.1347	118	1.3066	7.6242
19	0.3166	1.0039	69	0.8166	4.1913			
20	0.3266	1.0464	70	0.8266	4.2409			
21	0.3366	1.1030	71	0.8366	4.3047			
22	0.3466	1.1739	72	0.8466	4.3897			
23	0.3566	1.2235	73	0.8566	4.4605			
24	0.3666	1.2660	74	0.8666	4.5313			
25	0.3766	1.3155	75	0.8766	4.5951			
26	0.3866	1.3793	76	0.8866	4.6730			
27	0.3966	1.4643	77	0.8966	4.7438			
28	0.4066	1.4997	78	0.9066	4.8288			
29	0.4166	1.5351	79	0.9166	4.8926			
30	0.4266	1.5705	80	0.9266	4.9634			
31	0.4366	1.6414	81	0.9366	5.0413			
32	0.4466	1.7051	82	0.9466	5.0909			
33	0.4566	1.7972	83	0.9566	5.1192			
34	0.4666	1.8539	84	0.9666	5.1830			
35	0.4766	1.9247	85	0.9766	5.2326			
36	0.4866	1.9672	86	0.9866	5.3246			
37	0.4966	2.0593	87	0.9966	5.4309			
38	0.5066	2.1372	88	1.0066	5.5230			
39	0.5166	2.2151	89	1.0166	5.5796			
40	0.5266	2.2718	90	1.0266	5.6434			
41	0.5366	2.3284	91	1.0366	5.7284			
42	0.5466	2.3709	92	1.0466	5.7259			
43	0.5566	2.4064	93	1.0566	5.7684			
44	0.5666	2.4630	94	1.0666	5.8179			
45	0.5766	2.5126	95	1.0766	5.9100			
46	0.5866	2.5834	96	1.0866	5.9738			
47	0.5966	2.6755	97	1.0966	6.0729			
48	0.6066	2.7747	98	1.1066	6.1579			
49	0.6166	2.8455	99	1.1166	6.2571			
50	0.6266	2.9093	100	1.1266	6.2996			

NPE			K-8 FSJ4-50 CX3 06			PF ADJ & GS REM		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	0.1740	0.1334	51	0.6839	3.2813	101	1.1839	6.7528
2	0.1840	0.2567	52	0.6939	3.3429	102	1.1939	6.8299
3	0.1940	0.3337	53	0.7039	3.4200	103	1.2039	6.9069
4	0.2040	0.4108	54	0.7139	3.4816	104	1.2139	6.9994
5	0.2140	0.4879	55	0.7239	3.5279	105	1.2239	7.0611
6	0.2240	0.5341	56	0.7339	3.6049	106	1.2339	7.1073
7	0.2340	0.5958	57	0.7439	3.6820	107	1.2439	7.1690
8	0.2440	0.6420	58	0.7539	3.7591	108	1.2539	7.2692
9	0.2540	0.7191	59	0.7639	3.8515	109	1.2639	7.3385
10	0.2640	0.7807	60	0.7739	3.9132			
11	0.2740	0.8578	61	0.7839	4.0057			
12	0.2840	0.9117	62	0.7939	4.0827			
13	0.2940	0.9811	63	0.8039	4.1367			
14	0.3040	1.0427	64	0.8139	4.1752			
15	0.3140	1.1198	65	0.8239	4.2369			
16	0.3339	1.1081	66	0.8339	4.3139			
17	0.3439	1.1466	67	0.8439	4.3602			
18	0.3539	1.2005	68	0.8539	4.4526			
19	0.3639	1.2314	69	0.8639	4.4989			
20	0.3739	1.2930	70	0.8739	4.5605			
21	0.3839	1.3547	71	0.8839	4.6530			
22	0.3939	1.4317	72	0.8939	4.7301			
23	0.4039	1.4703	73	0.9039	4.7917			
24	0.4139	1.5242	74	0.9139	4.8611			
25	0.4239	1.5704	75	0.9239	4.9458			
26	0.4339	1.6552	76	0.9339	5.0383			
27	0.4439	1.7246	77	0.9439	5.0769			
28	0.4539	1.8016	78	0.9539	5.1462			
29	0.4639	1.8633	79	0.9639	5.2079			
30	0.4739	1.9326	80	0.9739	5.2541			
31	0.4839	1.9943	81	0.9839	5.3312			
32	0.4939	2.0868	82	0.9939	5.4236			
33	0.5039	2.1330	83	1.0039	5.4545			
34	0.5139	2.1947	84	1.0139	5.5315			
35	0.5239	2.2332	85	1.0239	5.6240			
36	0.5339	2.3103	86	1.0339	5.6857			
37	0.5439	2.3565	87	1.0439	5.7781			
38	0.5539	2.4490	88	1.0539	5.8552			
39	0.5639	2.4875	89	1.0639	5.9169			
40	0.5739	2.5414	90	1.0739	6.0247			
41	0.5839	2.6031	91	1.0839	6.0864			
42	0.5939	2.6879	92	1.0939	6.0978			
43	0.6039	2.7572	93	1.1039	6.1517			
44	0.6139	2.8420	94	1.1139	6.2288			
45	0.6239	2.8959	95	1.1239	6.2904			
46	0.6339	2.9730	96	1.1339	6.3675			
47	0.6439	3.0655	97	1.1439	6.4292			
48	0.6539	3.1194	98	1.1539	6.4908			
49	0.6639	3.1580	99	1.1639	6.5756			
50	0.6739	3.2350	100	1.1739	6.6758			

