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RESULTS AND CODE PREDICTIONS FOR ABCOVE AEROSOL CODE VALIDATION -- TEST AB6 WITH TWO AEROSOL SPECIES

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Hanford Engineering Development Laboratory

MASTER

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December 1984**

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RESULTS AND CODE PREDICTIONS FOR ABCOVE
AEROSOL CODE VALIDATION--TEST AB6 WITH TWO AEROSOL SPECIES

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ABSTRACT

A program for aerosol behavior code validation and evaluation (ABCOVE) has been developed in accordance with the LMFBR Safety Program Plan. The ABCOVE program is a cooperative effort between the USDOE, the USNRC, and their contractor organizations currently involved in aerosol code development, testing or application. The second large-scale test in the ABCOVE program, AB6, was performed in the 850-m³ CSTF vessel with a two-species test aerosol. The test conditions simulated the release of a fission product aerosol, NaI, in the presence of a sodium spray fire. Five organizations made pretest predictions of aerosol behavior using seven computer codes. Three of the codes (QUICKM, MAEROS and CONTAIN) were discrete, multiple species codes, while four (HAA-3, HAA-4, HAARM-3 and SOFIA) were log-normal codes which assume uniform coagglomeration of different aerosol species. Detailed test results are presented and compared with the code predictions for seven key aerosol behavior parameters.

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RESULTS AND CODE PREDICTIONS FOR ABCOVE AEROSOL CODE VALIDATION--
TEST AB6 WITH TWO AEROSOL SPECIES

1.0 INTRODUCTION

A program for aerosol behavior code validation and evaluation (ABCOVE) has been developed in accordance with the LMFBR Safety Program Plan. The ABCOVE program is a cooperative effort between the U.S. Department of Energy, the U.S. Nuclear Regulatory Commission, and their contractors currently involved in nuclear aerosol code development, testing or application. The purpose of the ABCOVE program is to provide a basis for judging the adequacy of existing aerosol behavior computer codes to describe inherent aerosol attenuation in containment buildings during postulated accidents. The program involves both analytical calculations by code developers and users and large-scale confirmatory tests in the 850-m³ containment vessel of the Containment Systems Test Facility (CSTF).

Each ABCOVE test is carried out in three stages: planning and pretest computer code predictions, test performances and analysis, and comparison of code predictions with the experimental measurements. During the planning stage, the test conditions (containment geometry, thermal conditions, and aerosol source information) are specified as completely as possible to eliminate as many sources of discrepancies in the code calculations as possible. However, code input parameters regarding aerosol behavior are not specified, and each participant is free to exercise his own judgement as to the proper values for such parameters as shape factors, collision efficiency, and boundary layer thickness for diffusional deposition. Most participants selected values for these parameters which gave good agreement with available test data.

Two ABCOVE tests have been performed in the CSTF to date. The first test, AB5, was performed in September, 1982 and the results were reported.⁽¹⁾ A single-species aerosol was used in Test AB5, with the aerosol being generated by spraying sodium at a high rate into an air atmosphere. The conditions for test AB5 were conducive to high agglomeration and settling rates, a condition applicable for severe LMFBR and LWR accidents.^(2,3,4) The results of test AB5 and the associated computer code calculations were encouraging in that

important aspects of aerosol behavior, such as total leaked mass and suspended concentration during the aerosol source period were predicted reasonably well. However, there were significant discrepancies among the codes for some of the aerosol parameters, notably suspended concentration after source cutoff and plated mass on vertical surfaces.

The present report describes the second test in the ABCOVE series, test AB6, and compares computer code predictions with the experimental results. The primary purpose of test AB6 was to demonstrate coagglomeration behavior of two aerosol species and the capabilities of existing aerosol behavior codes to predict the behavior of each species. The experimental conditions simulated an accident environment in which a fission produce aerosol, NaI, was released in the presence of a sodium fire.

The second test (AB6) in the ABCOVE series was performed in July, 1983, in the 850-m³ Containment Systems Test Facility (CSTF) vessel. The test conditions simulated the release of a fission product aerosol, sodium iodide (NaI), in the presence of a sodium fire which released sodium combustion product aerosol (NaO_x) at ~500 times the mass rate release of the NaI aerosol. The NaO_x source was continued well past the NaI source cutoff in order to demonstrate the "washout" effect of the NaI by the continuing NaO_x aerosol.

Two hundred five (205) kg of sodium were sprayed into the air atmosphere of the CSTF vessel at a constant rate of 42.8 g/s over a period of 4780 seconds. Oxygen gas was injected so that the oxygen concentration remained relatively constant throughout the test. All of the sodium was converted to an aerosol consisting of a mixture of sodium peroxide and sodium hydroxide (NaO_x). Concurrently, NaI aerosol was generated ex-containment by a volatilization-condensation process and injected into the containment atmosphere with a nitrogen carrier gas. The NaI source was terminated at 3000 s, while the NaO_x source continued for an additional 2400 s.

The maximum containment pressure and mean atmospheric temperature attained were 170 kPa (24.6 psia) and 160°C (320°F), with local temperatures near the sodium nozzle reaching 834°C (1530°F). Large temperature gradients developed in the containment atmosphere at elevations above the sodium spray nozzle.

Samples of suspended aerosol, taken at ten locations throughout the containment volume, showed that the concentration of each aerosol species was essentially uniform at all elevations above its release point at all times, but that the concentration was significantly lower at elevations below the release point during the source release period. After the end of each source period, the respective species concentrations in the upper and lower regions approached similar values. The upper homogeneous region occupied ~80% of the containment volume and its concentration ranged up to nine times higher than the lower region for NaO_x; up to four times higher for NaI.

The maximum suspended NaO_x aerosol concentration measured was 33 g/m^3 , reached at 600 s after initiation of sodium spray. A steady-state concentration of 28 g/m^3 was attained by the end of the NaO_x source period. The suspended NaI concentration attained a maximum value of 0.27 g/m^3 , and then slowly declined to 0.085 g/m^3 by the end of the NaI source.

Late in the NaI source release period, the measured removal rates for both aerosol species were equal. Termination of the NaI source (while the NaO_x source continued) had no measurable effect on the NaO_x suspended concentration, but the measured fractional removal rate for NaI increased to ~10% greater than that of the NaO_x specie. This resulted in a very rapid reduction in NaI suspended concentration (the washout effect), but the rapid removal rate lasted only ~700 s. After that, the NaI removal rate slowed to less than that of NaO_x until after the end of the NaO_x source, when the NaI removal rate again exceeded the NaO_x removal rate. The early NaI behavior was predicted by the discrete codes, but they did not predict the slow NaI removal at later times.

Pretest computer code predictions were made by five ABCOVE program participants representing USDOE and USNRC contractor organizations. Seven codes were used: HAA-3,⁽⁵⁾ HAARM-3,⁽⁶⁾ HAA-4,⁽⁷⁾ SOPHIA,⁽⁸⁾ QUICKM,⁽⁹⁾ MAEROS,⁽¹⁰⁾ and CONTAIN.⁽¹¹⁾ The QUICKM code was previously called MSPEC. MAEROS is a stand-alone version of the aerosol behavior calculation part of the comprehensive code, CONTAIN. Each of the codes has unique differences in its modeling of physical processes, approach used for solution of the integro-differential aerosol agglomeration equation, capability of accounting for multiple aerosol species, and stage of development. Each code has its advantages and limitations. The first four listed above are "log-normal" codes, so called because they assume the aerosol size distribution to be log-normal at all times. The last three of the codes listed above are "discrete," i.e., the aerosol size distribution is divided into a number of groups, with constant aerosol characteristics assumed for each size group. Treatment of multiple aerosol species is handled differently by each of the two classes of codes. The log-normal codes assume that particle composition

is independent of size, i.e., that the aerosol is uniformly coagglomerated. The discrete codes assume that the particles within each discrete size group have uniform chemical composition, but allow the composition to vary between size groups.

The actual test conditions deviated slightly from the test plan on which the pretest predictions were based. Therefore, an interim report was sent to the participants stating the actual conditions, and "blind" post-test predictions were made based on the actual sodium spray rate and thermal conditions. The blind post-test predictions were made without knowledge (except for the HEDL participant) of the test measurements of aerosol behavior. No effort was made to improve the agreement of code and test results by post-test adjustment of input parameters, such as particle shape factors and source particle size.

Each code user reported the predicted magnitude of seven output parameters that describe aerosol behavior. The reported parameters include: suspended mass concentration, aerodynamic mass median diameter of suspended aerosol, geometric standard deviation of particle size distribution, leaked mass, settled mass, plated mass, and instantaneous combined removal rate. All code results were reported in digital format at 16 specified times to facilitate comparisons.

Specific conclusions and summary statements supported by the reported work are as follows:

- 1) All seven code cases resulted in predictions of leaked mass that were within a factor of 2.4 of the experimental value for NaO_x ; within a factor of 1.2 for NaI. Leaked mass is an important parameter because it relates to the release of radionuclides, and thus, to offsite radiological consequences for accident cases where the containment building integrity is maintained. By this measure, all of the code cases were reasonably realistic and usable for accident analyses. This conclusion is similar to that reached for the ABCOVE test AB5 exercise (for NaO_x), and is an encouraging finding.

- 2) The discrete codes predicted the NaO_x suspended concentration slightly better, but predicted NaI concentration worse than the log-normal codes. The discrete codes predicted that the NaI suspended concentration would decay rapidly and continuously after NaI source cutoff, whereas the experimental measurements showed that the rapid decay lasted only a short while before slowing to approximate the rate predicted by the log-normal codes, which used the simplifying assumption of uniform coagglomeration. The good agreement for NaI by the log-normal codes may have been fortuitous. Phenomena not modelled in any of the codes may have caused this behavior, e.g., resuspension of previously deposited aerosol or oxidation of deposited NaI to form volatile I_2 which was then adsorbed on the surfaces of suspended NaO_x aerosol particles. Direct evidence of the occurrences of such phenomena was not obtained in the test, however. Further investigation of the NaI behavior is warranted.
- 3) The measured aerosol particle size-composition relationship was not as predicted by either the discrete codes or those using the uniform coagglomeration assumption. Analyses for NaI and NaO_x on cascade impactor stages taken during the concurrent source period showed that the maximum ratio of NaI to NaO_x occurred on median sized particles, with lower ratios at the smaller and larger ends of the distribution.
- 4) Two mixing cells developed in the containment atmosphere during the aerosol source periods, one above and one below the point of aerosol release. The suspended aerosol concentrations within each cell were uniform, but significant differences in concentration existed between the two cells. All of the aerosol codes involved in the ABCOVE program use a basic assumption that the aerosol is instantaneously distributed homogeneously throughout the entire containment volume as it is released. None of them predicted the nonhomogeneity observed in test AB6. Because the upper cell occupied a large fraction ($\sim 80\%$) of the total volume, the inability of the codes to treat nonhomogeneous atmospheres was not serious for the conditions of test AB6. However, code users should examine the conditions for each application to see whether nonhomogeneity effects could cause a serious error in code predictions.

- 5) Particle size distributions measured by cascade impactors showed that the aerodynamic mass median diameter (AMMD) for NaO_x increased steadily during the NaO_x source period to a value of $6.2 \mu\text{m}$, while the NaI AMMD increased to $6.7 \mu\text{m}$ and then decreased to that of the NaO_x . The geometric standard deviation, σ_g , increased to 2.55 for NaO_x ; to 2.2 for NaI. Particle size measurement techniques were not sufficiently sensitive for NaI after the NaI source cutoff, but the NaO_x AMMD decreased gradually to a value of $2.0 \mu\text{m}$ at 10^5 s . Neither the discrete nor the log-normal codes predicted the cascade impactor measurements very well, but both code classes generally gave reasonable estimates of the effective settling diameters.
- 6) Sedimentation was by far the dominant aerosol depletion process for both NaO_x and NaI species. Settled mass was 9.0 times greater than plated mass for NaO_x ; 7.6 times greater for NaI, even though plating area was 8.5 times greater than the upward facing horizontal surface area. All of the codes predicted that sedimentation was dominant. All of the codes underpredicted the NaO_x plated mass by factors from 0.1 to 0.6. All the codes except HAA-3 underpredicted the NaI plated mass by similar factors.
- 7) Both aerosol species were deposited on interior vertical surfaces (no heat sink) to essentially the same extent as on the outer vessel vertical walls (heat sink). This shows that thermophoresis was not the dominant process for deposition onto vertical surfaces, as predicted by some codes. The experimental results suggest that impaction and interception may be the important mechanisms for wall deposition. These processes are not modelled in any of the codes involved in the ABCOVE program.
- 8) The bulk density of settled aerosol was much lower in test AB6 than in previous CSTF tests with NaO_x aerosol. This may have affected the aerosol shape factors, though such an effect has not been substantiated.

- 9) Only one code was used by more than one participant in test AB6. This was the CONTAIN code, where one participant used the MAEROS stand-alone version of the aerosol behavior model used in the CONTAIN code. The results of the two code cases were nearly identical, a result due largely to the fact that both participants used the same or nearly the same input values for non-specified input parameters. This is an encouraging finding, since the two cases were performed independently and on different computers.
- 10) Data on containment thermal response are reported in sufficient detail for use in validating containment response codes such as SPRAY⁽¹²⁾ and SOMIX-2.⁽¹³⁾ However, the sodium burning rate was not measured, because the sodium spray drops were small and they burned to completion before impacting structural surfaces. A comparison of experiments with containment response codes was beyond the scope of the present work.
- 11) Test AB6 has provided useful information on the capabilities of the aerosol codes to account for more than one aerosol species when both species (NaO_x and NaO_x tagged with a trace of NaI) have similar characteristics, e.g., shape factors, density. No information was obtained on the capabilities of the codes to predict the behavior of multiple, non-similar species. A future ABCOVE test is planned to address this problem and to investigate further the behavior of NaI noted in the present study.

3.0 EXPERIMENTAL FACILITY AND PROCEDURE

3.1 FACILITY DESCRIPTION

The test was performed in the Containment Systems Test Facility (CSTF). The chief feature of the CSTF is the model containment vessel which is located within a ventilated concrete building. Other features include a sodium supply system, instrumentation systems, control room and data acquisition system, data reduction and analysis systems, chemical laboratory rooms, utility services, a maintenance shop and offices.

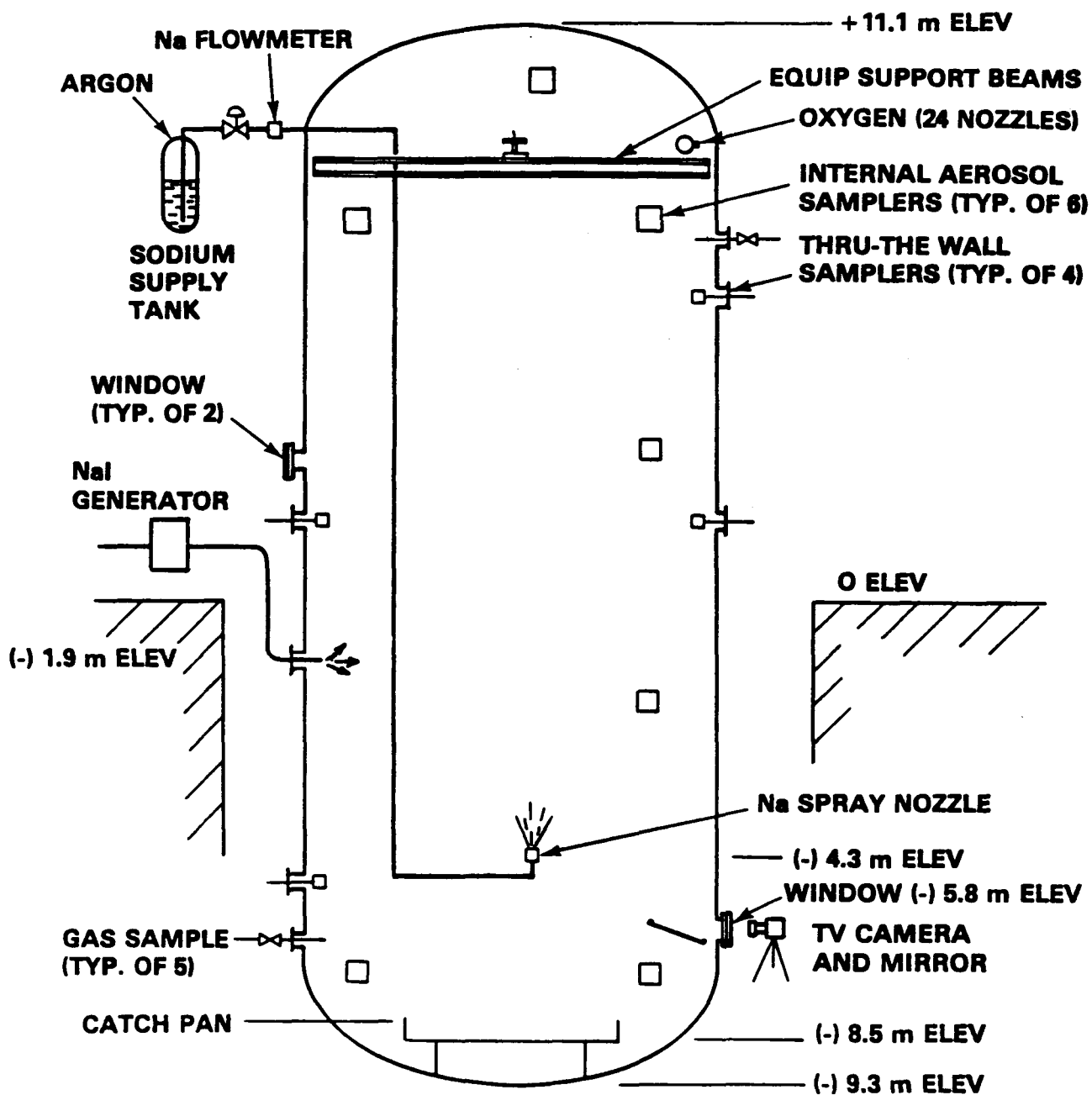
3.1.1 Containment Vessel

The CSTF containment vessel (CV) is a 852-m^3 ($30,000\text{-ft}^3$) carbon steel vessel with a design pressure of 0.517 MPa gauge (75 psig). It is installed in a concrete pit with the top half extending above the elevation of the main building work area, as shown by the schematic elevation view in Figure 3-1. All interior surfaces are coated with a modified phenolic paint, and exterior surfaces are covered with a 25.4-mm layer of fiberglass insulation with an outer aluminum vapor barrier. Additional details of the containment vessel are provided in Table 3-1.

3.1.2 Sodium Spray System

Commercial grade sodium, procured in 400-lb solid pack drums, was melted in a portable clam shell heater and charged into the sodium supply tank. The properties of the sodium supply tank are listed in Table 3.2. The supply tank was suspended from a load cell so that the combined weight of tank and sodium could be measured. Approximately 31 m of 40 1/2-in., Schedule 40 pipe connected the tank to the spray nozzle, as shown in Figure 3-1. Two valves and a magnetic flowmeter were located in the sodium line. A single sodium spray nozzle was installed in the containment vessel at the -4.36 m elevation (4.2 m above the catch pan). The nozzle was a hollow cone type* oriented to

*Spraying Systems Co., Wheaton, IL 60187, Catalog No. 3/8BA5 303 SS.



HEDL 8212-088

FIGURE 3-1. Schematic Diagram of Experimental Arrangement for Test AB6.
Neg No. 8300937-2

TABLE 3-1

CSTF CONTAINMENT VESSEL PROPERTIES

General

Code	ASME Section VIII, 1962
Material	Carbon Steel, SA 212-B
Interior paint (phenolic)	0.51 mm (0.020 in.)
Exterior thermal insulation	Fiberglass, 25 mm thick, k = 0.0467 W/m°C @ 100°C
Design pressure	0.517 MPa at 160°C (75 psig at 320°F)
Nominal leak rate	1.0% per day

Dimensions

Diameter (I.D.)	7.26 m	(25.0 ft)
Overall height	20.3 m	(66.7 ft)
Cylinder height	16.5 m	(54.0 ft)
Enclosed volume	852 m ³	(30,086 ft ³)

Weight, kg (lb)

Top head	8,753	(19,300)
Bottom head	8,753	(19,300)
Cylinder	69,390	(153,000)
Penetrations and doubler plates	10,295	(22,700)
Catch pan	500	(1,000)
Internal components	5,580	(12,300)
Total Weight	103,260	(227,700)

Surface Areas for Heat Transfer, m² (ft²)

Top head	63.0	(678)
Bottom head	63.0	(678)
Cylinder	394	(4242)
Total area for heat transfer to environs	520	(5598)
Internal components	323	(2500)

Surface Areas for Aerosol Settling, m² (ft²)

Bottom head	36.7	(395)
Catch pan	11.1	(120)
Personnel deck	4.2	(45)
Internal components	36.2	(390)
Total	88.3	(950)

TABLE 3-1 (Cont'd)

Surface Areas for Aerosol Plating, m² (ft²)

Vessel shell	520	(5598)
Internal components	232	(2500)
Total	752	(8098)

Thickness for Heat Transfer, mm (in.)

(Average lumped values)*		
Top head	18.1	(0.712)
Bottom head	18.1	(0.712)
Cylinder	22.9	(0.901)
Internal components	3.4	(0.134)

$$\text{*Average Thickness} = \frac{\text{Weight}}{(\text{area}) (\text{density of steel})}$$

TABLE 3-2

PROPERTIES OF CSTF SODIUM SUPPLY TANK

Code	*ASME B&PV Code, Section VIII, 1976
Design pressure	0.517 MPa gauge at 650°C
Material	SS 304 H
Wall thickness	12.7 mm (0.5 in.)
Weight	953 kg (2105 lb)
Volume	1.89 m ³ (500 gal)
Diameter	914 mm (36 in.)
Overall height	2990 mm (9.8 ft)
Orientation	Vertical
Heating	60 kw band heaters
Insulation	200 mm Kaowool [•] blanket

*Built to intent of code.

[•]Registered trademark of Babcock & Wilcox Refractories Division, Augusta, GA.

spray in the upward direction at the vessel centerline. Additional details of the sodium spray system are listed in Table 3-3.