NPE			K-9 FSJ4-50 CX3 01			PF ADJ & GS REM		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	0.0099	0.3606	51	0.5099	2.4956	101	1.0098	5.7802
2	0.0199	0.3683	52	0.5199	2.5573	102	1.0198	5.8496
3	0.0299	0.3683	53	0.5299	2.5959	103	1.0298	5.9113
4	0.0399	0.3760	54	0.5399	2.6345	104	1.0398	5.9807
5	0.0499	0.3760	55	0.5499	2.7039	105	1.0498	6.0887
6	0.0599	0.3760	56	0.5599	2.7734	106	1.0598	6.1582
7	0.0699	0.4069	57	0.5699	2.8505	107	1.0698	6.2122
8	0.0799	0.4377	58	0.5799	2.9199	108	1.0798	6.3048
9	0.0899	0.4686	59	0.5899	2.9894	109	1.0898	6.3588
10	0.0999	0.4994	60	0.5999	3.0202	110	1.0998	6.4282
11	0.1099	0.5380	61	0.6099	3.1128	111	1.1098	6.4745
12	0.1199	0.5689	62	0.6199	3.2054	112	1.1198	6.5362
13	0.1299	0.5920	63	0.6299	3.2748	113	1.1298	6.5825
14	0.1399	0.6306	64	0.6399	3.3365	114	1.1398	6.6751
15	0.1499	0.6537	65	0.6499	3.3905	115	1.1498	6.7368
16	0.1599	0.6769	66	0.6599	3.4368	116	1.1598	6.8294
17	0.1699	0.7000	67	0.6699	3.4985	117	1.1698	6.9065
18	0.1799	0.7386	68	0.6799	3.5448	118	1.1798	6.9296
19	0.1899	0.7772	69	0.6899	3.6065	119	1.1898	7.0145
20	0.1999	0.8312	70	0.6999	3.6760	120	1.1998	7.0916
21	0.2099	0.8775	71	0.7099	3.7608	121	1.2098	7.1765
22	0.2199	0.9238	72	0.7199	3.8303	122	1.2198	7.2459
23	0.2299	0.9546	73	0.7299	3.8997	123	1.2298	7.3462
24	0.2399	0.9932	74	0.7399	3.9537			
25	0.2499	1.0395	75	0.7499	4.0154			
26	0.2599	1.0780	76	0.7599	4.1466			
27	0.2699	1.1552	77	0.7699	4.1929			
28	0.2799	1.2323	78	0.7799	4.2700			
29	0.2899	1.2863	79	0.7899	4.3317			
30	0.2999	1.3403	80	0.7999	4.4011			
31	0.3099	1.3943	81	0.8099	4.4706			
32	0.3199	1.4002	82	0.8199	4.5323			
33	0.3299	1.4619	83	0.8299	4.5709			
34	0.3399	1.5082	84	0.8399	4.6403			
35	0.3499	1.5544	85	0.8499	4.7020			
36	0.3599	1.6007	86	0.8599	4.7715			
37	0.3699	1.6470	87	0.8699	4.8486			
38	0.3799	1.6856	88	0.8799	4.9103			
39	0.3899	1.7473	89	0.8899	4.9643			
40	0.3999	1.8090	90	0.8999	5.0492			
41	0.4099	1.8862	91	0.9099	5.1418			
42	0.4199	1.9325	92	0.9199	5.2420			
43	0.4299	1.9787	93	0.9299	5.2883			
44	0.4399	2.0328	94	0.9399	5.3655			
45	0.4499	2.0868	95	0.9498	5.3867			
46	0.4599	2.1716	96	0.9598	5.4561			
47	0.4699	2.2488	97	0.9698	5.5101			
48	0.4799	2.3259	98	0.9798	5.5564			
49	0.4899	2.3722	99	0.9898	5.6182			
50	0.4999	2.4339	100	0.9998	5.7030			