TABLE 3-3
SODIUM SPRAY SYSTEM CHARACTERISTICS

Number of nozzles	1
Nozzle orientation	Upward
Sodium temperature	560°C
Pressure drop across nozzle	203 kPa (29.5 psi)
Sodium spray rate	42.8 g/s
Nozzle distance above catch pan	4.2 m
Nozzle orifice diameter	3.18 mm
Spray angle	74°

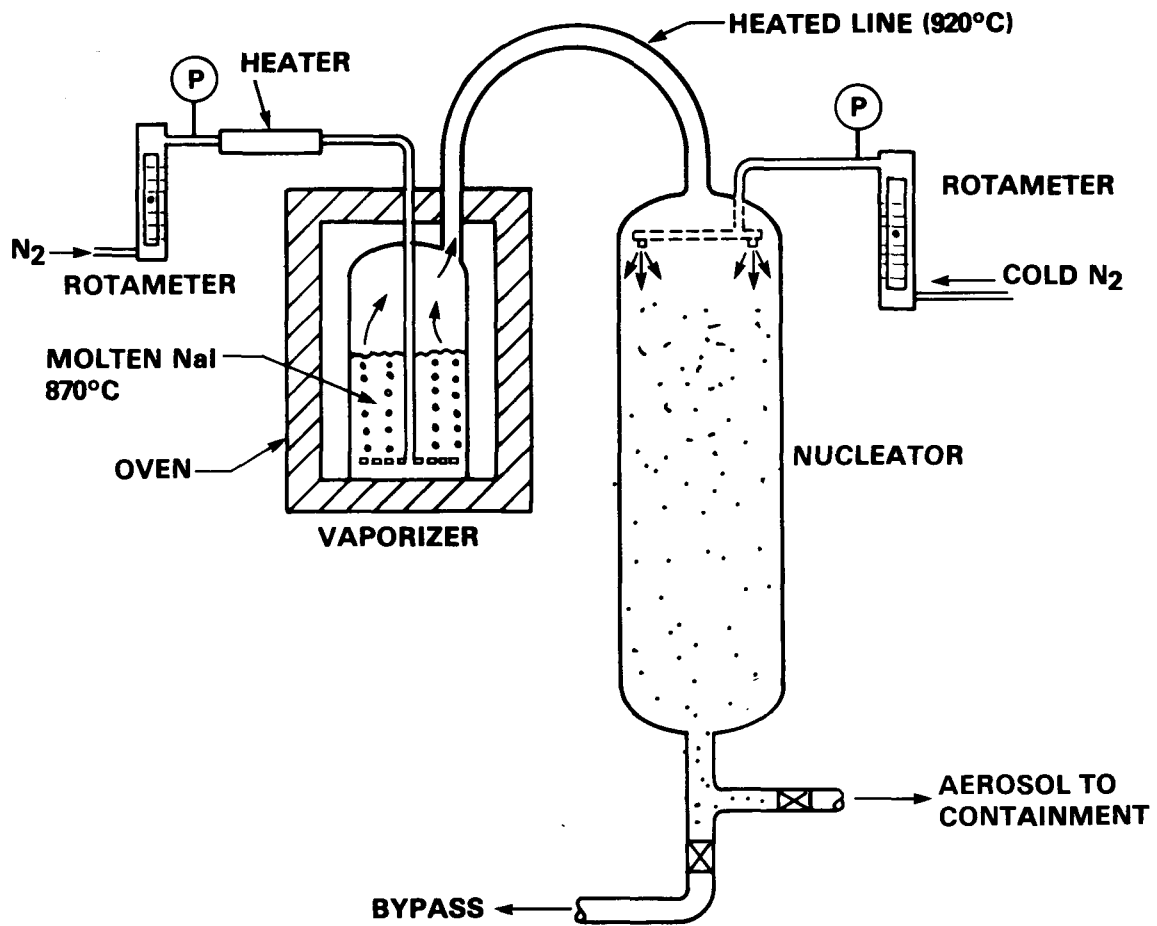
3.1.3 Sodium Iodide Aerosol Generator

NaI aerosol was generated by vaporizing NaI salt in a nitrogen carrier gas stream and then creating aerosol by a nucleation and condensation process. The latter was induced by rapidly mixing the hot NaI vapor with cold nitrogen in a nucleator vessel. A sketch of the generation equipment is shown in Figure 3-2.

The vaporizer was fabricated of 304 SS 10-in. Schedule 40 pipe and had a height of 530 mm. It had a flat bottom and a dished top head. Its design pressure was 82.7 kPa at 870°C (12 psig at 1600°F). It had a gas sparge ring with 188 4.8-mm diameter holes located near the bottom.

The nucleator was fabricated of 304 SS 12-in. Schedule 40 pipe with two dished heads and an overall height of 1.73 m. Its design pressure was 82.7 kPa at 430°C (12 psig at 800°F). Its volume was 0.125 m³.

The procedure for generating NaI aerosol was to charge 19 kg of NaI crystals into the vaporizer and to heat the vaporizer to 875°C in an oven. At this temperature, NaI is a liquid with a vapor pressure of ~18 mm Hg.⁽¹⁴⁾



HEDL 8309-089.1

FIGURE 3-2. Schematic Diagram of NaI Aerosol Generation System.
Neg No. 8306937-1

Nitrogen gas, heated to 840°C, was metered and injected to the sparge ring, which was immersed ~120 mm below the surface of the NaI pool. The hot nitrogen gas, carrying some NaI vapor, flowed from the top through a 38-mm diameter pipe to the inlet of the nucleator. The gas was kept superheated by an electrical heater. Immediately upon entering the nucleator, it was mixed with cold nitrogen to give a 220°C mixture temperature. At this temperature, the NaI was highly supersaturated and formed an aerosol. The gas-aerosol stream was sent to a bypass filter during the heatup stage, and was valved to the containment vessel (CV) at the desired time. The pipe leading to the containment vessel was 38 mm ID and it projected horizontally 400 mm past the CV wall at a CV elevation of -1.9 m and an azimuth of 8°. A small fan was operated during the initial nine minutes of the test to aid in mixing the NaI aerosol. The fan was shut off during the remainder of the test. At the end of the NaI injection period, the NaI aerosol stream was valved back to the bypass filter and the heaters were shut off.

3.2 EXPERIMENTAL MEASUREMENTS

The methods and instrumentation for the experimental measurements used in this work have been described previously.⁽¹⁵⁾ The measurements are summarized in Table 3-4.

3.2.1 Aerosol Characterization

The careful characterization of the test aerosol was an important part of the present work. The suspended mass concentration, the particle size distribution, and the chemical composition were measured periodically by direct sampling at various times and locations throughout the test. In addition, some information on shape and size was obtained by electron microscopy.

The mass concentration of suspended particles was measured as a function of time by periodically passing a measured quantity of gas through small filters located directly in the containment atmosphere and subsequently analyzing the material collected on the filter for NaI, Na and total mass. Two

TABLE 3-4
EXPERIMENTAL MEASUREMENTS AND ACCURACY

Measurement(b)	No. of Locations	No. of Times	Standard Error	Method
Suspended aerosol mass concentration	6	1	+ 25%	In-vessel filter clusters
Suspended aerosol mass concentration	4	52	+ 15%	Through-the-wall samplers
Aerosol particle size and σ_g	3	16	+ 20%	Cascade impactor
Aerosol particle size (actual)	1	2	N/A	Electron microscopy, sizing
Aerosol particle shape	1	2	N/A	Electron microscopy
Aerosol chemical composition	1	5	N/A	Various; Chemistry Lab.
Aerosol instantaneous deposition rate	1	9	+ 20%	Through-the-wall coupons
Integral settled mass/unit area	23	1	+ 10%	Fall-out pans
Integral plated mass on vessel walls per unit area	7	1	+ 20%	Vessel wall smears
Aerosol settled/unit area during Na spray period	1	2	+ 25%	Special samplers
Aerosol mass deposited in catch pan	1	1	+ 10%	Wash and analyze for Na
Total settled aerosol mass	1	1	+ 10%	Wash vessel floor
Total aerosol wall plateout	1	1	+ 30%	Wash vessel walls
Temperature of containment atmosphere	28	(a)	+ 2%	Thermocouples
Temperature of vessel surface	18	(a)	+ 2%	Thermocouples
Temperature of Na sprayed	2	(a)	+ 2%	Thermocouples
Containment pressure	1	(a)	+ 1%	Pressure Transducer
Containment O ₂ concentration	5	(a)	+ 2%	On-line O ₂ analyzer
Containment H ₂ concentration	5	(a)	+ 20%	On-line H ₂ analyzer
Containment moisture concentration	2	(a)	+ 30%	On-line humidity analyzer
Sodium spray mass flow rate	1	(a)	+ 10%	Magnetic flowmeter and load cell
Overall Na and NaI mass balances	N/A	1	+ 10%	Weighing, washing, volume, chem. analysis, calculation

(a)Continuous

(b)For Na and NaI, as appropriate.

types of sampling techniques were used: in-vessel filter clusters located at different elevations and radii, and through-the-wall samplers inserted and retrieved through air locks on the vessel wall. The locations of the six in-vessel clusters and the four through-the-wall sampling stations are given in Table 3-5.

TABLE 3-5
AEROSOL SAMPLE LOCATIONS

<u>Station No.</u>	<u>CV Nozzle No.</u>	<u>Elevation (m)</u>	<u>Azimuth(a) (degrees)</u>	<u>Radius (m)</u>
<u>Through-the-wall</u>				
T1	N2A	+ 6.1	255	3.73
T2	N3A	+ 1.5	290	3.73
T3	N33	+ 1.37	135	3.73
T4	N17A	- 5.8	85	3.73
<u>In-vessel Clusters</u>				
C1	--	+ 9.45	240	1.43
C2	--	+ 6.70	270	2.74
C3	--	+ 3.66	270	2.74
C4	--	+ 0.30	180	2.74
C5	--	- 6.70	180	2.74
C6	--	- 6.70	0	2.74

(a) Clockwise looking down, zero degrees at center of 2.44-m equipment hatch.

The aerodynamic size distribution was determined by sampling with cascade impactors inserted through the wall. Two types of cascade impactors were used: Andersen Mark III 8-stage* and Sierra Model 225 6-stage.** Previous tests have shown that these instruments give good agreement when proper sample sizes are taken and proper calibration data are supplied.⁽¹⁵⁾ Glass fiber collection surfaces provided by the manufacturers were used.

Chemical identification of the aerosol was determined at various times during each test by collecting aerosol on a membrane filter paper*** at a wall station and analyzing for various chemical species by x-ray diffraction and wet chemistry. The sample was protected from ambient atmosphere to minimize chemical changes that might occur after the sample was taken.

The instantaneous deposition rate of particles was measured by exposing coupons in a horizontal orientation for brief periods at a through-the-wall station. The top surface of the coupon was washed and the rinse water analyzed for sodium. The deposition rate was calculated as a total mass flux of particles. No information was obtained on settling as a function of particle size by this technique. The "deposition velocity" was calculated by dividing the flux by the airborne concentration.

Additional information regarding the CSTF aerosol characterization methods is provided in Reference (15).

3.2.2 Temperature Measurement

All temperatures were measured by calibrated Chromel-Alumel® thermocouples with stainless steel sheaths. Readout was in parallel on strip chart recorders, magnetic tape, and paper tape. The location of the thermocouples are listed in Appendix A.

*Andersen Samplers, Inc., Atlanta, GA.

**Sierra Instruments, Co., Inc., Carmel Valley, CA.

***Mitex, manufactured by the Millipore Corp., Bedford, MA.

®Chromel-Alumel is a registered trademark of Richmond Machine Products Corp., Staten Island, NY.

3.2.3 Pressure Measurement

The absolute and gauge pressure in the containment vessel was measured by a pressure transducer and a Heise gauge. In addition, the differential pressure across the sodium spray nozzle was measured by a differential pressure transducer.

3.2.4 Oxygen Injection System

A flow diagram of the oxygen injection system is shown in Figure 3-3. It consisted of ten standard 1A gas bottles manifolded to a 1-in. pipe line leading to a 360° manifold located at the top of the containment vessel. The CV manifold had 24 equally spaced nozzles approximately 0.5 m from the CV wall and oriented so that flow was directed horizontally toward the CV wall. A recording turbine flowmeter measured the oxygen flow rate.

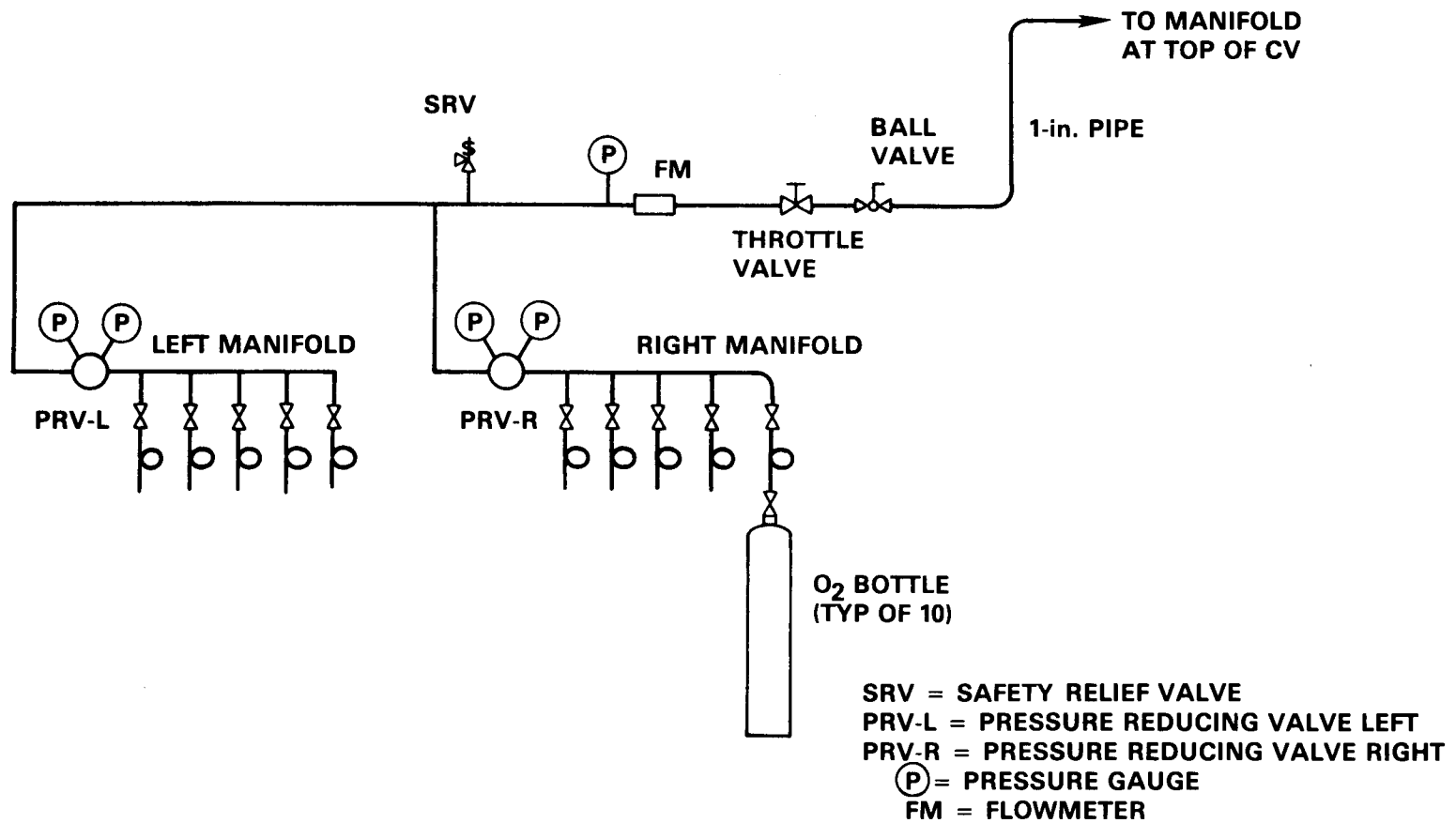
3.2.5 Gas Analysis System

The composition of the containment gas was measured continuously at five locations by pulling samples through tubing to on-line analyzers located ex-vessel. Filters were provided at the tube inlet to prevent aerosol from entering the analyzers. The locations of the gas sample points are shown in Table 3-6. A few grab samples were taken for subsequent analysis by mass spectrometry.

3.2.6 Data Acquisition System

Many of the key experimental measurements were made manually and periodically, e.g., filter samples, cascade impactor samples, electron microscope samples, and samples for chemical analyses. The data associated with these manual samples were logged by technicians onto data sheets or recorded in notebooks.

The on-line instrumentation included thermocouples, pressure transducers, sodium flowrate meter, sodium supply tank load cell, and gas analyzers for



HEDL 8306-095.14

FIGURE 3-3. Schematic Diagram of Oxygen Injection System.

TABLE 3-6
GAS SAMPLE LOCATIONS

<u>Gas Sample Point No.</u>	<u>Elev (m)</u>	<u>Azimuth (deg)</u>	<u>Radius (m)</u>	<u>Gas Analyzed</u>
G1	+ 6.1	255	3.5	O ₂ , H ₂ , dew point
G2	- 6.7	10	3.5	O ₂ , H ₂ , dew point
G3	- 4.9	CL*	CL	O ₂ , H ₂
G4	- 0.9	CL	CL	O ₂ , H ₂
G5	+ 8.8	CL	CL	O ₂ , H ₂

*CL = centerline of containment vessel.

O₂, H₂ and water vapor. The output of these sensors was recorded in parallel on strip chart recorders and on a 140-channel digital data acquisition system (DAS)*. For test AB6, 126 channels were recorded on magnetic tape every 20 seconds initially, with decreasing frequency at later times. Information on identification of data recorded on each DAS channel is provided in Appendix A. Digital output for all channels for the initial 100 minutes is presented in Appendix B. For times greater than 100 minutes, the measured parameters changed more slowly, and summary tables of temperature and pressure data extending to 6 days are presented in Appendix C.

3.3 CHEMICAL ANALYSES

Filter papers from cascade impactors, through-the-wall aerosol concentration samplers, and in-vessel filter clusters were analyzed for sodium by either acid titration or atomic absorption spectrometry. Analyses for iodide was by ion-specific electrode and by neutron activation analysis. Better sensitivity was obtained for iodine by the ion-specific method than by NAA. Appropriate blank corrections were made to account for background sodium and

*John Fluke Manufacturing Co., Inc., Mountlake Terrace, WA 98043
Datalogger Model 2240.

iodine in the filter paper and demineralized water. Approximately half of the filter papers were weighed before and after exposure to aerosol to determine the total mass of aerosol on the paper. Chemical forms of aerosol were determined by performing a combination of chemical techniques, including x-ray diffraction, chromatography, and wet chemistry for metallic Na, Na_2O_2 and CO_2 content.

3.4 EXPERIMENTAL PROCEDURE

The following key activities were performed during test AB6:

- Preparation of a Test Plan describing the intended test conditions.
- Pretest computer code predictions.
- Preparation of detailed Test Operating Procedures.
- Installation of sodium spray and NaI generation systems.
- Installation and calibration of instruments.
- Pretest photography.
- Drying of the CV to constant, normal humidity.
- Sealing the vessel so that it was essentially leak-tight.
- Inject oxygen to 23.9% O_2 .
- Inject air to establish desired pretest pressure (114.2 kPa absolute).
- Charge sodium to sodium supply tank and preheat to test temperature (560°C).
- At several hours before time zero, start NaI generator, sending NaI aerosol to bypass filter.
- At time zero (t_0), start NaI aerosol injection to containment vessel.
- Take several measurements of aerosol characterization during this period of NaI injection only.
- At 600 seconds after t_0 , open sodium valve to start sodium flow. (Spray started 20 seconds later.)

- Take video recording of spray through window in CV.
- Maintain constant pressure drop across spray nozzles by adjusting the sodium supply tank cover gas pressure.
- Inject oxygen throughout the sodium spray period.
- Make test measurements according to Section 3.2.
- Continually adjust nitrogen carrier gas flow rates to give constant volumetric flow rate through NaI generator as pressure changed.
- Terminate NaI aerosol injection at $t = 3000$ seconds by closing valve to CV and opening valve to bypass filter.
- Sodium spray terminated at $t = 5400$ seconds by closing isolation valve in sodium line.
- Continue to make test measurements for four days.
- At 4620 minutes after t_0 , open CV door and take photograph and floor samples.
- At 4660 minutes, inject 115 m^3 (STP) of air to keep CV at positive pressure.
- At $t = 8565$ minutes, a purge of the CV with 66% R.H. air was started.
- At $t = 8616$ minutes, personnel entered the CV for photography and sampling.
- At $t = 8685$ minutes, end of post-test examination and beginning of cleanup and material balance operations.
- Chemical analyses of samples performed.
- Data reduction and engineering analyses performed. Interim report of test conditions issued.
- Blind post-test computer code predictions performed.
- Comparisons made of code predictions with experimental results.

3.5 TEST CONDITIONS

The test conditions for test AB6 are summarized in Table 3-7.