NPE			K-11 FSJ1-50 CX3 27			PF ADJ & GS REM		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	0.0091	-0.1088	51	0.5091	2.0780	101	1.0090	5.4617
2	0.0191	-0.0449	52	0.5191	2.1491	102	1.0190	5.4830
3	0.0291	-0.0093	53	0.5291	2.1989	103	1.0290	5.6038
4	0.0391	0.0049	54	0.5391	2.2558	104	1.0390	5.6607
5	0.0491	0.0618	55	0.5491	2.3268	105	1.0490	5.7531
6	0.0591	0.0618	56	0.5591	2.4192	106	1.0590	5.8100
7	0.0691	0.0902	57	0.5691	2.4761	107	1.0690	5.8668
8	0.0791	0.1115	58	0.5791	2.5472	108	1.0790	5.9308
9	0.0891	0.1400	59	0.5891	2.6112	109	1.0890	6.0232
10	0.0991	0.1542	60	0.5991	2.6609	110	1.0990	6.1014
11	0.1091	0.1968	61	0.6091	2.7391	111	1.1090	6.1583
12	0.1191	0.2110	62	0.6191	2.7747	112	1.1190	6.2294
13	0.1291	0.2395	63	0.6291	2.8458	113	1.1290	6.2791
14	0.1391	0.2679	64	0.6391	2.9239	114	1.1390	6.3573
15	0.1491	0.2963	65	0.6491	3.0164	115	1.1490	6.4142
16	0.1591	0.3603	66	0.6591	3.0803	116	1.1590	6.4853
17	0.1691	0.3959	67	0.6691	3.1230	117	1.1690	6.5538
18	0.1791	0.4385	68	0.6791	3.1941	118	1.1790	6.6107
19	0.1891	0.4883	69	0.6891	3.2794	119	1.1890	6.6960
20	0.1991	0.5167	70	0.6991	3.3647	120	1.1990	6.7671
21	0.2091	0.5451	71	0.7091	3.4215	121	1.2090	6.8524
22	0.2191	0.5807	72	0.7191	3.5211	122	1.2190	6.9093
23	0.2291	0.6162	73	0.7291	3.5282			
24	0.2391	0.6731	74	0.7391	3.6277			
25	0.2491	0.7015	75	0.7491	3.6845			
26	0.2591	0.7655	76	0.7591	3.7130			
27	0.2691	0.8224	77	0.7691	3.7841			
28	0.2791	0.8650	78	0.7791	3.8907			
29	0.2891	0.9006	79	0.7891	3.9689			
30	0.2991	0.9432	80	0.7991	4.0115			
31	0.3091	0.9788	81	0.8091	4.0897			
32	0.3191	1.0356	82	0.8191	4.1466			
33	0.3291	1.0925	83	0.8291	4.2390			
34	0.3391	1.1351	84	0.8391	4.3172			
35	0.3491	1.2062	85	0.8491	4.3670			
36	0.3591	1.2489	86	0.8591	4.4309			
37	0.3691	1.3200	87	0.8691	4.4949			
38	0.3791	1.3768	88	0.8791	4.5660			
39	0.3891	1.4266	89	0.8891	4.6229			
40	0.3991	1.4692	90	0.8991	4.7011			
41	0.4091	1.5190	91	0.9091	4.7793			
42	0.4191	1.5591	92	0.9191	4.8574			
43	0.4291	1.6018	93	0.9290	4.9072			
44	0.4391	1.6586	94	0.9390	4.9570			
45	0.4491	1.7084	95	0.9490	5.0423			
46	0.4591	1.7582	96	0.9590	5.1205			
47	0.4691	1.8079	97	0.9690	5.1987			
48	0.4791	1.8648	98	0.9790	5.2697			
49	0.4891	1.9359	99	0.9890	5.3408			
50	0.4991	2.0070	100	0.9990	5.3764			