TABLE 3-7
SUMMARY OF TEST CONDITIONS FOR TEST AB6

<u>Test Condition</u>	<u>Value</u>
<u>Initial Containment Atmosphere</u>	
Oxygen concentration	23.9 + 0.2 vol %
Temperature, mean	31.0°C (87.8°F)
Pressure	114.2 kPa (16.56 psia)
Dew point	12.2 + 2°C (54°F)
Nominal leak rate	1% per day at 10 psig
<u>Sodium Spray</u>	
Sodium spray rate	42.8 + 2.1 g/s
Spray start time	620 s
Spray stop time	5400 s
Total Na sprayed	204.7 + 4.1 kg
Sodium temperature	560°C
Spray drop size, MMD	640 + 40 μm
Spray size geom. std. dev.	1.4
Pressure drop across nozzle	203 kPa (29.5 psi)
<u>Oxygen Concentration</u>	
Initial O ₂ concentration	23.9 + 0.2 vol %
Final O ₂ concentration	21.9 + 0.2 vol %
Oxygen injection start	60 s
Oxygen injection stop	4400 s
Total O ₂ injected	63.0 std. m ³
<u>Containment Conditions During Test</u>	
Maximum average atmosphere temperature	159.6°C (319.4°F)
Maximum average temperature of steel vessel	78.9°C (174.0°F)
Maximum pressure (absolute)	169.5 kPa (24.58 psia)
Final dew point	-4.2 + 2°C (24.4°F)
<u>NaO_x Aerosol Source</u>	
Start time	620 s
Stop time	5400 s
Release rate	77.9 + 4 g/s
Total NaO _x released	372.4 + 10 kg
Material density	2.45 g/cm ³
Source 50% Radius	0.25 μm
Source sigma	2.0
Initial concentration	0
Mass ratio, total to Na	1.82

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4.0 EXPERIMENTAL RESULTS

4.1 GENERAL OBSERVATIONS

Zero time (t_0) for test AB6 was defined as the instant that NaI aerosol began to flow into the containment atmosphere. It occurred at 10:00:00 on July 19, 1983. Visual observation through a window showed that the white aerosol stream exiting the 41-mm ID pipe tended to rise as it mixed with the containment atmosphere, in spite of a small fan blowing down at a 45° angle from above at the pipe exit. At the end of the initial 10-minute period, when only NaI aerosol was being released, the visibility was 6 to 10 m.

At 600 seconds after t_0 , the isolation valve in the sodium spray line was opened. Twenty seconds later, sodium was seen exiting the spray nozzle. Ignition was instantaneous and the spray pattern was fully developed within one second after beginning of spray. At the end of the test, a clinker of fused sodium and sodium oxide was observed to have built up at the spray nozzle in the shape of an inverted cone. It is believed that spray drop formation and burning efficiency was not affected significantly by the clinker. The sodium isolation valve was closed at 5400 seconds and the spray fire ceased immediately.

Visibility within the containment atmosphere was approximately 150 mm during the sodium spray period. At $t = 7000$ seconds, the visibility had increased to ~ 1.5 m and at this time large individual aerosol particles were seen when a light beam was directed through a window into the containment atmosphere. The aerosol cloud illuminated by the beam appeared to be settling much like a snowstorm. The downward velocity of the larger particles was estimated to be ~ 2 cm/sec, with some falling faster than others. This phenomenon was observed to continue for ~ 2 hr, with occasional giant particles of ~ 5 mm diameter seen. The direction and velocity of the aerosol cloud varied in a pulsating manner, sometimes moving downward rapidly (2 to 4 cm/s) and then slowing and even rising for short periods, with a cycle time of ~ 15 seconds. The particle size gradually decreased until individual particles could not be identified at ~ 150 minutes after the end of the sodium spray.

The containment vessel was kept sealed until $t = 4620$ minutes, when the personnel door was opened briefly to make observations of the aerosol deposit and to take samples of the floor deposit. A very light haze and the sharp odor of sodium oxide aerosol was detected. The thickness of the aerosol which had deposited on the horizontal entry platform (~ 40 mm) was much greater than in test AB5 (~ 6.5 mm), even though approximately the same quantity of sodium was sprayed in both tests. The bulk density in test AB6 was 0.05 g/cm^3 , compared with 0.36 g/cm^3 measured in test AB5. This is discussed further in Section 4.9.

At 8616 minutes, the containment atmosphere was purged for 35 minutes with fresh air in preparation for personnel entry. Figure 4-1 is a view of the aerosol deposit on the personnel deck showing one of the authors testing the resuspension characteristics of the settled aerosol. Although the aerosol appeared dry and fluffy, it could not be dispersed into aerosol-size particles by throwing it into the air. As in all other aerosol tests performed in the CSTF, the deposit on upward facing horizontal surfaces was much thicker than on vertical surfaces. The thickness of the layer adhering to the vertical wall at the zero elevation ranged from 2 to 4 mm, averaging 2.5 mm. However, the thickness of aerosol deposited on the vertical wall at elevations below approximately -4 m was much thinner than at higher elevations. Figure 4-2 is a view looking down at the bottom head, which shows the variation in aerosol deposit thickness on the lower vertical wall. A view of the upper dome and side walls is shown in Figure 4-3. The visual line of demarcation at -4 m is approximately the elevation of the sodium spray nozzle. Measurements of atmosphere temperature and suspended aerosol concentration showed that the containment atmosphere during the early phase of the test was divided into two mixing cells: a large upper cell above the -4.5-m elevation, which had a high suspended aerosol concentration and a relatively high temperature, and a smaller cell below the -4.5-m elevation, which had a low aerosol concentration and gas temperature. This two-cell effect is discussed further in Section 4.6.1.

The data logger output for the first 110 minutes is listed in Appendix B in digital form. Data for longer time periods are given in Appendix C and in the text.



FIGURE 4-1. View of Experimenters Examining the Aerosol Deposit In-Vessel. Neg 108558-9cn



FIGURE 4-2. Post-Test View of Aerosol on Bottom Head and Lower Side Walls.

Neg 108559-19cn

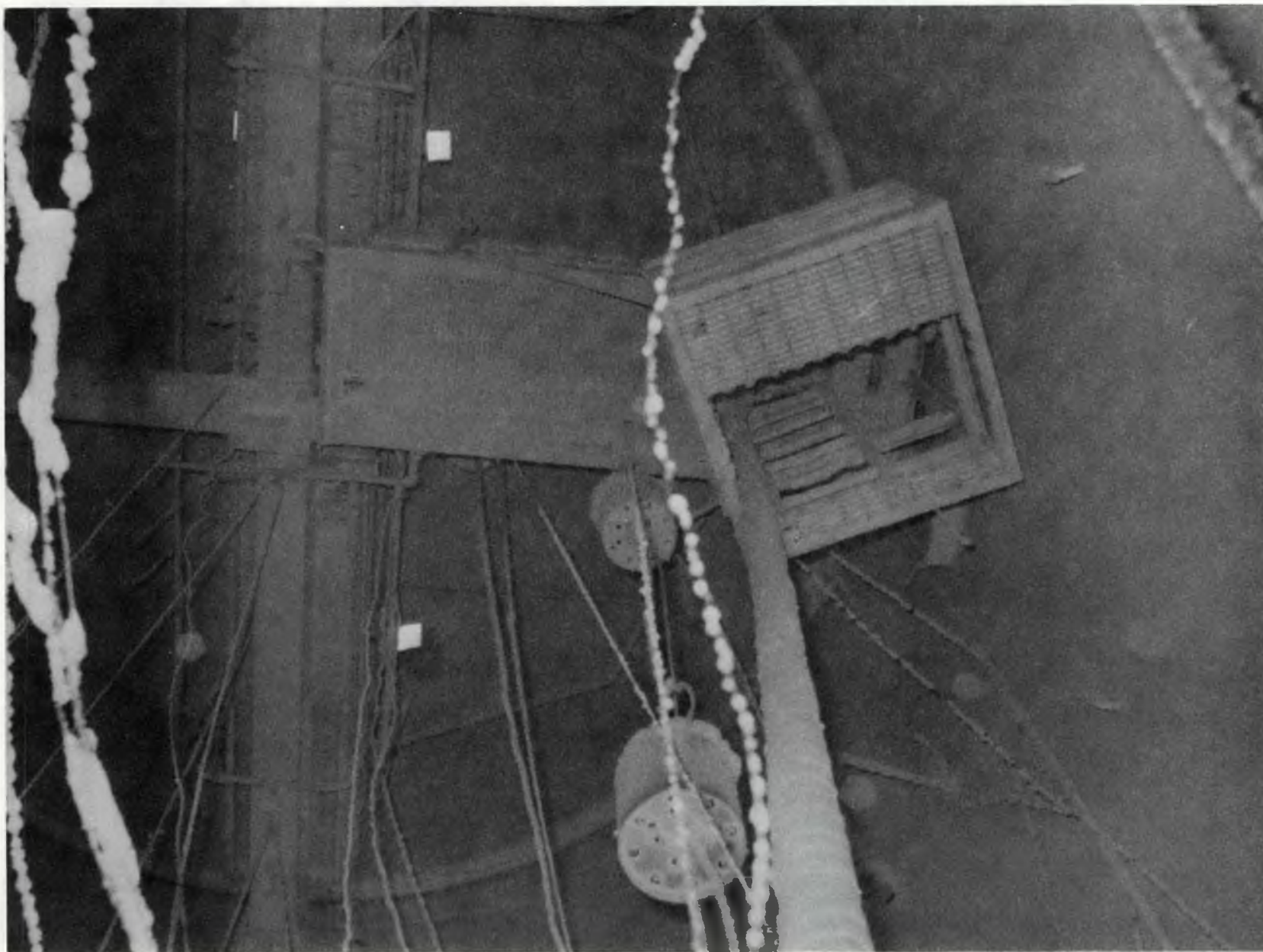


FIGURE 4-3. Post-Test View Looking Up at Top Dome and Upper Side Walls. Neg 108558-32cn

4.2 SODIUM SPRAY OPERATIONS

4.2.1 Spray Timing

The isolation valve on the sodium spray supply line began to open at 600 seconds after time zero. Sodium spray began in the containment atmosphere 20 seconds later and full flow was established within the next second. Thus, sodium oxide aerosol generation began at 620 seconds after t_0 . The isolation valve was closed at 5400 seconds after t_0 , terminating the spray at that time.

4.2.2 Spray Rate

The sodium spray rate averaged 42.8 ± 2.1 g/s throughout the 4780-s spray period, as determined by calibrated load cell measurements of the weight of the sodium supply tank. The load cell data are shown in Figure 4-4. The momentary high flow rate at the beginning of the flow period was caused by rapid filling of the empty pipe downstream of the isolation valve. Some of the irregularity of the measurement is believed to be due to hysteresis. The data of Figure 4-4 show that the sodium flow rate was essentially linear.

4.2.3 Spray Drop Size Distribution

The size distribution of sodium drops generated by the AB6 spray nozzle was not measured. In a previous experiment in an inert atmosphere, the size distribution of sodium drops generated by a similar nozzle was measured by catching them in kerosene and sieving. The mass median diameter (MMD) was 45% larger than the size claimed by the manufacturer for water at room temperatures. Assuming that this factor (1.45) is valid for the present nozzle, the drop size is calculated to be 640 ± 40 μm , with a geometric standard deviation of 1.4.

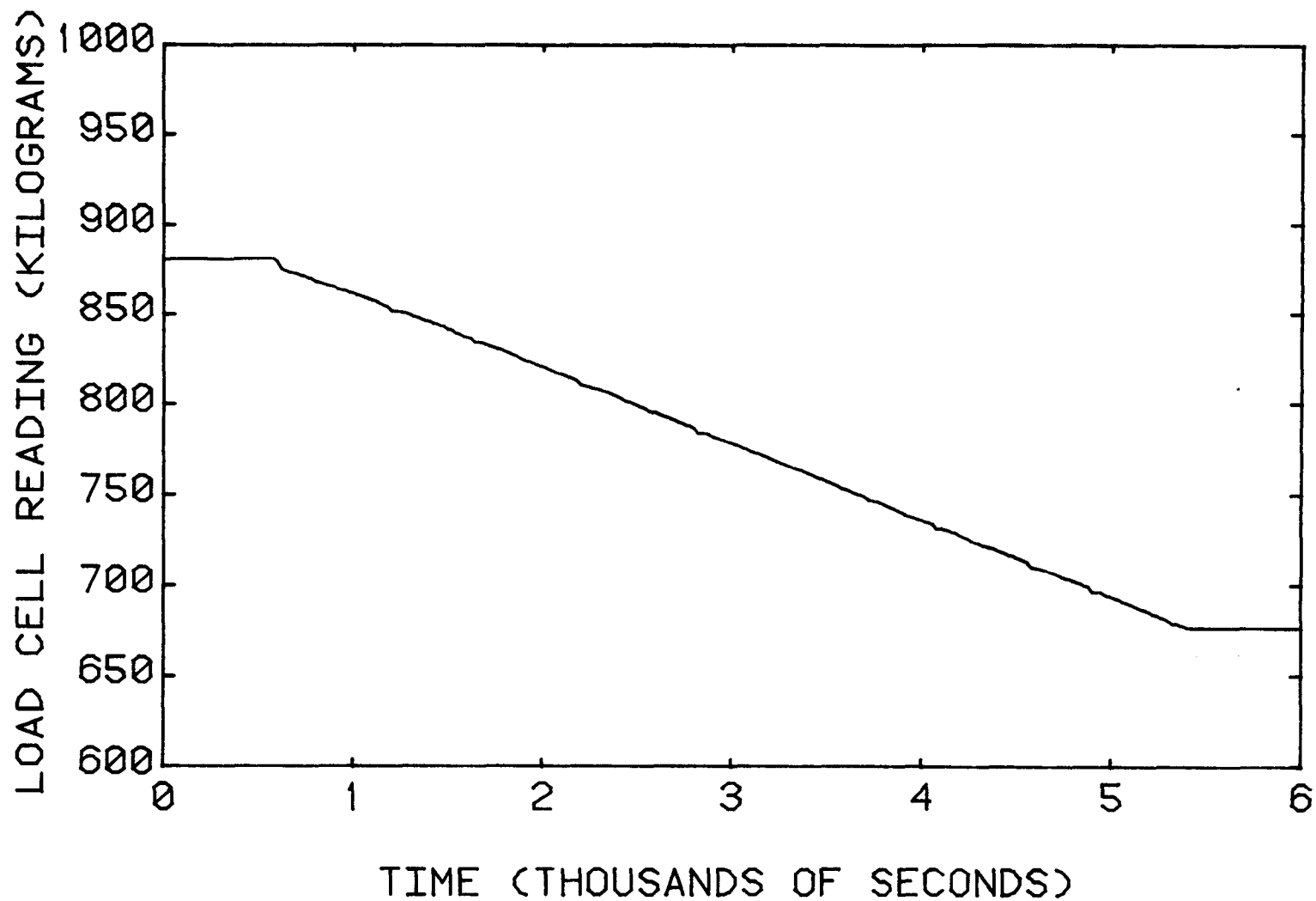


FIGURE 4-4. Weight of Sodium Remaining in Sodium Supply Tank as a Function of Time -- Test AB6.

4.2.4 Sodium Mass Balance

After all the aerosol measurements had been completed, the containment vessel surfaces were washed with water to recover the deposited aerosol materials. Portions of the vessel surfaces were washed selectively to obtain information on distribution of deposited material. A mass balance, based on sodium, is presented in Table 4-1.

TABLE 4-1
SODIUM MASS BALANCE

	<u>kg Na</u>	<u>wt%</u>
Delivered to Containment ^(a)	204.7	100.0
Recovered from Containment ^(b)		
Bottom Head	52.6	25.7
Catch Pan	79.3	38.7
Personnel Platform	14.6	7.1
All Other Surfaces ^(c)	58.7	28.7
Total CV Washes	205.2	100.2
Samples	2.5	1.2
Total Accounted For	207.7	101.5
Difference	3.0 (gain)	+1.5

^(a)Measured by load cell on Na supply tank.

^(b)Measured by water wash volume and Na concentration.

^(c)Vertical walls, top dome and interior components.

It was not possible to accurately differentiate the various surfaces reported in Table 4-1 because invariably the water sprays splashed on other surfaces. The data obtained by deposition tray measurements (Tables 4-10 and 4-20) are believed to be considerably more accurate for individual types of surfaces.

Table 4-1 shows that the recovered sodium mass exceeded the delivered mass by 1.5%. The value for delivered mass is believed to be accurate to $\pm 2\%$. The recovered mass is biased toward the high side by the procedure used for washing the vessel. Fourteen washes were made, beginning with high deposition areas, e.g., the bottom head, and progressing to cleaner surfaces. The closure of the sodium mass balance is considered to be excellent.

4.3 SODIUM IODIDE AEROSOL GENERATION

The NaI aerosol generation system is described in Section 3.1.3. During startup, the aerosol was sent to a bypass filter until steady-state conditions were attained. At time zero (t_0), it was valved to the containment vessel (CV) and the generation rate maintained constant until the end of the NaI source period ($t = 3000$ s), when it was valved back to the bypass filter during generator cool-down.

The temperature of the molten NaI pool in the vaporizer averaged $878.6 \pm 1.0^\circ\text{C}$, as measured by a thermocouple in a submerged thermowell. The volumetric flow rates of nitrogen streams to the vaporizer and nucleator vessels were kept constant by a technician assigned to the flow control system. Since the vapor pressure of NaI varies by $<2\%$ for the measured temperature variation, the volatilization rate can be considered constant. For constant deposition rate in the nucleator and lines, the release to the containment vessel was constant.

The average rate of NaI release to the CV was 0.14 g/s, as determined by dividing the total mass of NaI recovered from the CV by washing and sampling (416.4 g) by the 3000-s release period. This release rate measurement was substantiated by an independent measurement of the rate delivered to the bypass filter, which was determined to be 0.146 g/s. The 0.14 value is believed to be more accurate.

Nitrogen gas was fed to the vaporizer and nucleator vessels at an average rate of $0.0124 \text{ std. m}^3/\text{s}$ and it entered the containment atmosphere at a temperature of $210 \pm 10^\circ\text{C}$.

4.4 CONTAINMENT RESPONSE

4.4.1 Containment Temperature and Pressure

The containment atmosphere temperature was measured by 38 thermocouples located at various elevations and radial positions. The coordinates of each thermocouple are given in Appendix A. Nineteen of these thermocouples were selected for averaging to give a bulk average temperature for the entire 852-m^3 gas volume. The average gas temperature determined by this method is plotted as a function of time in Figure 4-5 and listed in Table C-1 in Appendix C. The average gas temperature increased at a rate of $17.6^\circ\text{C}/\text{minute}$ during the initial minute of spraying. The rate of increase slowed to $0.5^\circ\text{C}/\text{min}$ near the end of the spray period, when a maximum temperature of 165.1°C was obtained. The maximum temperature recorded by an individual thermocouple was 834°C , attained at 2100 seconds by a thermocouple located 0.23 m from the containment vessel centerline at 0.5 m above the spray nozzles. Three thermocouples failed and a portion of their data was lost.

Accurate measurement of the bulk average gas temperature, sometimes referred to as the cup-mixing temperature, by the thermocouple method depends on proper placement of thermocouples so that a true average is attained. For a vessel with large and rapidly changing thermal gradients, as in test AB6, this would require a very large number of thermocouples. Furthermore, experimental measurement of gas temperature in the sodium spray region is biased toward the high side by impaction of burning sodium on the thermocouple hot junction. A more accurate method of determining the average gas temperature is to calculate it from pressure measurements by use of the perfect gas law. This method requires knowledge of the number of moles of gas contained in the vessel. During the spray period, the number of gas moles varied in an uncertain manner as oxygen was consumed and oxygen and nitrogen were injected. However, the initial conditions were known accurately.

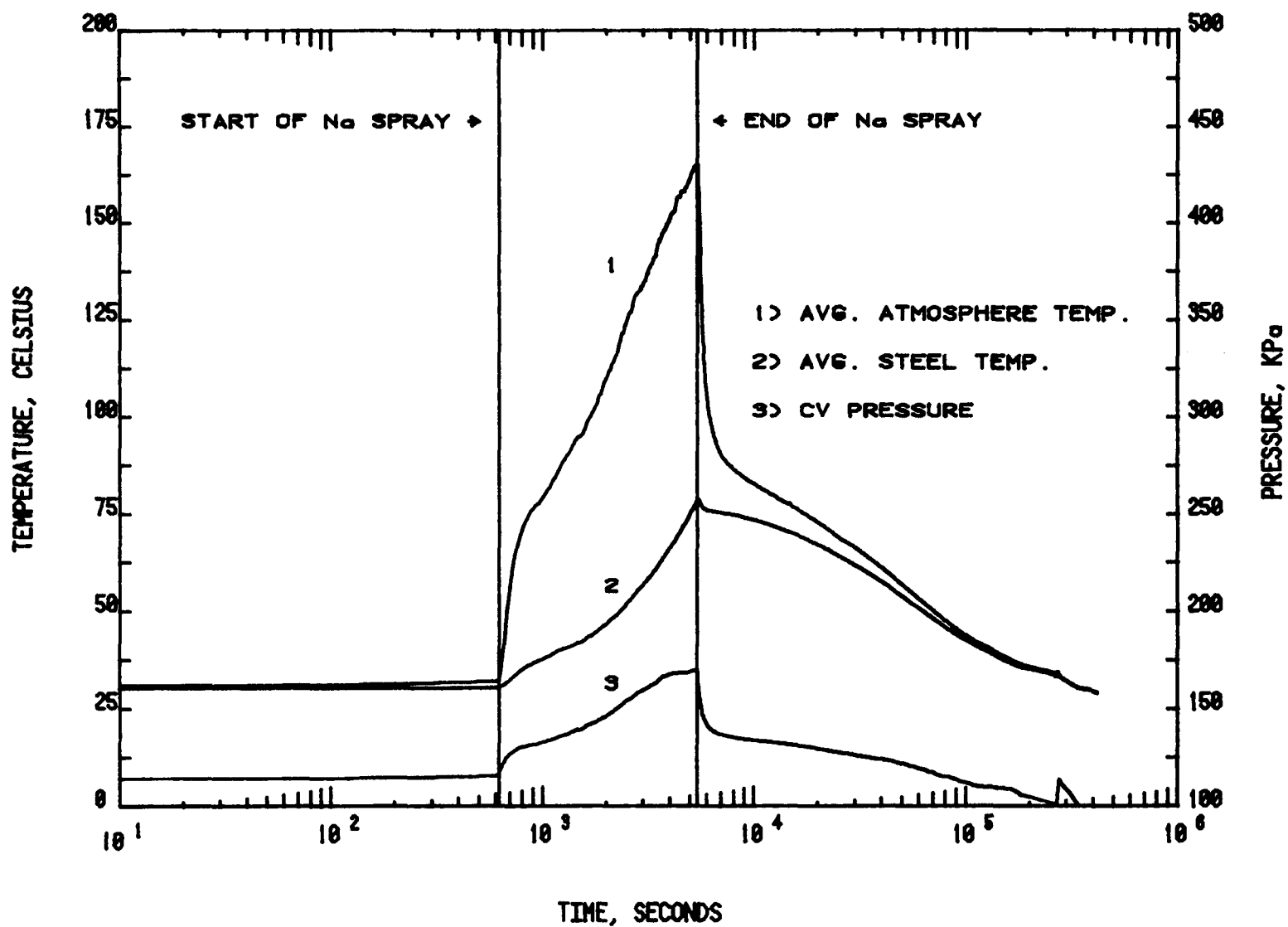


FIGURE 4-5. Containment Temperature and Pressure as a Function of Time -- Test AB6.

By the use of the perfect gas law and knowledge of the peak pressure (169.5 kPa absolute) which coincided with the end of the sodium spray, a value of 159.6°C is calculated for the peak average gas temperature. This agrees reasonably well with the value of 165.1°C obtained by averaging thermocouple readings. The 159.7°C value is believed to be more accurate.

Two-dimensional isotherms in the containment atmosphere are shown at four times in Figures 4-6 through 4-9. The location of thermocouples are denoted by + symbols, and their readings are shown adjacent to the symbol. The sodium nozzle was located at -4.2 m elevation on the centerline. Figure 4-6 shows that within the first two minutes after start of sodium spray, a hot central core had developed, but radial (horizontal) gradients were not well established at two minutes. Figures 4-7 and 4-8 show that, as the sodium spray continued, the central core became hotter and the radial gradient increased at elevations above the sodium spray nozzle. The colder, more dense gas near the walls flowed downward and toward the vessel center, due to density differences. This condition causes good mixing at elevations above the spray nozzle. However, at elevations below the spray nozzle, only very slight radial gradients existed, and the temperature decreased with increasing downward distance. This condition caused a stable, stagnant gas volume to exist at elevations below the spray nozzle. Mixing between the two cells was probably minimal.

Figure 4-9 shows that, at 10 minutes after the end of the sodium spray, the radial gradient persisted, though absolute values were much lower. Thus, mixing in the upper zone probably continued at a diminished rate after the sodium burning terminated. As before, the lower volume conditions favored stagnation.

4.4.2 Energy Balance

An energy balance was made by computing the sensible heat gained by the containment vessel and the contained atmosphere and comparing this with the computed energy release from chemical reactions based on the chemical analysis of deposited reaction products listed in Table 4-3 of Section 4.5.1.2.

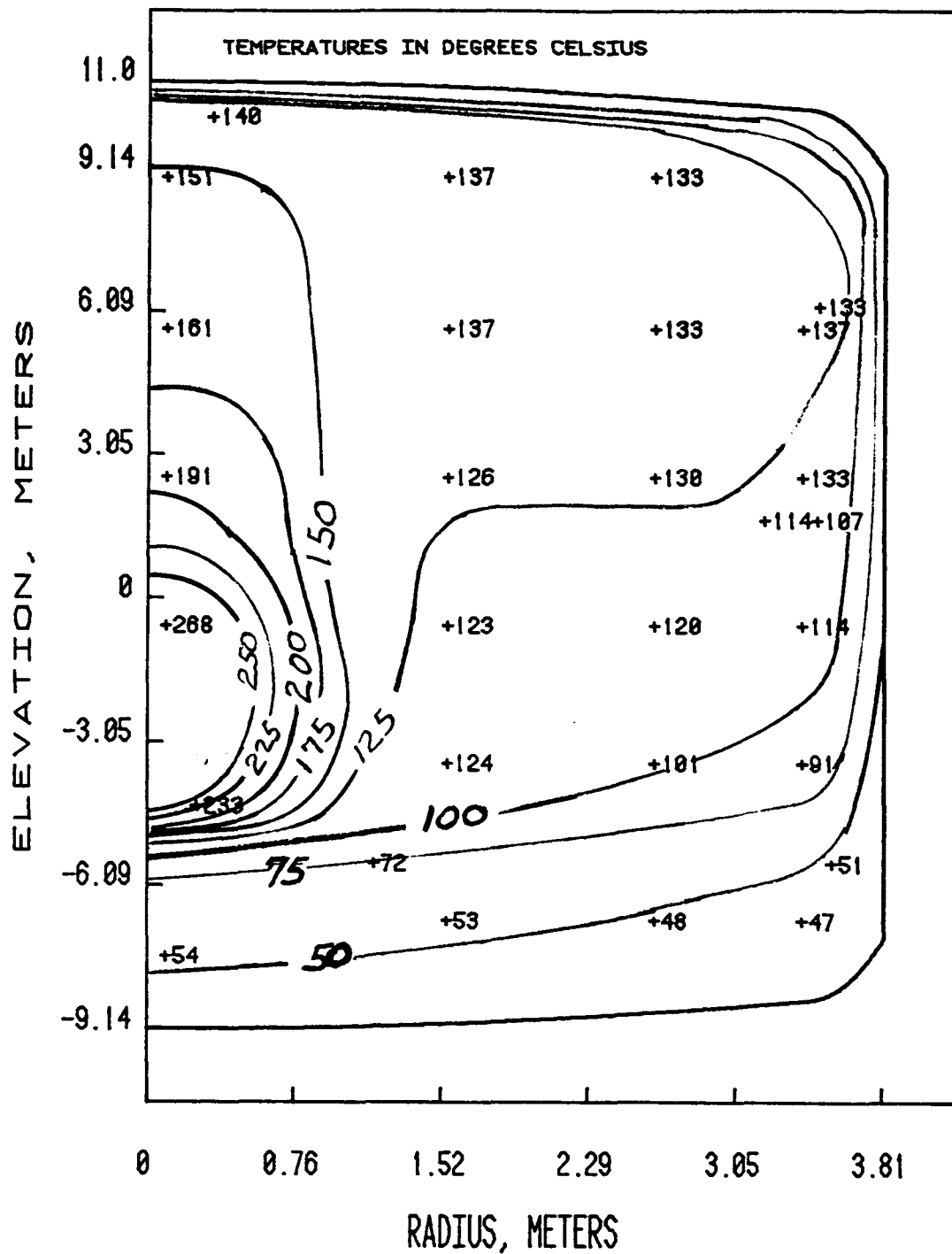


FIGURE 4-7. Containment Atmosphere Isotherms at 24 Minutes After Start of Sodium Spray ($t=2100$ s).

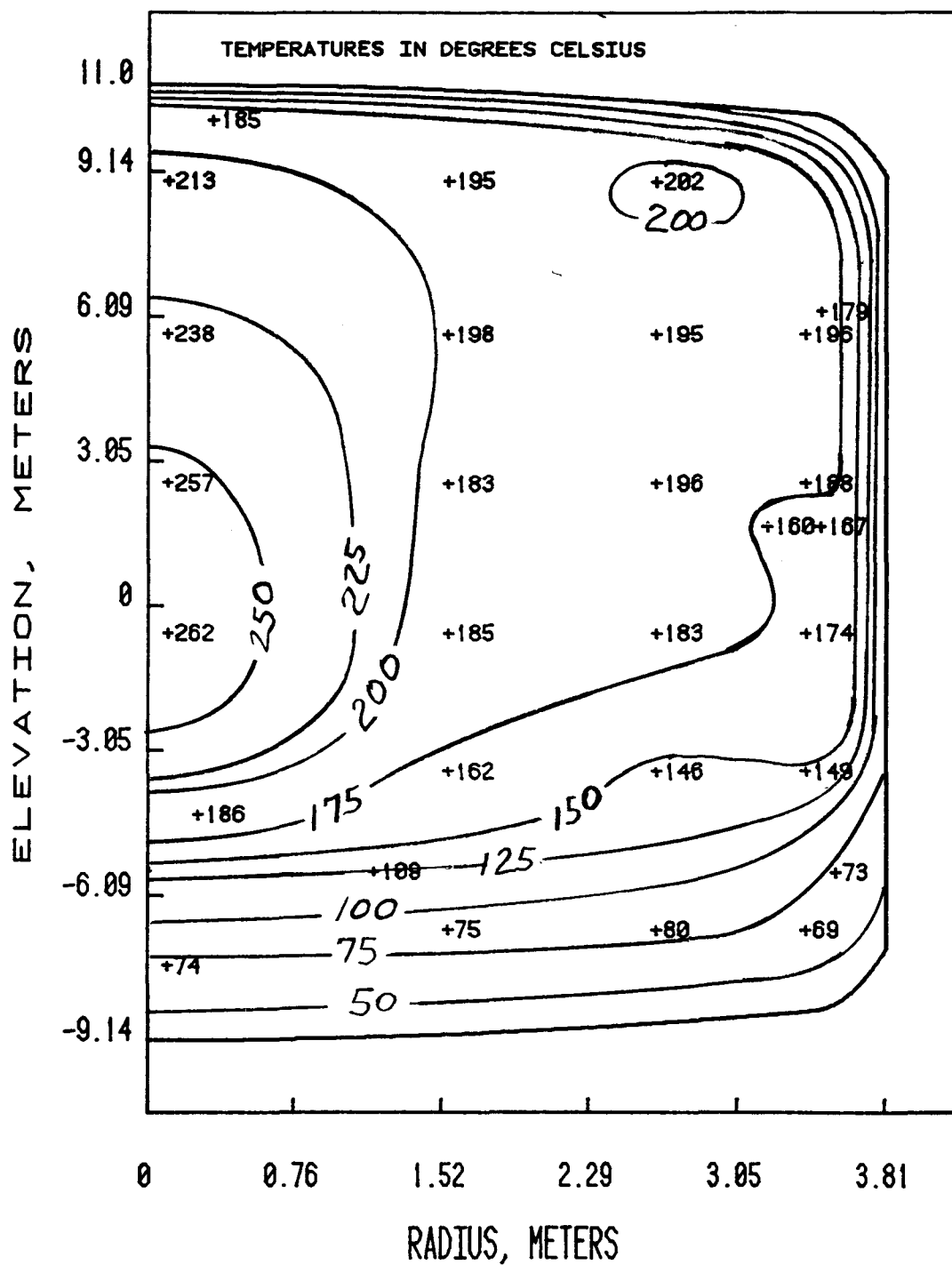


FIGURE 4-8. Containment Atmosphere Isotherms at 1 Minute Before End of Sodium Spray ($t=5340$ s).

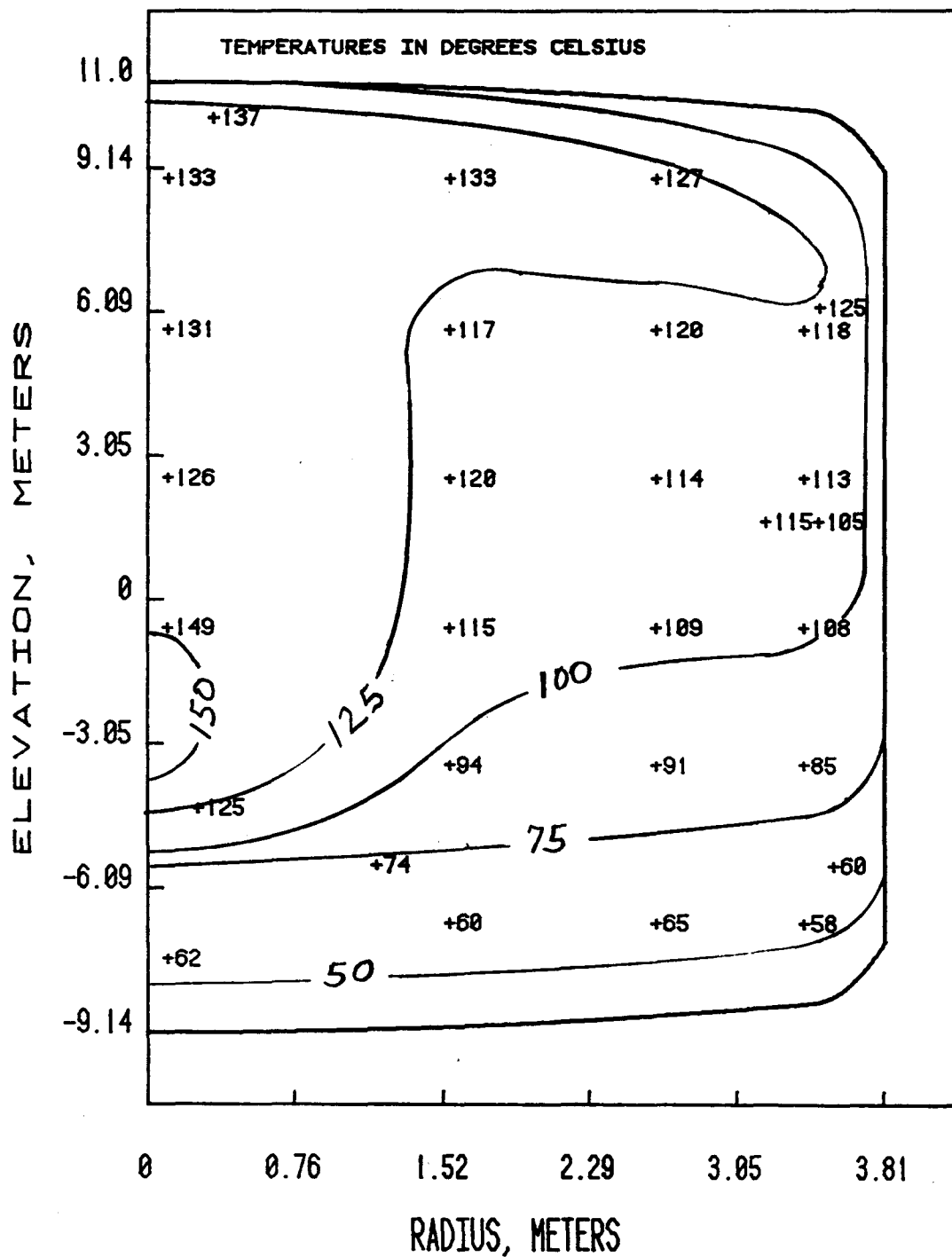


FIGURE 4-9. Containment Atmosphere Isotherms at 10 Minutes After End of Sodium Spray ($t=6000$ s).

Table 4-2 shows that 96.1% of the calculated heat generated by chemical reaction was accounted for. This is considered to be good agreement and supports the validity of the thermal measurements and the chemical analyses of the reaction products.

TABLE 4-2
ENERGY BALANCE(a)

Heat Generated by Chemical Reaction		2.86 GJ
Heat Accounted For		
Steel enthalpy	2.359 GJ	
Air enthalpy	0.158 GJ	
Insulation enthalpy	0.232 GJ	
Loss through vessel walls	0.0023 GJ	
Total accounted for	2.751 GJ	2.75 GJ
Percent accounted for	96.1%	

(a) At end of Na spray period.

4.4.3 Temperature Gradient Near Wall and Ceiling

The temperature gradients near the containment vessel wall and ceiling were measured at two locations by five thermocouples located in an array normal to each surface. One thermocouple was touching the surface and was covered by a thin film of adhesive. The other four thermocouples were located at various distances from the surface. The coordinates of the thermocouples are listed in Appendix A (TC 61 through 65 for the vertical wall, TC 38 through 42 for the ceiling).

Figure 4-10 is a plot of the temperature profiles near the surface at the end of the sodium spray period. It is obvious that most of the temperature difference between gas and surface occurs within a few millimeters of the surface. The atmosphere temperature is essentially uniform at distances greater than 5 cm.

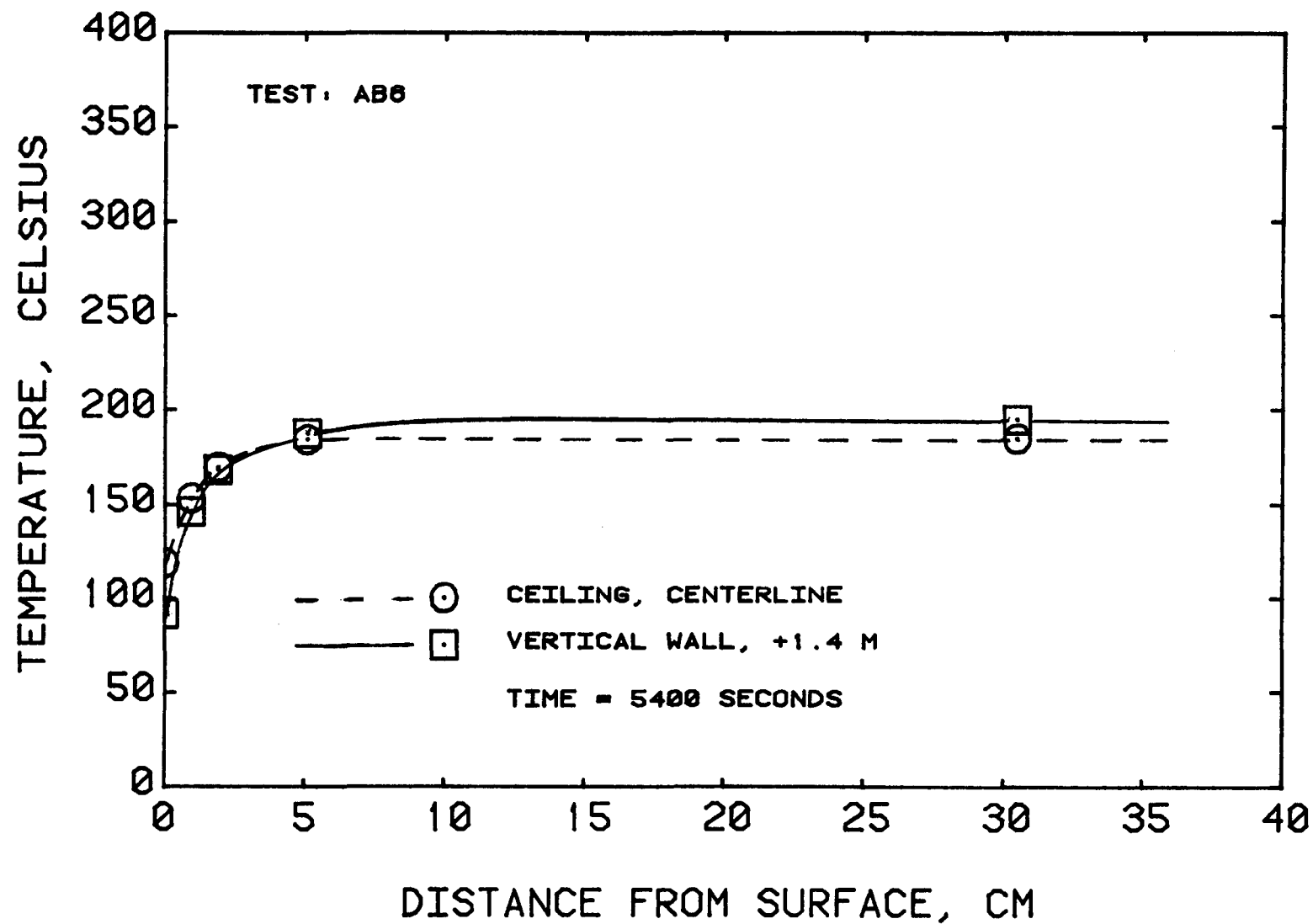


FIGURE 4-10. Temperature Profiles Near Surfaces in Containment Atmosphere at End of Sodium Spray.

More thermocouples at closer spacing near the surface would be required in order to define the temperature gradient accurately. However, approximate gradients were calculated by using the surface thermocouple and the thermocouple located nearest the wall (at 1.0 cm). The gradients calculated by this method are listed in Appendix C and plotted in Figure 4-11. A fairly steady state condition was established within 600 seconds after start of sodium spray, with a gradient of $\sim 50^\circ\text{K}/\text{cm}$ at the vertical wall and $\sim 30^\circ\text{K}/\text{cm}$ at the centerline of the top dome. The calculated values for temperature gradients are believed accurate within $\pm 50\%$.

4.4.4 Containment Atmosphere Composition

The gaseous composition of the containment atmosphere was determined continuously by monitoring flowing gas streams extracted from the vessel at five different locations. The coordinates of the sample line inlets are listed in Table 3-6. The gas streams were analyzed for oxygen,* hydrogen,** and water vapor dew point;*** and, in addition, periodic grab samples were analyzed by mass spectrometry. The on-line measured concentrations are reported in volume percent for oxygen and hydrogen and the dew point in $^\circ\text{C}$ for water vapor in Appendix B. The mass spectrometric analyses are given in Table 4-3.

The containment atmosphere was enriched in oxygen prior to the start of the experiment to an average of 23.86 vol%, as determined by averaging five on-line analyzer readings. This agreed very closely with the pretest analysis by mass spectrometer, as shown by Table 4-3. The oxygen concentration remained uniform ($\pm 0.5\%$) and nearly constant during the first half of the sodium spray period, as oxygen was injected as described in Section 3.2.4. During the last half of the spray period, the rate of O_2 injection decreased, and the average oxygen concentrations in the containment atmosphere decreased slowly to a value of 21.85 vol% at the end of the spray period.

*Beckman Instruments, Inc., Fullerton, CA, Model 7003.