NPE			K-12 RDX4-50 CX3 03			PF ADJ & GS REM		
I	X(I)	Y(I)	I	X(I)	Y(I)	I	X(I)	Y(I)
1	0.0204	-0.0922	51	0.5203	2.3916	101	1.0203	5.6656
2	0.0304	-0.0469	52	0.5303	2.4974	102	1.0303	5.7261
3	0.0404	-0.0317	53	0.5403	2.5655	103	1.0403	5.7564
4	0.0504	-0.0015	54	0.5503	2.6260	104	1.0503	5.8281
5	0.0604	0.0136	55	0.5603	2.7016	105	1.0603	5.9189
6	0.0704	0.0439	56	0.5703	2.7470	106	1.0703	5.9718
7	0.0804	0.0741	57	0.5803	2.7923	107	1.0803	6.0172
8	0.0904	0.1195	58	0.5903	2.8301	108	1.0903	6.0777
9	0.1004	0.1648	59	0.6003	2.8831	109	1.1003	6.1684
10	0.1104	0.2102	60	0.6103	2.9436	110	1.1103	6.2440
11	0.1204	0.2480	61	0.6203	3.0419	111	1.1203	6.3423
12	0.1304	0.2783	62	0.6303	3.1023	112	1.1303	6.4104
13	0.1403	0.3085	63	0.6403	3.1628	113	1.1403	6.5087
14	0.1503	0.3312	64	0.6503	3.2082	114	1.1503	6.5540
15	0.1603	0.3614	65	0.6603	3.2989	115	1.1603	6.6145
16	0.1703	0.3992	66	0.6703	3.3897	116	1.1703	6.6448
17	0.1803	0.4749	67	0.6803	3.4653	117	1.1803	6.6901
18	0.1903	0.5202	68	0.6903	3.5258	118	1.1903	6.7355
19	0.2003	0.5958	69	0.7003	3.5863	119	1.2003	6.8262
20	0.2103	0.6488	70	0.7103	3.6694	120	1.2103	6.9018
21	0.2203	0.6941	71	0.7203	3.7299			
22	0.2303	0.7471	72	0.7303	3.7753			
23	0.2403	0.8151	73	0.7403	3.8055			
24	0.2503	0.8454	74	0.7503	3.8509			
25	0.2603	0.8718	75	0.7603	3.9492			
26	0.2703	0.9020	76	0.7703	4.0248			
27	0.2803	0.9323	77	0.7803	4.0778			
28	0.2903	0.9776	78	0.7903	4.1382			
29	0.3003	1.0381	79	0.8003	4.1760			
30	0.3103	1.1289	80	0.8103	4.2441			
31	0.3203	1.1893	81	0.8203	4.3424			
32	0.3303	1.2272	82	0.8303	4.4331			
33	0.3403	1.2801	83	0.8403	4.5087			
34	0.3503	1.3784	84	0.8503	4.5768			
35	0.3603	1.4389	85	0.8603	4.6373			
36	0.3703	1.5145	86	0.8703	4.7129			
37	0.3803	1.5750	87	0.8803	4.7507			
38	0.3903	1.6430	88	0.8903	4.7885			
39	0.4003	1.7338	89	0.9003	4.8339			
40	0.4103	1.7640	90	0.9103	4.9095			
41	0.4203	1.7943	91	0.9203	4.9851			
42	0.4303	1.8396	92	0.9303	5.0532			
43	0.4403	1.8699	93	0.9403	5.0910			
44	0.4503	1.9228	94	0.9503	5.1590			
45	0.4603	2.0060	95	0.9603	5.2573			
46	0.4703	2.0891	96	0.9703	5.3405			
47	0.4803	2.1345	97	0.9803	5.4237			
48	0.4903	2.1874	98	0.9903	5.4993			
49	0.5003	2.2252	99	1.0003	5.5824			
50	0.5103	2.3160	100	1.0103	5.6202			

END

DATE

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