**Teledyne Analytical Instruments, San Gabriel, CA, Model 102.

***General Eastern Instrument Corp., Watertown, MA, Model 1100A.

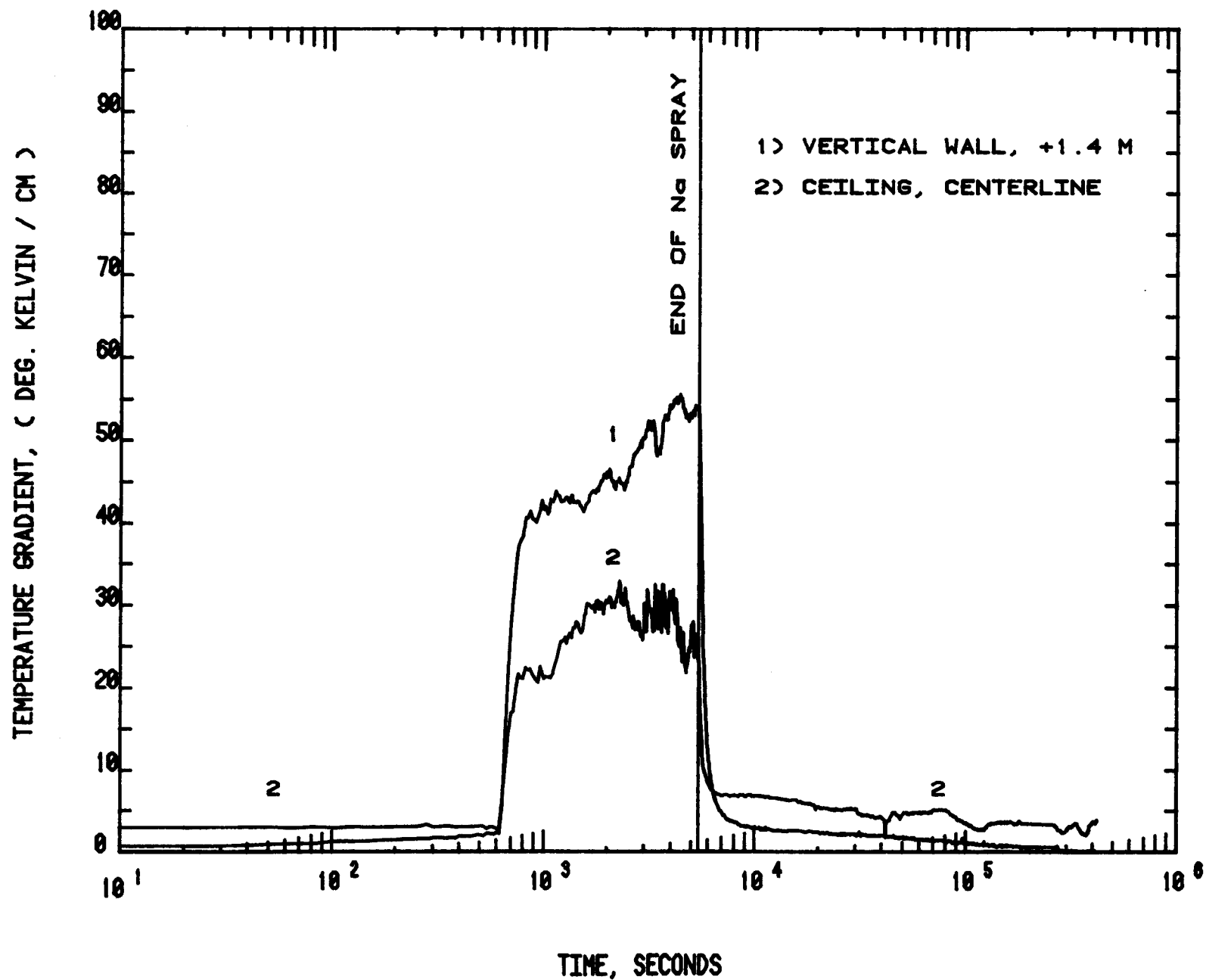


FIGURE 4-11. Temperature Gradients in Containment Atmosphere Near Surfaces as a Function of Time.

TABLE 4-3

MASS SPECTROMETRIC ANALYSES OF GRAB SAMPLES
FROM CONTAINMENT ATMOSPHERE

Gas	Vol. % on Dry Basis at Specified Time and Location									
	-25 min		+45 min		+85 min		+120 min		+1435 min	
	+6.1 m	-6.7 m	+6.1 m	-6.7 m	+6.1 m	-6.7 m	+6.1 m	-6.7 m	+6.1 m	-6.7 m
O ₂	23.8	23.9	23.7	23.7	21.4	23.3	20.5	22.1	21.2	21.1
H ₂	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N ₂	75.3	75.2	74.9	75.0	77.0	75.3	77.9	76.6	77.3	77.8
CO ₂	0.06	0.08	0.05	0.04	0.03	0.04	0.03	0.05	0.04	0.06
A	0.90	0.90	1.36	1.23	1.52	1.35	1.52	1.25	1.50	1.05
CH ₄	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CO	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

No hydrogen or combustible gas was detected at any time during the test.

The pretest dewpoint averaged 12.2°C as measured by the on-line hygrometers. At time 90 minutes, the hygrometers averaged -4.2°C. Samples of containment atmospheres were withdrawn through prefiltered and preweighed desiccant tubes and the dew point was calculated based on weight gain. The gravimetric method gave a value of 10.2°C before the sodium spray started and -4.3°C after the spray. These values are in good agreement with the hygrometer readings. Based on these moisture analyses, a total of 6.2 kg of water was removed from the containment atmosphere, presumably reacting with sodium oxide to form NaOH. This is not enough water to account for the quantity of NaOH found in the deposited aerosol after the test (see Section 4.5.1.2). This behavior is similar to that observed in previous experiments in the CSTF and can be explained by desorption of water from the vessel surfaces and thermal insulation.

4.4.5 Conversion Factors for Standard-to-Actual Containment Conditions

The volume occupied by a given molar quantity of gas in the containment atmosphere varied throughout the test as the gas temperature and pressure varied. Aerosol sampling was performed with rotameters calibrated for standard conditions (1 atm, 0°C). The ratio of standard to actual volumes in the containment atmosphere are listed in Table C-1, Appendix C.

4.5 AEROSOL SOURCE TERM

4.5.1 Sodium Oxide/Hydroxide Source

The chemical form of the sodium spray combustion product was a mixture of sodium peroxide (Na_2O_2) and sodium hydroxide (NaOH), with variable amounts of water of hydration. To simplify discussions, the aerosol formed by burning sodium is referred to as NaO_x in this report. The chemical nature of the aerosol is discussed further in Section 4.5.1.2.

4.5.1.1 NaO_x Source Timing

NaO_x aerosol release began at 620 seconds after time zero (t_0). The sodium supply valve was closed at 5400 seconds, effectively reducing the NaO_x aerosol release to zero at that time.

4.5.1.2 NaO_x Chemical Form

Chemical analyses were performed on two types of aerosol samples: settled bulk aerosol, and suspended aerosol. The settled aerosol samples were collected in two special samplers (called drop collectors) which collected settled aerosol during the sodium spray period. The first sampler (DCA) was exposed from time zero to 3000 seconds; the second (DCB) from 3000 to 5340 seconds. The samplers were sealed in-containment to prevent additional aerosol or moisture from entering. The results are listed in Table 4-3, along with the results of a sample removed from the personnel platform 3.1 days later (sample D80). Sample D80 is believed to be the best representative of the aerosol formed during the entire spray period. It showed that the aerosol was approximately 49% Na₂O₂, 20% Na₂O₂·2H₂O, and 31.0% NaOH. Chemical analyses of this type are subject to large errors, and the consistency between the various samples in Tables 4-3A and 4-4 is not good.

The compositions of suspended aerosol at various times are given in Table 4-4. The samples were collected on nonreacting membrane* filters protected from exposure to ambient atmosphere, and analyzed in an inert atmosphere glove box. Table 4-4 shows that the suspended aerosol was a mixture of Na₂O₂ and NaOH. From weight gain of the glassfiber filter papers, the sodium mass fraction of the suspended aerosol was seen to decrease with time, presumably by picking up moisture from the atmosphere. It should be noted that the NaI concentration was negligible.

*Mitex membrane, manufactured by the Millipore Filter Corp.,
Bedford, MA 01730

TABLE 4-3A
CHEMICAL COMPOSITION OF SETTLED AEROSOL

Compound	Mass Fraction		
	Sample DCA 0-3000 s	Sample DCB 3000-5340 s	Sample D80 Floor Deposit 0-3.1 d
Na ₂ O ₂	0	0.103	0.491
Na ₂ O ₂ •2H ₂ O	0.300	0.147	0.199
NaOH	0.695	0.750	0.310
H ₂ O	<u>0.005</u>	<u>0</u>	<u>0</u>
Total Aerosol	1.000	1.000	1.000
Total Na	0.520	0.551	0.548

4.5.1.3 Sodium Mass Fraction in Suspended Aerosol

As discussed in the previous section of this report, the suspended aerosol continuously adsorbed water vapor, which reduced the sodium mass fraction and increased the ratio of total mass to sodium mass. Figure 4-12 is a plot of the sodium mass fraction as a function of time. The sodium mass fraction decreased from a maximum of 0.557 during the sodium spray to 0.48 at 10⁵ seconds. The average value of the sodium mass fraction for the bulk of the NaO_x aerosol was 0.548, which corresponds to a value of 1.82 for the ratio of total mass to sodium.

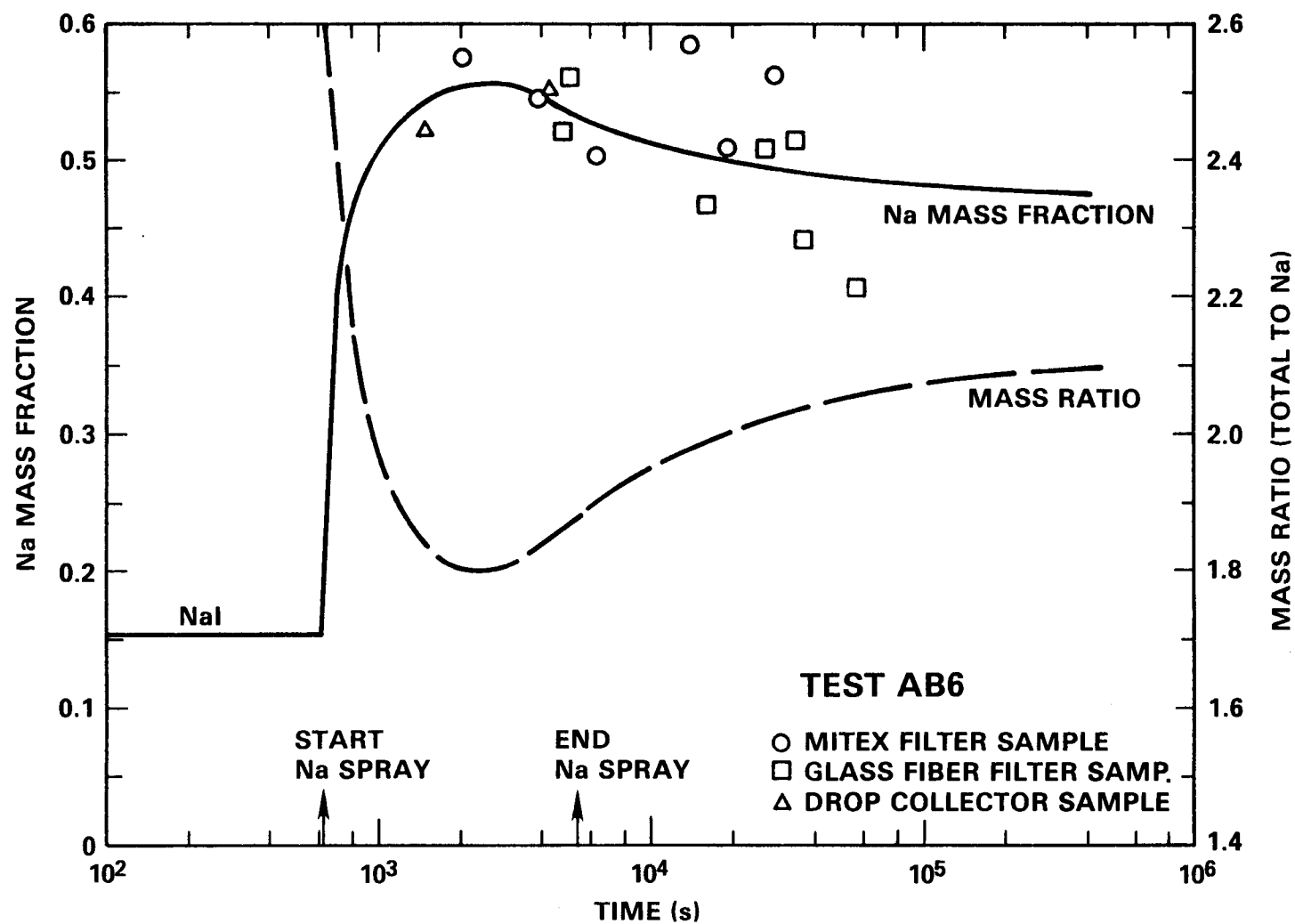
4.5.1.4 NaO_x Aerosol Release Rate

The average sodium spray rate was 42.8 ± 2.1 g/s, as discussed in Section 4.2.2. Since the average value for the mass ratio of total/Na was 1.82, the average release rate of NaO_x aerosol is assumed to be 77.9 ± 4.0 g/s. This assumes that 100% of the burned sodium was released as an aerosol, the same assumption that was used in reports of previous spray tests.^(1,16)

TABLE 4-4

CHEMICAL COMPOSITION OF SUSPENDED AEROSOL
AT VARIOUS TIMES

Compound	Mass Fraction					
	Sample S1 2085 s	Sample S2 3945 s	Sample S3 6330 s	Sample S4 13000 s	Sample S5 19260 s	Sample S6 28300 s
Na_2O_2	0.690	0.859	0.789	0.785	0.662	0.731
$\text{Na}_2\text{O}_2 \cdot 2\text{H}_2\text{O}$	0	0	0	0	0.044	0.049
NaOH	0.296	0.067	0.062	0.196	0.177	0.195
H_2O	<u>0.014</u>	<u>0.074</u>	<u>0.149</u>	<u>0.019</u>	<u>0.117</u>	<u>0.025</u>
Total Aerosol	1.000	1.000	1.000	1.000	1.000	1.000
Total Na	0.577	0.545	0.501	0.576	0.510	0.563



HEDL 8412-060.11

FIGURE 4-12. Sodium Mass Fraction of Suspended Aerosol as a Function of Time.

4.5.1.5 NaO_x Source Particle Size

As was the case in previous experiments, no direct measurements were made of the NaO_x source particle size distribution. However, the mass median diameter (MMD) of the suspended primary particles was determined to be $0.84^{+0.54}_{-0.25}$ μm with the geometric standard deviation, σ_g , of 1.92 by visually examining electron microscope photographs of grids exposed to the containment atmosphere at 1960 s after start of sodium spray. The method for calculating the MMD from EM photographs was described in a previous report.⁽¹⁾

Some agglomerates may have been erroneously counted as single particles, which would bias the measurement toward larger sizes. It is concluded that the test plan value of 0.5 μm MMD and 2.0 σ_g are reasonable estimates for the source particle size distribution.

4.5.2 Sodium Iodide Aerosol Source

4.5.2.1 NaI Source Timing

Operation of the NaI aerosol generation system is described in Section 4.3. The NaI source period started at time zero (t_0) and ended 3000 s later.

4.5.2.2 NaI Source Release Rate

As discussed in Section 4.3, the average rate of NaI release to the containment atmosphere was 0.14 ± 0.028 g/s. The total released mass of NaI during the 3000-s source period was 416 g.

4.5.2.3 NaI Source Particle Size

Three cascade impactor samples of the containment atmosphere were taken during the 600-s period when only NaI aerosol was being released. Agglomeration after release to the CV is believed to be negligible due to the dilute concentration. The results of the impactor measurements are given in Table 4-5 and in Appendix D, Tables D-26 through D-28.

TABLE 4-5
CASCADE IMPACTOR MEASUREMENTS OF NaI AEROSOL

<u>Sample No.</u>	<u>Time (s)</u>	<u>Impactor Type</u>	<u>AMMD (μm)</u>	<u>σ_g</u>
T3I1	135	Andersen 8-stage	1.08	1.48
T3I2	345	Andersen 8-stage	1.08	1.50
T3I3	570	Sierra 8-stage	<u>0.96</u>	<u>1.66</u>
Average			1.04	1.55

Based on the data of Table 4-5, the aerodynamic mass median diameter (AMMD) of the NaI source was 1.04 μm and the geometric standard deviation (σ_g) was 1.55. Information regarding the extent of agglomeration of the NaI source particles as determined from electron microscopy was inconclusive. Although the electron microscope photographs indicate single spherical particles, there is some indication that vaporization and particle distortion may have occurred in the electron beam. For the purpose of code input, it is suggested that the source be considered to be spherical singlets with a material density of 3.67 g/cm^3 . Thus, $d_{50} = (1.04)/(3.67)^{0.5} = 0.543 \text{ } \mu\text{m}$, and $r_{50} = 0.272 \text{ } \mu\text{m}$, with $\sigma_g = 1.55$.

4.6 AEROSOL SUSPENDED MASS CONCENTRATION

4.6.1 Mixing in the Containment Atmosphere

The containment atmosphere was not well mixed during the source periods in test AB6. Two distinct cells formed, in each of which the concentration was uniform. The two-cell concept is illustrated in Figure 4-13. The larger cell was located at elevations above the sodium spray nozzle and included aerosol sample locations T1, T2, T3, C1, C2, C3 and C4. (Refer to Table 3-5 for coordinates of the sample locations.) A smaller cell was located at elevations below the sodium spray nozzle and included aerosol sample locations T4, C5 and C6. It is thought that the upper region was stirred by

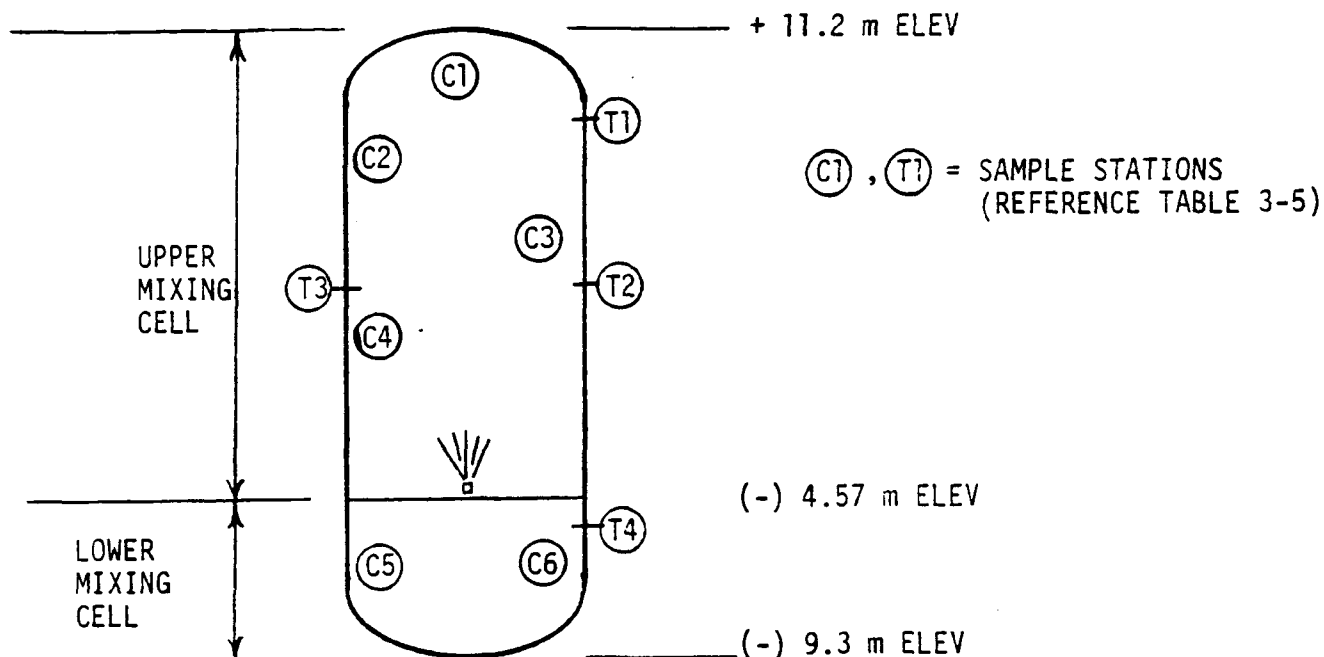


FIGURE 4-13. Schematic Diagram of Two Mixing Cells in Containment Atmosphere.

buoyancy effects induced by heating of the atmosphere in a localized region near the sodium spray nozzle. The temperature isotherms shown in Figures 4-6 through 4-9 show this effect. The colder, more dense air in the bottom zone had no driving force to mix with the hotter upper zone.

The two-cell effect was not observed in previous experiments where the heat source was located at the bottom of the vessel^(17,18) or in a spray test (AB5) where the sodium spray nozzle was at the same elevation as in test AB6 but where the sodium spray rate was six times greater.⁽¹⁾ It is believed that the energy release rate in test AB5 was sufficiently great to induce convection currents capable of entraining air from the lower region of the vessel, while the lower energy release rate in test AB6 was insufficient to mix the two cells.

After the end of the source periods, the suspended concentrations of the two cells slowly approached each other until the concentration in the entire vessel was uniform at times later than $\sim 10^4$ seconds.

The suspended concentrations in the two mixing cells are plotted as a function of time in Figures 4-14 and 4-15 for sodium and NaI, respectively. The same data are presented in digital format in Table 4-6. The reader should note that the suspended concentration of aerosol sodium content, expressed as g Na/m³ rather than NaO_x, is shown in Figure 4-14 and Table 4-6. The appropriate gravimetric factor should be applied to obtain NaO_x data (see Table 4-7).

4.6.2 NaO_x Suspended Concentration

The volume of the upper mixing cell shown in Figure 4-13 was 670 m³, while that of the lower cell was 182 m³. A weighted average NaO_x concentration for the entire containment vessel volume was computed according to Equation (1).

$$\bar{C}_{\text{total}} = 0.786 \bar{C}_{\text{upper}} + 0.214 \bar{C}_{\text{lower}} \quad (1)$$

where:

$\bar{C}_{\text{total}}$ = weighted average concentration for entire volume,

$\bar{C}_{\text{upper}}$ = average concentration in upper cell, and

$\bar{C}_{\text{lower}}$ = average concentration in lower cell.

The physical meaning of the weighted average concept is questionable. However, because all of the aerosol computer codes being assessed in the ABCOVE program assume a single well-mixed volume, Equation (1) was used to calculate a corresponding concentration for the purpose of comparing experimental

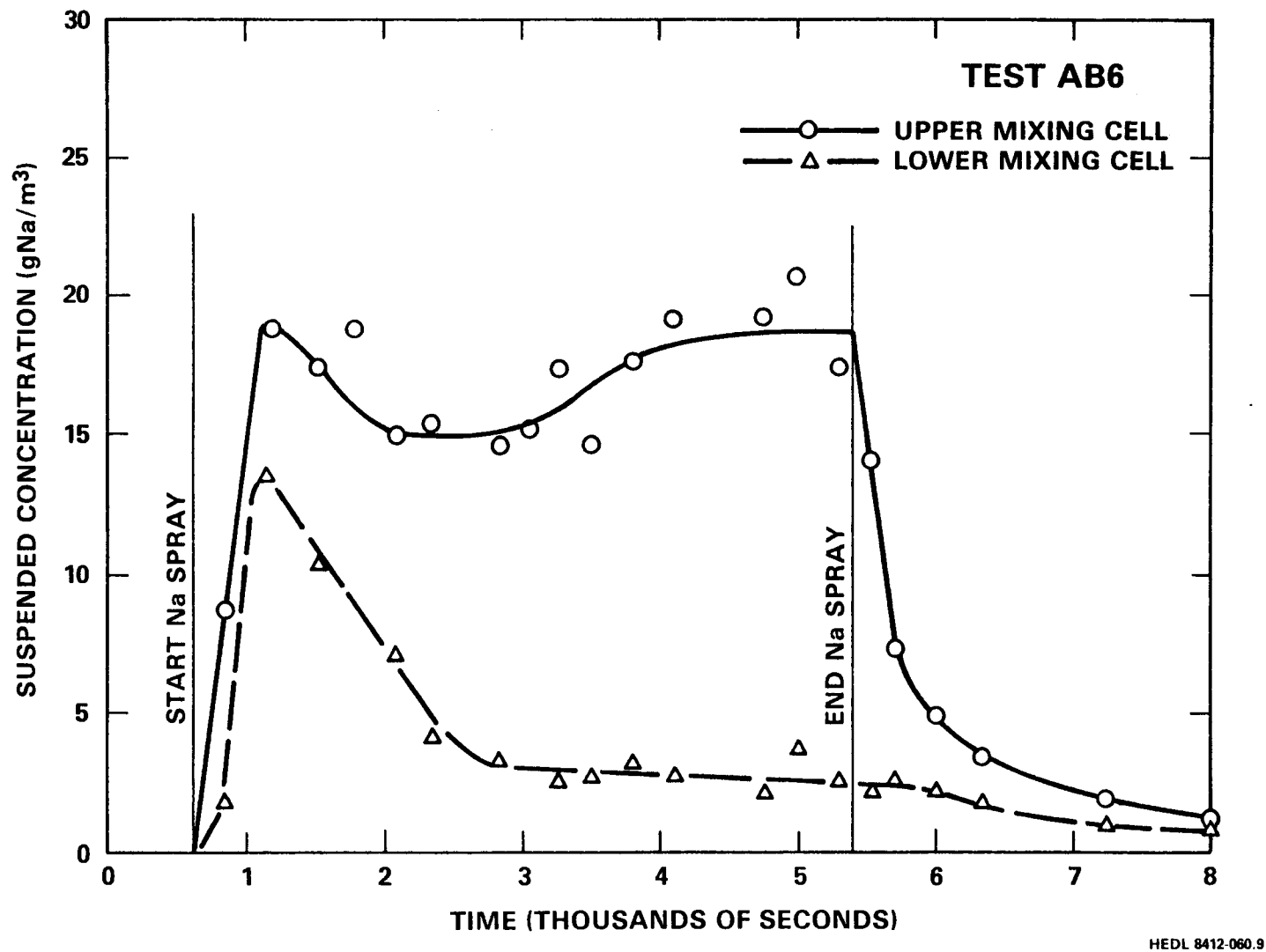
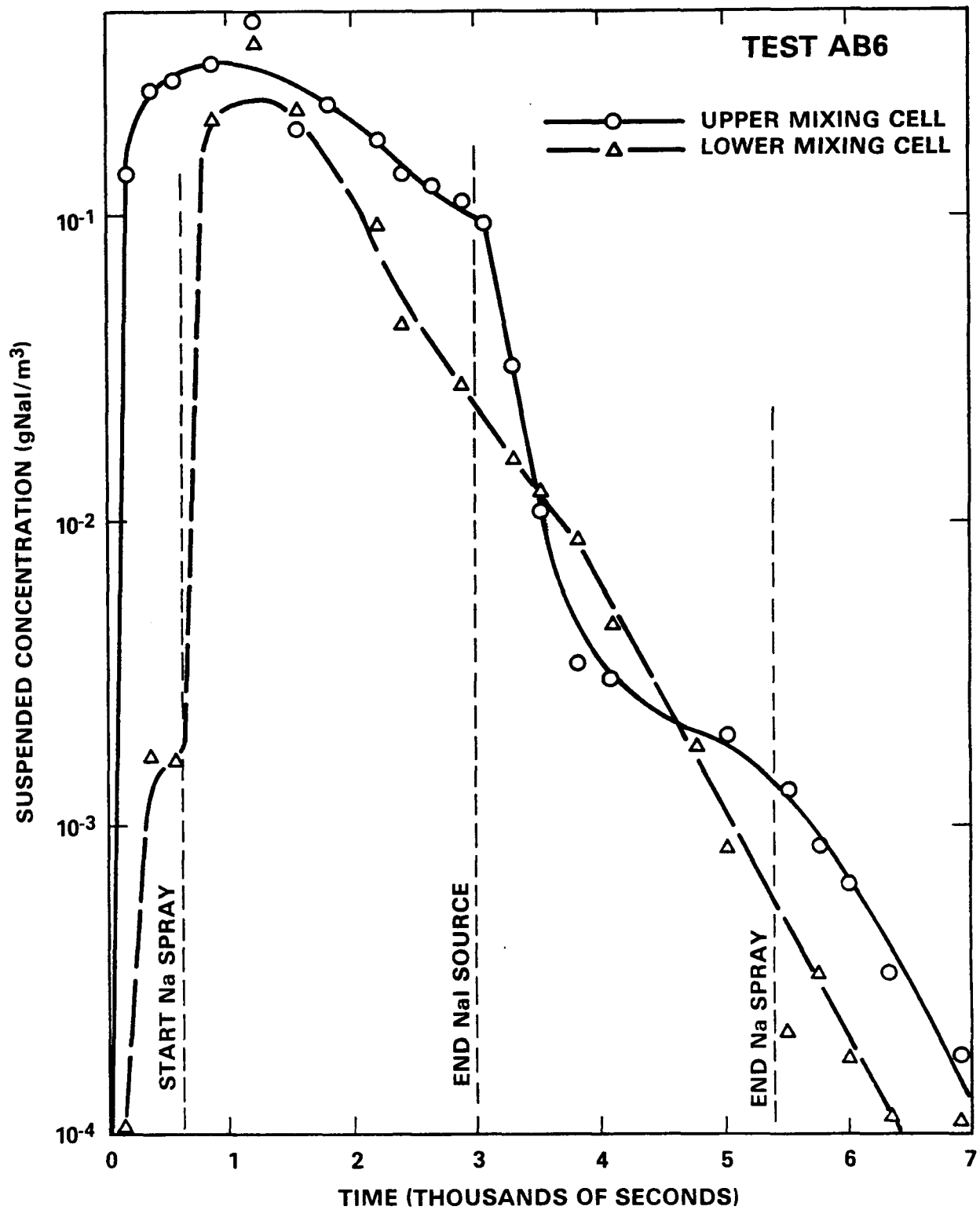


FIGURE 4-14. Suspended Sodium Concentration in Two Mixing Cells.



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FIGURE 4-15. Suspended NaI Concentration in Two Mixing Cells.

TABLE 4-6

SUSPENDED CONCENTRATIONS IN UPPER AND LOWER MIXING CELLS

Time (sec)	Suspended Na Concentration (g Na/m ³) (e)				Suspended NaI Concentration (g NaI/m ³) (e)			
	Upper Zone(a)		Lower Zone(b)		Upper Zone(a)		Lower Zone(b)	
	Avg	σ	Avg	σ	Avg	σ	Avg	σ
1.50(2)(c)	(d)	(d)	(d)	(d)	1.36(-1)	9.30(-2)	9.38(-5)	---
3.45(2)	(d)	(d)	(d)	(d)	2.69(-1)	7.35(-2)	1.70(-3)	---
5.40(2)	(d)	(d)	(d)	(d)	2.89(-1)	9.20(-2)	1.62(-3)	1.42(-3)
8.55(2)	8.86(0)	1.59(0)	1.69(0)	1.33(0)	3.29(-1)	1.02(-1)	2.08(-1)	1.11(-2)
1.16(3)	1.89(1)	---	1.35(1)	---	4.68(-1)	---	3.95(-1)	---
1.52(3)	1.74(1)	1.90(0)	1.04(1)	4.35(0)	1.95(-1)	5.13(-2)	2.26(-1)	3.95(-2)
1.78(3)	1.89(1)	---	---	---	2.37(-1)	---	---	---
2.11(3)	1.49(1)	1.98(0)	7.11(0)	---	1.76(-1)	1.77(-2)	9.06(-2)	---
2.36(3)	1.54(1)	3.99(0)	4.07(0)	2.12(0)	1.35(-1)	5.66(-2)	4.30(-2)	1.77(-2)
2.83(3)	1.47(1)	3.48(0)	3.22(0)	1.36(0)	1.11(-1)	4.26(-2)	2.76(-2)	9.40(-3)
3.08(3)	1.51(1)	5.66(-1)	---	---	9.18(-2)	1.15(-2)	---	---
3.28(3)	1.73(1)	1.04(1)	2.50(0)	7.06(-1)	3.13(-2)	4.74(-2)	1.57(-2)	1.54(-3)
3.50(3)	1.45(1)	3.37(0)	2.62(0)	9.34(-1)	1.08(-2)	1.33(-2)	1.26(-2)	2.26(-3)
3.79(3)	1.76(1)	8.48(-1)	3.16(0)	---	3.38(-3)	1.36(-3)	8.56(-3)	---
4.10(3)	1.92(1)	6.36(-1)	2.71(0)	---	3.07(-3)	1.85(-3)	4.58(-3)	---
4.75(3)	1.92(1)	2.88(0)	2.04(0)	9.95(-1)	1.84(-3)	5.79(-4)	1.85(-3)	6.36(-4)
4.99(3)	2.07(1)	1.03(0)	3.79(0)	---	1.98(-3)	6.68(-4)	8.57(-4)	---
5.29(3)	1.73(1)	4.89(0)	2.44(0)	7.27(-1)	2.32(-3)	---	7.79(-4)	---
5.53(3)	1.41(1)	5.20(0)	2.11(0)	2.90(-1)	1.34(-3)	---	2.17(-4)	---
5.77(3)	7.45(0)	---	2.50(0)	---	8.90(-4)	---	3.40(-4)	---
6.03(3)	4.93(0)	5.66(-2)	2.18(0)	---	6.82(-4)	4.36(-4)	1.81(-4)	---
6.33(3)	3.46(0)	1.06(-1)	1.68(0)	---	3.41(-4)	1.56(-5)	1.12(-4)	---
6.99(3)	---	---	---	---	1.80(-4)	1.23(-4)	8.95(-5)	---
7.23(3)	1.98(0)	4.56(-1)	9.79(-1)	1.52(-1)	2.06(-4)	1.58(-4)	2.48(-4)	---
8.19(3)	1.19(0)	7.37(-2)	9.60(-1)	---	1.02(-4)	2.79(-5)	4.64(-5)	---
1.09(4)	5.74(-1)	6.56(-2)	4.66(-1)	---	7.97(-5)	7.57(-5)	4.94(-5)	---
1.21(4)	4.73(-1)	3.45(-2)	3.46(-1)	---	4.35(-5)	1.48(-6)	1.77(-5)	---
1.39(4)	4.05(-1)	1.11(-1)	2.59(-1)	---	8.90(-6)	5.32(-6)	4.71(-6)	---

(a) Average of samples T1, T2, T3, C1, C2, C3 and C4.

(b) Average of samples T4, C5 and C6.

(c) Numbers in parenthesis are exponents of ten.

(d) Not applicable.

(e) m³ at containment conditions.

TABLE 4-6 (Cont'd)

Time (sec)	Suspended Na Concentration (g Na/m ³) ^(e)				Suspended NaI Concentration (g NaI/m ³) ^(e)			
	Upper Zone(a)		Lower Zone(b)		Upper Zone(a)		Lower Zone(b)	
	Avg	σ	Avg	σ	Avg	σ	Avg	σ
1.54(4)	2.93(-1)	9.45(-3)	2.14(-1)	---	1.47(-5)	1.78(-5)	9.41(-6)	---
1.58(4)	2.84(-1)	3.53(-3)	1.97(-1)	---	9.08(-6)	2.29(-6)	7.06(-6)	---
1.61(4)	2.73(-1)	1.34(-2)	1.95(-1)	---	1.20(-5)	1.34(-5)	2.35(-6)	---
1.81(4)	2.30(-1)	4.01(-2)	1.20(-1)	---	5.68(-6)	1.95(-6)	<1(-6)	---
2.09(4)(c)	1.88(-1)	1.77(-2)	7.88(-2)	---				
2.23(4)	1.47(-1)	1.01(-2)	7.02(-2)	---				
2.60(4)	9.52(-2)	1.46(-2)	5.44(-2)	---	1.39(-6)	4.74(-7)	<1(-6)	---
3.06(4)	8.18(-2)	1.32(-2)	4.31(-2)	---				
3.28(4)	7.37(-2)	2.80(-3)	3.77(-2)	---				
3.70(4)	5.23(-2)	1.97(-3)	2.93(-2)	---				
4.16(4)	4.51(-2)	5.02(-3)	2.36(-2)	---				
4.59(4)	2.87(-2)	1.41(-3)	---	---				
5.19(4)	2.48(-2)	2.97(-3)	1.36(-2)	---				
5.37(4)	2.09(-2)	2.92(-3)	1.11(-2)	---				
5.86(4)	1.67(-2)	1.80(-3)	1.09(-2)	---				
6.51(4)	1.80(-2)	6.08(-3)	7.78(-3)	---				
7.11(4)	1.13(-2)	4.97(-3)	7.73(-3)	---				
7.75(4)	6.51(-3)	---	---	---				
8.46(4)	4.92(-3)	1.44(-4)	4.49(-3)	---				
9.12(4)	3.61(-3)	2.62(-4)	3.69(-3)	---				
1.04(5)	2.32(-3)	8.48(-5)	2.28(-3)	---				
1.72(5)	3.98(-4)	2.62(-5)	3.67(-4)	---				
1.87(5)	2.73(-4)	7.78(-6)	3.46(-4)	---				
2.58(5)	8.43(-5)	3.75(-6)	9.58(-5)	---				

(a) Average of samples T1, T2, T3, C1, C2, C3 and C4.

(b) Average of samples T4, C5 and C6.

(c) Numbers in parenthesis are exponents of ten.

(d) Not applicable.

(e) m³ at containment conditions.

TABLE 4-7

SUSPENDED NaO_x MASS CONCENTRATION - TEST AB6

Time (sec)	Na Concentration (g Na/m ³) (g)			Na Mass(d) Fraction	Weighted Average NaO _x Conc. + 1σ
	Upper Zone(a)	Lower Zone(b)	Weighted Average(c)		(g NaO _x /m ³) (g)
8.55(2)(e)	8.66(0)(f)	1.69(0)	7.33(0)	0.480	1.53(1) + 4.33(0)
1.16(3)	1.89(1)	1.35(1)	1.77(1)	0.526	3.37(1) + 1.01(1)
1.52(3)(e)	1.74(1)	1.04(1)	1.59(1)	0.547	2.91(1) + 4.80(0)
1.76(3)	1.89(1)			0.551	
2.12(3)	1.49(1)	7.11(0)	1.32(1)	0.556	2.37(1) + 7.11(0)
2.36(3)(e)	1.54(1)	4.07(0)	1.30(1)	0.557	2.33(1) + 6.57(0)
2.84(3)(e)	1.47(1)	3.22(0)	1.22(1)	0.555	2.20(1) + 5.46(0)
3.08(3)	1.51(1)			0.553	
3.28(3)(e)	1.73(1)	2.50(0)	1.41(1)	0.551	2.56(1) + 1.51(1)
3.50(3)(e)	1.45(1)	2.62(0)	1.20(1)	0.551	2.18(1) + 5.17(0)
3.79(3)	1.76(1)	3.16(0)	1.45(1)	0.550	2.64(1) + 5.28(0)
4.09(3)	1.92(1)	2.71(0)	1.57(1)	0.548	2.86(1) + 5.72(0)
4.75(3)(e)	1.92(1)	2.04(0)	1.52(1)	0.542	2.80(1) + 4.56(0)
4.99(3)	2.07(1)	3.97(0)	1.71(1)	0.538	3.18(1) + 6.36(0)
5.29(3)(e)	1.73(1)	2.44(0)	1.41(1)	9.536	2.63(1) + 7.47(0)
5.54(3)(e)	1.41(1)	2.11(0)	1.15(1)	0.532	2.16(1) + 7.80(0)
5.78(3)	7.45(0)	2.50(0)	6.39(0)	0.530	1.21(1) + 2.42(0)
6.03(3)	4.93(0)	2.18(0)	4.34(0)	0.529	8.20(0) + 1.64(0)
6.33(3)	3.46(0)	1.68(0)	3.08(0)	0.527	5.84(0) + 1.17(0)
7.23(3)(e)	1.98(0)	9.79(-1)	1.77(0)	0.521	3.40(0) + 7.51(-1)
8.19(3)	1.19(0)	9.60(-1)	1.14(0)	0.519	2.2(0) + 4.40(-1)
9.79(3)	7.07(-1)			0.513	
1.09(4)	5.74(-1)	4.66(-1)	5.51(-1)	0.510	1.08(0) + 2.16(-1)
1.21(4)	4.73(-1)	3.46(-1)	4.46(-1)	0.508	8.78(-1) + 1.76(-1)

(a) Upper zone samples were T1, T2, T3, C1, C2, C3, C4.

(b) Lower zone samples were T5, C5, C6.

(c) Weighted average = 0.786 (Upper Zone) + 0.214 (Lower Zone).

(d) From Figure 4-12.

(e) Average of cluster and through-the-wall samples.

(f) Numbers in parenthesis are exponents of ten.

(g) m³ at containment conditions.

TABLE 4-7 (Cont'd)

Time (sec)	Na Concentration (g Na/m ³) (g)			Na Mass(d) Fraction	Weighted Average NaO _x Conc. + 1σ
	Upper Zone(a)	Lower Zone(b)	Weighted Average(c)		(g NaO _x /m ³) (g)
1.39(4)	4.05(-1)	2.59(-1)	3.67(-1)	0.505	7.27(-1) + 1.45(-1)
1.54(4)	2.93(-1)	2.14(-1)	2.78(-1)	0.503	5.53(-1) + 1.11(-1)
1.58(4)	2.84(-1)	1.97(-1)	2.65(-1)	0.502	5.28(-1) + 1.05(-1)
1.61(4)	2.73(-1)	1.95(-1)	2.56(-1)	0.502	5.10(-1) + 1.02(-1)
1.81(4)	2.30(-1)	1.20(-1)	2.06(-1)	0.500	4.12(-1) + 8.24(-2)
2.04(4)	1.88(-1)	7.88(-2)	1.65(-1)	0.498	3.31(-1) + 6.62(-2)
2.23(4)	1.47(-1)	7.02(-2)	1.31(-1)	0.497	2.64(-1) + 5.28(-2)
2.60(4)	9.52(-2)	5.44(-2)	8.65(-2)	0.495	1.75(-1) + 3.50(-2)
3.06(4)	8.18(-2)	4.31(-2)	7.35(-2)	0.492	1.49(-1) + 3.05(-2)
3.28(4)	7.37(-2)	3.77(-2)	6.60(-2)	0.492	1.34(-1) + 2.10(-2)
3.70(4)	5.23(-2)	2.93(-2)	4.74(-2)	0.491	9.65(-2) + 1.45(-2)
4.16(4)	4.51(-2)	2.36(-2)	3.54(-2)	0.490	7.22(-2) + 1.10(-2)
4.59(4)	2.87(-2)			0.489	
5.19(4)	2.48(-2)	1.36(-2)	2.24(-2)	0.488	4.59(-2) + 6.90(-3)
5.37(4)	2.09(-2)	1.11(-2)	1.88(-2)	0.487	3.86(-2) + 5.81(-3)
5.86(4)	1.67(-2)	1.09(-2)	1.55(-2)	0.487	3.18(-2) + 4.82(-3)
6.51(4)	1.80(-2)	7.78(-3)	1.58(-2)	0.486	3.25(-2) + 9.85(-3)
7.11(4)	1.13(-2)	7.73(-3)	1.06(-2)	0.485	2.19(-2) + 8.76(-3)
8.46(4)	4.92(-3)	4.49(-3)	4.83(-3)	0.483	1.00(-2) + 1.50(-3)
9.12(4)	3.61(-3)	3.69(-3)	3.63(-3)	0.482	7.53(-3) + 7.52(-4)
1.04(5)	2.32(-3)	2.28(-3)	2.31(-3)	0.482	4.79(-3) + 4.82(-4)
1.72(5)	3.98(-4)	3.67(-4)	3.91(-4)	0.480	8.15(-4) + 8.15(-5)
1.87(5)	2.73(-4)	3.46(-4)	2.89(-4)	0.479	6.03(-4) + 6.03(-5)
2.58(5)	8.43(-5)	9.58(-5)	8.68(-5)	0.477	1.82(-4) + 1.82(-5)

(a) Upper zone samples were T1, T2, T3, C1, C2, C3, C4.

(b) Lower zone samples were T5, C5, C6.

(c) Weighted average = 0.786 (Upper Zone) + 0.214 (Lower Zone).

(d) From Figure 4-12.

(e) Average of cluster and through-the-wall samples.

(f) Numbers in parenthesis are exponents of ten.

(g) m³ at containment conditions.

results with code predictions. The weighted average concentration of NaO_x is listed in the last column of Table 4-7. Inspection of the data in Table 4-7 shows that the weighted average concentration varied less than 20% from the upper cell concentration.

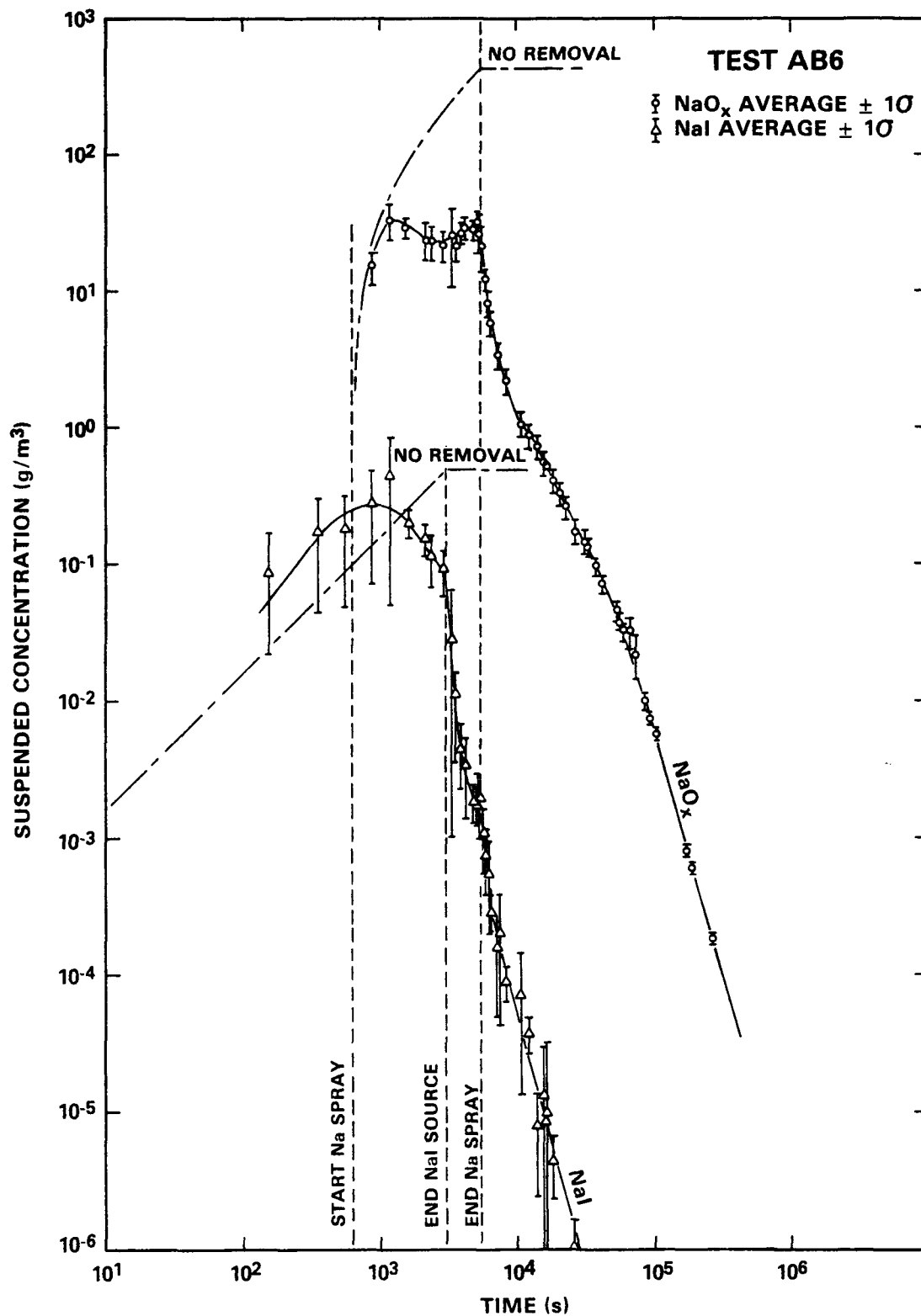
The weighted average suspended concentration of NaO_x is plotted versus time in Figure 4-16. The standard error (1σ) listed in Table 4-7 and shown for each point in Figure 4-16 is somewhat larger than in previous CSTF tests, due to the uncertainty introduced by the presence of two mixing cells in test AB6. Errors in the determination of the average suspended mass concentration result from two causes.⁽¹⁵⁾ The first is inherent error in individual measurements and the second is variation of concentration at different locations within the containment atmosphere. The error bands listed in Table 4-7 and shown in Figure 4-16 are our best judgement of the combined error.

Most of the points shown in Figure 4-16 were obtained by averaging the through-the-wall samples. Eleven of the points were obtained by averaging the in-containment filter cluster samples and the through-the-wall samples taken at the same time. These eleven points are denoted by a footnote in Table 4-7. Good agreement was obtained between the two types of samples.

The NaO_x concentration rapidly increased to a maximum value of 33 g/m^3 at 1200 seconds (10 minutes after start of Na spray). It then slowly decreased to a value of 23 g/m^3 and then increased to 28.0 g/m^3 at the end of the spray period. After the NaO_x source cutoff, the concentration decreased rapidly, attaining a value of 10 g/m^3 at 100 minutes and 10^{-3} g/m^3 at 44 h.

4.6.3 NaI Suspended Concentration

The nonuniform mixing problem was observed for NaI aerosol as well as for NaO_x , as shown in Table 4-6 and Figure 4-15. In fact, it appears that the size of the lower mixing cell was larger for the first few minutes when only



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FIGURE 4-16. Suspended Mass Concentrations of NaO_x and NaI as a Function of Time.

NaI aerosol was being released. This is reasonable, because the NaI release point was at a higher elevation than the sodium spray nozzle. After the heat generated by the sodium spray had established good mixing in the upper cell, the NaI concentration was fairly uniform throughout the upper cell. The weighted average concentration of NaI was calculated by Equation (1) for times greater than 10^3 s. For times $<10^3$ s, Equation (2) was used.

$$\bar{C}_{\text{total}} = 0.645 \bar{C}_{\text{upper}} + 0.355 \bar{C}_{\text{lower}} \quad (2)$$

The coefficients in Equation (2) are based on the assumption that the plane dividing the two mixing zones was at the elevation of the NaI release pipe (-1.9 m).

The weighted average NaI concentrations and standard errors are listed in Table 4-8 for each sampling time. Large uncertainties are reported, caused chiefly by poor mixing. The weighted average concentration of NaI is plotted as a function of time in Figure 4-16. A curve representing the theoretical concentration for no removal is also shown in the figure.

Figure 4-16 shows that samples taken at early times ($t < 10^3$ s) gave concentrations that were significantly above the theory curve. This behavior can be explained by two reasons. First, the initial release rate may have been higher than accounted for. Second, poor mixing during the early time period may have caused non-representative sampling. The latter reason is more likely. This is not considered to be a serious impairment to the test results because the purpose of releasing NaI prior to the sodium spray was to allow a period with only NaI aerosol so that good cascade impactor samples could be taken. This objective was met.

After the sodium spray had established good mixing in the upper zone, the NaI concentration decreased from a maximum of 0.28 g/m^3 to 0.085 g/m^3 at the end

TABLE 4-8
SUSPENDED NaI MASS CONCENTRATION - TEST AB6

Time (sec)	Suspended Concentration (g NaI/m ³)(e)		
	Upper Zone (a)	Lower Zone (b)	Weighted Average + 1 σ (c)
1.50(2)(d)	1.36(-1)	9.38(-5)	8.78(-2) $\pm$ 8.8(-2)
3.45(2)	2.69(-1))	1.70(-3)	1.74(-1) $\pm$ 1.3(-1)
5.40(2)	2.89(-1)	1.62(-3)	1.87(-1) $\pm$ 1.4(-1)
8.55(2)	3.29(-1)	2.08(-1)	2.86(-1) $\pm$ 2.14(-1)
1.16(3)	4.68(-1)	3.95(-1)	4.52(-1) $\pm$ 4.0(-1)
1.52(3)	1.95(-1)	2.26(-1)	2.02(-1) $\pm$ 4.88(-2)
1.78(3)	2.37(-1)	---	---
2.11(3)	1.76(-1)	9.06(-2)	1.58(-1) ---
2.36(3)	1.35(-1)	4.30(-2)	1.15(-1) $\pm$ 4.83(-2)
2.83(3)	1.11(-1)	2.76(-2)	9.32(-2) $\pm$ 3.55(-2)
3.08(3)	9.18(-2)	---	---
3.28(3)	3.13(-2)	1.57(-2)	2.80(-2) $\pm$ 3.76(-2)
3.50(3)	1.08(-2)	1.26(-2)	1.12(-2) $\pm$ 1.09(-2)
3.79(3)	3.38(-3)	8.56(-3)	4.49(-3) $\pm$ 2.24(-3)
4.10(3)	3.07(-3)	4.58(-3)	3.39(-3) $\pm$ 2.03(-3)
4.75(3)	1.84(-3)	1.85(-3)	1.84(-3) $\pm$ 5.91(-4)
4.99(3)	1.98(-3)	8.57(-4)	1.74(-3) $\pm$ 6.10(-4)
5.29(3)	2.32(-3)	7.79(-4)	1.99(-3) $\pm$ 9.95(-4)
5.53(3)	1.34(-3)	2.17(-4)	1.10(-3) $\pm$ 5.50(-4)
5.77(3)	8.90(-4)	3.40(-4)	7.72(-4) $\pm$ 3.86(-4)
6.03(3)	6.82(-4)	1.81(-4)	5.75(-4) $\pm$ 3.74(-4)
6.33(3)	3.41(-4)	1.12(-4)	2.92(-4) $\pm$ 8.70(-5)
6.99(3)	1.80(-4)	8.95(-5)	1.61(-4) $\pm$ 1.12(-4)
7.23(3)	2.06(-4)	2.48(-4)	2.15(-4) $\pm$ 1.72 (-4)

(a) At $t < 10^3$ s, upper zone is top 550 m³ volume of containment.

At $t > 10^3$ s, upper zone is top 670 m³ volume of containment.

(b) At $t < 10^3$ s, lower zone is bottom 302 m³ volume of containment. At $t > 10^3$ s, lower zone is bottom 182 m³ volume of containment.

(c) At $t < 10^3$ s, weighted average = 0.645 (upper core) + 0.355 (lower core).

At $t > 10^3$ s, weighted average = 0.786 (upper core) + 0.214 (lower core).

(d) Numbers in parenthesis are exponents of ten.

(e) m³ at containment conditions.

TABLE 4-8 (Cont'd)

Time (sec)	Suspended Concentration (g NaI/m ³) ^(e)		
	Upper ^(a) Zone	Lower ^(b) Zone	Weighted Average + 1 σ ^(c)
8.19(3)	1.02(-4)	4.64(-5)	9.01(-5) + 2.70(-5)
1.09(4)	7.97(-5)	4.94(-5)	7.32(-5) + 7.32(-5)
1.21(4)	4.35(-5)	1.77(-5)	3.79(-5) + 1.15(-5)
1.39(4)	8.90(-6)	4.71(-6)	8.00(-6) + 5.60(-6)
1.54(4)	1.47(-5)	9.41(-6)	1.36(-5) + 1.75(-5)
1.58(4)	9.08(-6)	7.06(-6)	8.63(-6) + 4.31(-6)
1.61(4)	1.20(-5)	2.35(-6)	9.93(-6) + 1.19(-5)
1.81(4)	5.68(-6)	<1(-6)	1.09(-6) + 2.2(-6)
2.60(4)	1.39(-6)	<1(-6)	1.09(-6) + 5.5(-7)

(a) At $t < 10^3$ s, upper zone is top 550 m³ volume of containment.

At $t > 10^3$ s, upper zone is top 670 m³ volume of containment.

(b) At $t < 10^3$ s, lower zone is bottom 302 m³ volume of containment. At $t > 10^3$ s, lower zone is bottom 182 m³ volume of containment.

(c) At $t < 10^3$ s, weighted average = 0.645 (upper core) + 0.355 (lower core).

At $t > 10^3$ s, weighted average = 0.786 (upper core) + 0.214 (lower core).

(d) Numbers in parenthesis are exponents of ten.

(e) m³ at containment conditions.

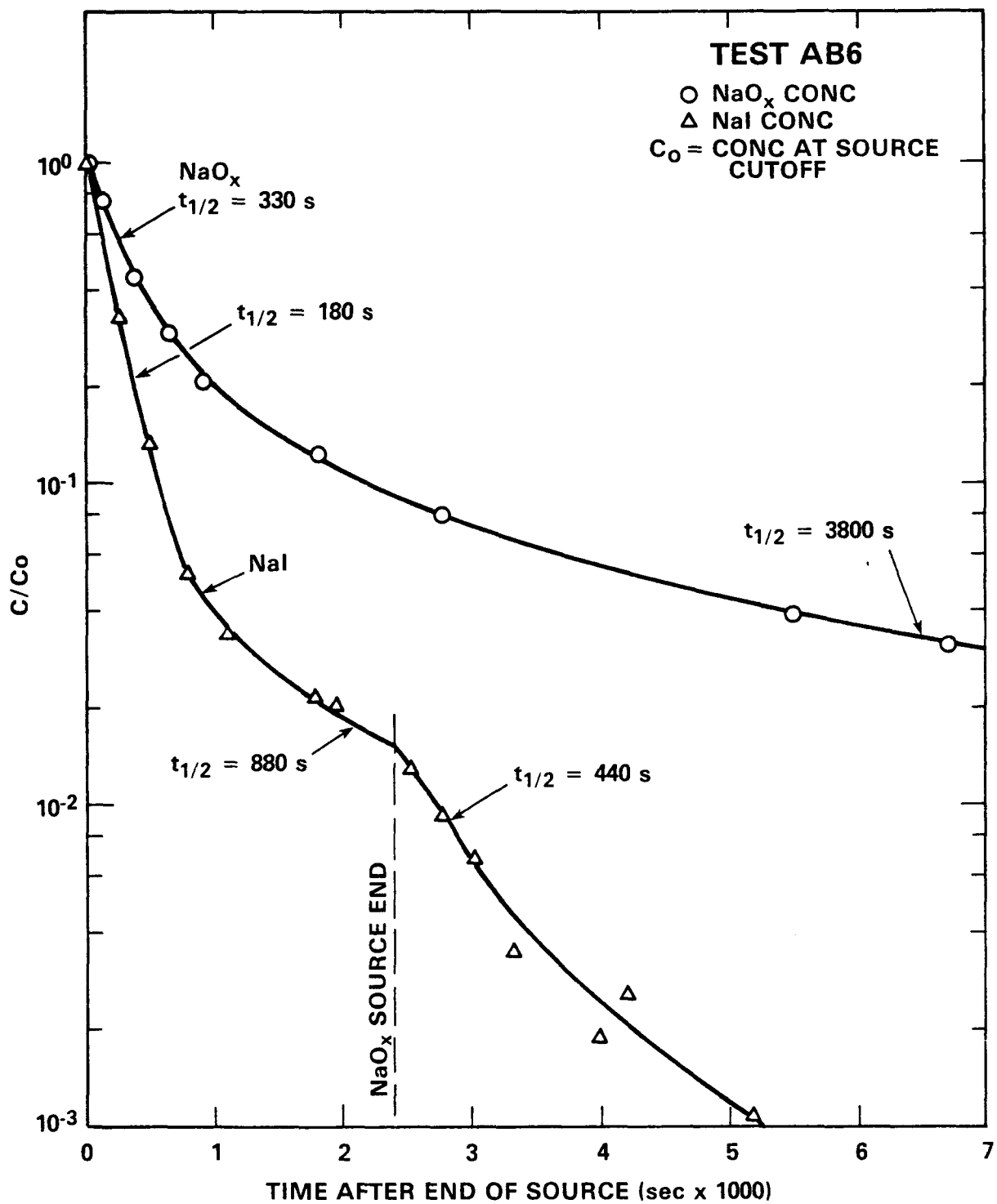
of the NaI source period. Immediately after the source cutoff, the concentration decreased very rapidly, until a value of 0.0012 g/m^3 was reached at the end of the sodium spray period, and a value of $1 \times 10^{-6} \text{ g/m}^3$ at 7 hours.

4.6.4 Comparison of NaO_x and NaI Concentrations After Source Cutoffs

The rates of decay of suspended mass concentration after the source cutoffs are plotted on semilog paper in Figure 4-17. In order to make a comparison of the NaO_x and NaI decay rates, the dimensionless concentrations are used, where C_0 is the concentration at the end of the respective source period, and the abscissa is the time after the respective source cutoff.

The slopes of the curves in Figure 4-17 reveal several important facts regarding the suspended aerosol behavior. First, the rates of decay decrease with time for both species. This is caused by the fact that the settling mean diameter becomes smaller with time as the agglomeration rate slows. A second observation is that the initial rate of decay for NaI is significantly greater than that of NaO_x . This behavior can be explained as follows. The dominant removal mechanism is settling by gravity. For NaO_x , the settling rate is established by the steady-state size distribution attained during the source period, which includes small source particles. After the source cutoff, the largest NaO_x particles settle to surfaces faster than the smaller ones agglomerate, so that the size distribution becomes smaller and the settling rate slows with time. However, for NaI, the source ended while the NaO_x source continued at constant rate. The NaI particles agglomerated with the much more abundant NaO_x particles, causing a rapid shift of the NaI size distribution to larger sizes. The larger sized particles did not diminish because they were replaced by agglomeration of smaller NaO_x particles.

A third observation seen in Figure 4-17 is the inflection in the NaI curve at the time of NaO_x source cutoff. The NaI concentration decayed at a significantly greater rate immediately after the NaO_x source cutoff than



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FIGURE 4-17. Comparison of NaO_x and NaI Concentration Decay Rates After Source Cutoff.

just before NaO_x cutoff. This behavior was not expected by the authors. A possible explanation is that a small amount of previously deposited material was resuspended by convection currents during the sodium fire, which served as a weak source of NaI. After the fire was over, the convection currents diminished and resuspension was negligible. No direct measurement of resuspension was made to confirm this hypothesis. However, post-test inspection of the deposit on the vertical walls showed that the deposited material was easily dislodged and that the deposit thickness on horizontal floor surfaces was thicker near vertical walls than at distances far from the walls. Although resuspension, if present at all, played only a minor role in the aerosol behavior and leakage to the environs, it is a mechanism that needs more study.

4.7 AEROSOL DEPOSITION ON FLOORS AND WALLS

4.7.1 Deposition on Vertical Walls and Ceiling

Aerosol deposition on the containment vessel walls and ceiling were measured post-test by wiping a measured area of the painted wall with a series of damp cloths and analyzing for sodium. The results of sampling in this manner at seven different locations are listed in Table 4-9 for Na and NaI. Two samples stand out from the others in Table 4-9. Sample W1, taken from the top dome (ceiling), was approximately half of those taken from the main vertical wall. This is similar to the measurements made for test AB5.⁽¹⁾

Sample W8, taken from the vertical wall near the bottom head (elevation -6.4 m) gave very low surface concentrations for both Na and NaI. The low W8 measurement agreed with the visual observation that the wall deposit at elevations below approximately -3 m was definitely much thinner than at higher elevations. Figure 4-18 is a close-up view of the deposit on the vertical wall of the CSTF vessel at an elevation of +0.5 m. The deposit thickness at this location ranged from 2 to 4 mm, averaging 2.5 mm. The surface of the deposit was rippled, as is clearly shown by Figure 4-18. The thickness of deposit at low elevations was too thin for direct measurement.

TABLE 4-9
WALL AND CEILING POST-TEST SURFACE CONCENTRATIONS

Sample No.	Wall Elevation (m)	Sample Area (m ²)(a)	Na		NaI		Mass Ratio Na/NaI
			Mass Sampled (g Na)	Surface Conc. (g Na/m ²)	Mass Sampled (g NaI)	Surface Conc. (g NaI/m ²)	
W1	Ceiling	0.0930	1.13	12.2	0.00303	0.0326	374
W2	+9.1	0.0930	4.98	53.5	0.0158	0.170	314
W3	+7.0	0.0930	2.30	24.7	0.00695	0.0747	331
W4	+4.3	0.0930	2.77	29.8	0.00644	0.0692	431
W5	+1.8	0.0930	2.18	23.4	0.00982	0.1056	222
W7	-3.7	0.0930	2.00	21.5	0.00686	0.0738	291
W8	-6.4	0.0930	0.0768	0.83	<0.0003	<0.003	>256
Average (all samples) $\pm \sigma$				23.7 $\pm$ 16.3		0.0753 $\pm$ 0.0536	327 $\pm$ 71(b)
Average wall $\pm \sigma$				25.6 $\pm$ 16.9		0.0824 $\pm$ 0.0550	314 $\pm$ 78(b)
Average ceiling				12.2		0.0326	374

(a) Painted wall of CSTF vessel.

(b) Excluding sample W8.



FIGURE 4-18. Close-up View of Aerosol Deposit on Vertical Wall at +1.5 m Elevation. Neg 108558-16cn

4.7.2 Deposition on Horizontal Surfaces

The distribution of settled mass within the containment vessel was determined from analyses of settling trays located at 22 different locations and exposed to the containment atmosphere throughout the test. Each tray had 266 cm^2 of upward facing surface. After the test the trays were retrieved and the deposited material analyzed for Na and NaI. The results are presented in Table 4-10. The individual samples listed in Table 4-10 are arranged into four groups according to their general location within the containment environment. The average surface concentration of each group is then multiplied by the upward facing surface area of that portion of the containment vessel. By this method, a total of 159.8 kg of Na were found to have settled to horizontal surfaces. Dividing this mass by the total settling area of 88.1 m^2 gives a weighted mean surface concentration of 1813 g Na/m^2 . Table 4-10 shows that the settled concentration ranged from a low of 1178 g Na/m^2 for internal structures to a high value of 3437 for the catch pan. This variation shows a similar trend to that found for test AB5, and may indicate a localized high settling rate in the central region under the sodium spray nozzle.

A total of 433.4 g of NaI were found on horizontal surfaces, according to Table 4-10. Dividing by the 88.1-m^2 total settling area gives an average surface concentration of 4.92 g NaI/m^2 . The settled concentration ranged from a low of 2.50 g NaI/m^2 on internal structures to 8.67 g NaI/m^2 for the catch pan.

4.7.3 Comparison of Deposition on Vertical and Horizontal Surfaces

A comparison of aerosol deposition on vertical walls and ceilings with settled mass on horizontal surfaces is given in Table 4-11.

The ratio of settled Na surface concentration to wall plateout concentration was 76, while the same ratio for NaI was 65. The vertical and ceiling plating surface area was 8.85 times greater than the settling area, giving an overall result of 10.0% Na on vertical and ceiling surfaces; 11.6% for NaI.

TABLE 4-10

INTEGRAL SETTLED MASS BY DEPOSITION TRAYS

Sample No.	Location	Area Represented (m ²)	Sodium		NaI	
			Surface Conc. (q Na/m ²)	(kg Na)	Surface Conc. (q NaI/m ²)	(kg NaI)
D50	Personnel Platform at -1.7 m		1130		4.65	
D51	Personnel Platform at -1.7 m		444		1.19	
D52	Personnel Platform at -1.7 m		1333		4.86	
D53	Personnel Platform at -1.7 m		<u>1350</u>		<u>4.56</u>	
Avg Personnel Platform		4.2	1064	4.47	3.82	0.0160
D54	Bottom Head		2436		2.56	
D55	Bottom Head		1496		5.45	
D56	Bottom Head		2109		8.61	
D57	Bottom Head		4361		11.29	
D64	Bottom Head		1117		4.39	
D65	Bottom Head		1170		3.98	
D66	Bottom Head		1508		6.77	
D67	Bottom Head		<u>2029</u>		<u>7.13</u>	
Avg Bottom Head		36.7	2028	74.44	6.27	0.2302
D58	Catch Pan at -8.66 m		6320		---	
D59	Catch Pan at -8.66 m		1710		7.36	
D60	Catch Pan at -8.66 m		1677		6.87	
D61	Catch Pan at -8.66 m		5000		17.20	
D62	Catch Pan at -8.66 m		2962		9.48	
D63	Catch Pan at -8.66 m		<u>2955</u>		<u>2.46</u>	
Avg Catch Pan		11.2	3437	38.50	8.67	0.0972
D68	Internal Components		1248		4.34	
D69	Internal Components		1289		2.18	
D70	Internal Components		1620		2.14	
D71	Internal Components		<u>556</u>		<u>1.34</u>	
Avg Internal Components		36.0	1178	42.41	2.50	0.0900
Overall Total		88.1		159.82		0.4334

TABLE 4-11

COMPARISON OF AEROSOL DEPOSITION ON
HORIZONTAL AND VERTICAL SURFACES^(a)

	Na		NaI	
	Vertical and Ceiling	Upward Facing Horizontal	Vertical and Ceiling	Upward Facing Horizontal
Surface Area (m ²)	753	88.1	753	88.1
Avg Surface Conc. (g/m ²)	23.7 ^(b)	1813	0.0753 ^(b)	4.92
Mass Deposited (kg)	17.85	159.82 ^(c)	0.0567	0.4334 ^(c)
Wt % Deposited	10.0	90.0	11.6	88.4

^(a)Based on post-test sampling.^(b)From Table 4-9.^(c)From Table 4-10.4.8 AEROSOL DEPOSITION ON VERTICAL PANELS

Seven 305 x 305-mm panels were installed in a vertical position in the containment atmosphere as a means of measuring aerosol plating with negligible thermophoretic effect. The panels were fabricated of polished stainless steel, 0.79 mm thick, and were hung by wires at various distances from the vessel wall at the vessel mid-elevation. Six of the panels were oriented with the surface parallel to the containment wall, while one panel was oriented normal to the wall. The panels were exposed to the containment conditions for the entire test period.

Photographs of two of the panels taken six days after time zero are shown in Figures 4-19 and 4-20. The containment vessel had been sealed until an hour before the photographs were made. The deposit on both panels is similar in agreement to the deposit on the vessel walls. Considerably more deposit was found on the panel located parallel to the wall (Figure 4-19) than on the panel oriented normal to the wall (Figure 4-20). The deposit was easily brushed off the surfaces, and some deposited material was lost during handling of the panels.

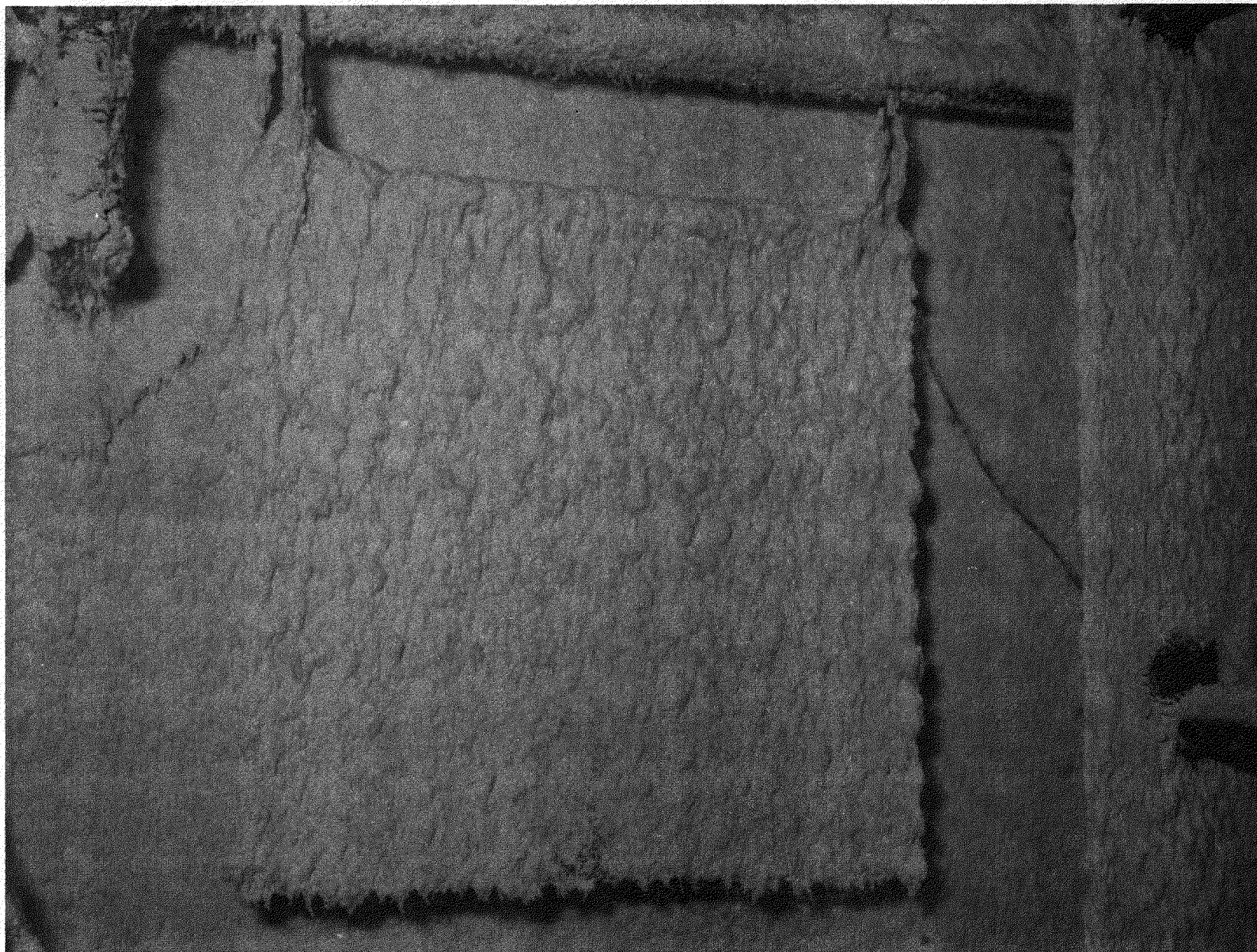


FIGURE 4-19. View of Aerosol Deposit on Vertical Panel VP-3 Located Parallel to Containment Wall.
Neg 108558-17cn

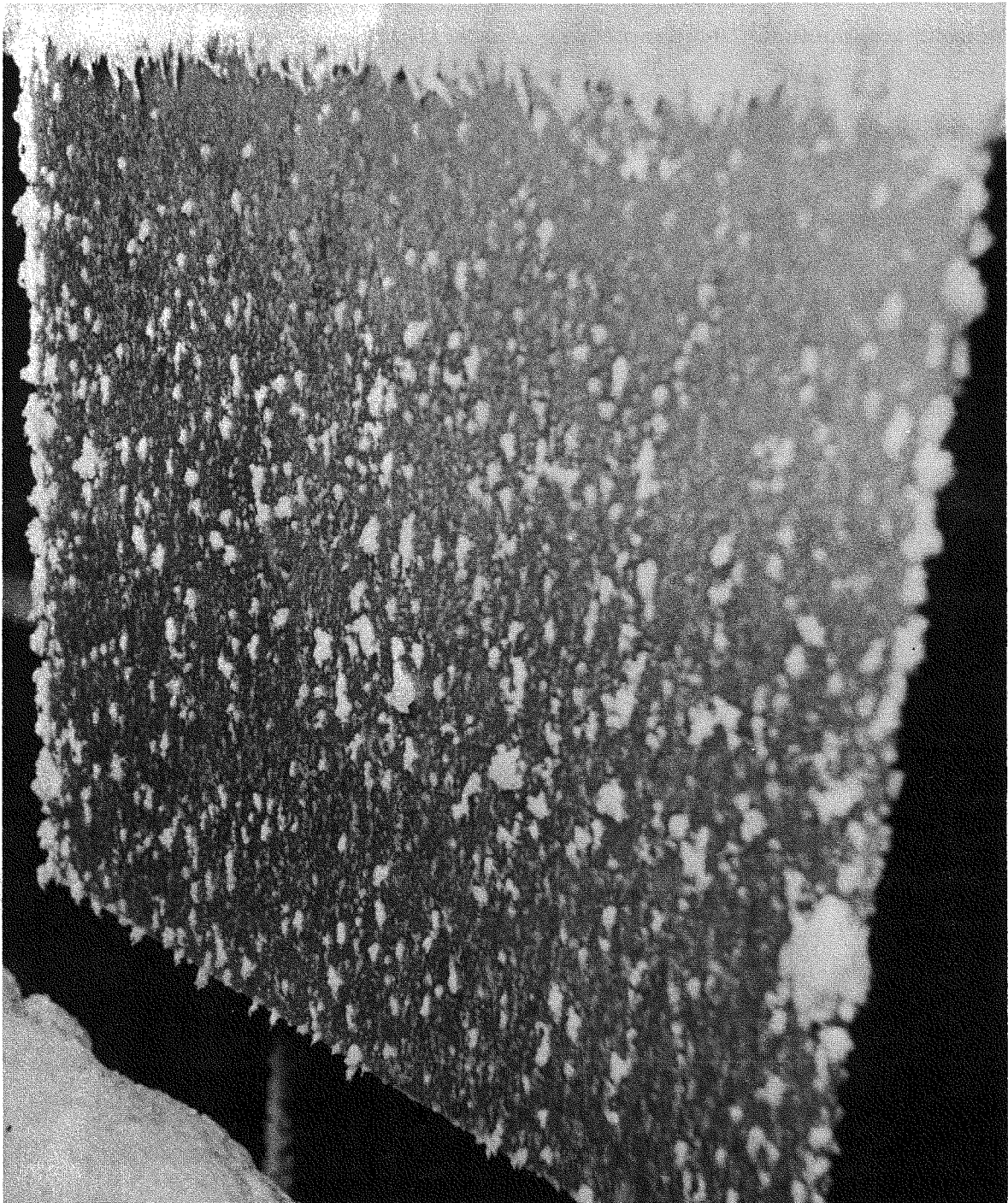


FIGURE 4-20. View of Aerosol Deposit on Vertical Panel VP-7 Located Normal to Containment Wall. Neg 108558-11cn

The aerosol deposit was washed from the panels and the solutions from each side were analyzed for Na and for NaI. The results are given in Table 4-12. Several observations can be made from the data of Table 4-12.

- The deposit concentration on surfaces facing the containment vessel wall was significantly greater (up to 13 times greater for NaO_x) than sides facing away from the vessel wall.
- The effect of higher deposition on surfaces facing the containment wall was accentuated for the three panels located far from the wall compared to the three panels close to the wall.
- The foregoing observations apply much more strongly for NaO_x than for NaI.

In addition to the above observations, a comparison of the deposit concentration on the main vessel wall (from Table 4-9) with the data of Table 4-12 shows that the main wall deposit averaged 25.6 g Na/m^2 compared to 22.2 g Na/m^2 for the inward facing panels closest to the wall, a negligible difference. However, the outward sides of the same three panels averaged 39.4 g/m^2 , appreciably greater than on the wall. Also, Table 4-9 shows that the average NaI deposition on the vessel wall was 0.082 g/m^2 , considerably greater than the concentration on the vertical panels, which averaged 0.030 g/m^2 for both sides.

The following explanation is offered to account for the foregoing observations. Temperature gradients near the vertical wall cause the gas near the wall to be more dense than farther from the wall. Thus, a downward flow of gas occurs near the wall, compensating for the upward flow of hot gas in the central core of the vessel. A radial component (toward the vessel centerline) of the velocity also develops with time, due to the temperature gradients in the bulk atmosphere shown in Figures 4-6 through 4-9. At the location where the seven vertical panels were located, the inward radial velocity was accentuated because a steel platform projected from the vessel wall $\sim 0.8 \text{ m}$ below the panels, acting as a turning vane for the downward flowing gas stream. Thus, an impaction mechanism was important for the panel surfaces which faced into this radial gas flow, while the other side

TABLE 4-12
AEROSOL DEPOSITION ON VERTICAL PANELS^(a)

Sample No.	Orientation(h)	Distance From Wall (mm)	Na			NaI		
			Conc. (g Na/m ²)		Ratio Out/In	Conc. (g NaI/m ²)		
			Inward(c)	Outward(c)		Inward(c)	Outward(c)	
			Facing Surface	Facing Surface		Facing Surface	Facing Surface	Ratio Out/In
VP-1	P	64	15.9	45.7	2.87	0.0256	0.0547	2.14
VP-2	P	64	20.9	24.1	1.15	0.0325	0.0457	1.41
VP-3	P	64	29.9	48.4	1.62	0.0465	0.0538	1.16
VP-4	P	460	5.91	78.8	13.3	0.0109	0.0484	4.44
VP-5	P	610	9.89	95.7	9.68	0.0214	0.0208	0.97
VP-6	P	1500	8.06	96.5	12.0	0.0115	0.0095	0.83
VP-7(d)	N	900	8.60(d)	8.06(d)	--	0.0197(d)	0.0192(d)	--
Average			14.17	56.75	6.77	0.0240	0.0360	1.83

(a) Polished stainless steel, 0.093 m².

(b) P = parallel to wall, N = normal to wall.

(c) Inward means facing center of vessel; outward means facing wall.

(d) Panel was normal to wall, no inward or outward surface.

of the panels were sheltered from this mechanism. The panels located further from the wall showed more impaction effect because the radial velocity was greater at greater distances from the wall.

The fact that NaI did not show this effect to the same extent as NaO_x can be explained by the fact that the convection currents were not built up by the sodium spray until $\sim 10^3$ s, and at times $> 10^3$ s, the NaI suspended concentration decreased sharply, as shown in Figure 4-16. Thus, most of the NaI deposited during times of low convection velocity or lower suspended concentrations.

A final observation can be made from the vertical panel data. Thermophoretic forces were greatly overshadowed by turbulence and impaction mechanisms for NaO_x , but may have been important for NaI.

4.9 BULK DENSITY OF SETTLED AEROSOL

The bulk density of aerosol deposited by settling onto horizontal surfaces was calculated by weight and volume measurements on samples from various locations. The average density of aerosol collected in 22 settling traps (see Table 4-10) was 0.057 g/cm^3 , with a standard deviation of 0.0097 g/cm^3 . Separate measurements made on three samples scooped from the personnel platform when the vessel was first opened ($t = 4620 \text{ min}$) averaged 0.050 g/cm^3 , with a standard deviation of 0.0058 g/cm^3 . No measurements were made with freshly settled aerosol, but previous information⁽⁴⁻¹⁸⁾ showed that the bulk density increases slowly with time.

The bulk density of the settled aerosol in test AB6 was much lower than that measured in previous CSTF tests with $\text{Na}_2\text{O}_2/\text{NaOH}$ aerosol, as is shown by Table 4-13. The average density of settled $\text{Na}_2\text{O}_2/\text{NaOH}$ aerosol in nine previous tests was 0.286 g/cm^3 . Only the light, fluffy Na_2CO_3 aerosol in tests AC3 and AC9 had densities similar to the AB6 aerosol. As discussed in Section 4.5.1.2, the AB6 aerosol was $\sim 70\%$ Na_2O_2 and 30% NaOH. The spray rate, spray duration, and containment temperature in test AB6 all were

TABLE 4-13
BULK DENSITY OF SETTLED AEROSOL IN
VARIOUS CSTF TESTS

Test	Bulk Density (g/cm ³)		
	<u>Na₂O₂ + NaOH</u>	<u>NaOH</u>	<u>Na₂CO₃</u>
AC1	0.14		
AC2		0.87	
AC3			0.069
AC5	0.30		
AC6	0.35		
AC7	0.32		
AC8	0.29		
AC9			0.041
AC10	0.24		
AB1	0.33		
AB3	0.24		
AB5	<u>0.36</u>		
Average	0.286	0.87	0.055
σ	0.069		
AB6	0.057		

within the range of conditions for the nine other CSTF tests with Na₂O₂/NaOH aerosol. However, the final water vapor concentration of the atmosphere was lower in test AB6 (-4°C dewpoint) than in the previous tests (+1.5 to 20°C). The bulk density of settled aerosol is probably related to the moisture content of the aerosol, which in turn is related to the water vapor concentration and temperature of the atmosphere exposed to the aerosol. Information on the effect of bulk density on the aerosol shape factors is not available, but it is likely that shape factors are affected. Further study of this phenomenon is merited.

4.10 AEROSOL PARTICLE SIZE

4.10.1 Cascade Impactor Data

The chief particle size measurement technique used in test AB6 employed cascade impactors. The impactors were inserted directly into the containment atmosphere in a horizontal position at three elevations. Two types of multi-jet impactors were used, an Andersen Mark III* circular jet sampler and a Sierra Model 226** rectangular slit sampler. Precut fiberglass paper furnished by the manufacturers was used as the stage collection surface. A description of the technique and discussion of errors has been provided.⁽¹⁵⁾ The standard error ($\pm 1\sigma$) is believed to be $\pm 20\%$.

The cascade impactors showed that the aerosol generally had a log-normal distribution, but that significant deviations from log-normal occurred from time to time. One data set that typifies the cascade impactor results is shown in Figure 4-21. The aerodynamic mass median diameter (AMMD) and geometric standard deviation, σ_g , obtained from plots similar to Figure 4-21 are listed in Table 4-14. A plot of the AMMD as a function of time is given in Figure 4-22 and a plot of σ_g as a function of time is presented in Figure 4-23. The raw data are presented in Appendix D in tables and on log-probability plots.

4.10.2 Electron Microscopy

Information on aerosol shape and size was obtained by transmission electron microscopy. Figure 4-24 shows some typical EM photographs of carbon-coated grids exposed to gravity settling in the containment atmosphere. The sample in Figure 4-24a was exposed at 330 seconds, during the period when only NaI was being released. The particles are very small ($\sim 1 \mu\text{m}$ diameter) and

*Manufactured by Andersen 2000, Inc., Atlanta, GA.

**Manufactured by Sierra Instrument Co., Carmel Valley, CA.

TABLE 4-14

CASCADE IMPACTOR DATA FOR TEST AB6

Time (s)(a)	Sample No.(b)	Sample Elevation (m)	Type of Impactor(c)	NaOx(b)		NaI(b)	
				AMMD (μ m)	σ_g	AMMD (μ m)	σ_g
1.35(2)	T3I1	+1.4	A	--	--	1.08	1.48
3.45(2)	T3I2	+1.4	A	--	--	1.08	1.50
5.70(2)	T3I3	+1.4	S	--	--	0.96	1.66
8.55(2)	T3I4	+1.4	S	3.87	1.4	3.85	1.40
1.15(3)	T3I5	+1.4	S	5.2	2.3	6.7	1.87
1.75(3)	T3I6	+1.4	S	5.7	2.42	6.2	1.98
3.28(3)	T3I7	+1.4	S	5.7	2.55	--	--
4.34(3)	T3I8	+1.4	S	6.0	2.42	--	--
5.28(3)	T3I9	+1.4	A	6.7	2.27	--	--
5.52(3)	T3I10	+1.4	A	6.1	2.26	--	--
5.78(3)	T3I11	+1.4	S	5.1	2.58	--	--
6.57(3)	T3I12	+1.4	S	6.3	2.46	--	--
1.25(4)	T3I13	+1.4	S	4.5	2.33	--	--
1.60(4)	T3I14	+1.4	S	2.6	3.19	--	--
2.06(4)	T3I15	+1.4	A	4.25	2.49	--	--
2.70(4)	T3I16	+1.4	A	4.1	2.58	--	--
3.48(4)	T4I1	-5.8	S	3.65	2.27	--	--
4.74(4)	T1I2	+6.1	S	2.3	3.31	--	--
4.74(4)	T4I2	-5.8	S	2.9	2.48	--	--
6.27(4)	T3I17	+1.4	A	3.55	1.83	--	--
7.59(4)	T1I3	+6.1	A	3.3	3.0	--	--
7.59(4)	T4I3	-5.8	A	2.65	1.74	--	--
9.15(4)	T3I18	+1.4	A	2.0	1.91	--	--
1.01(5)	T3I19	+1.4	A	1.9	1.67	--	--
1.79(5)	T3I20	+1.4	A	1.08	1.91	--	--

(a) Numbers in parenthesis are exponents of ten.,

(b) Refer to Appendix D for raw data.

(c) S = Sierra Model 226; A = Andersen Mark III.

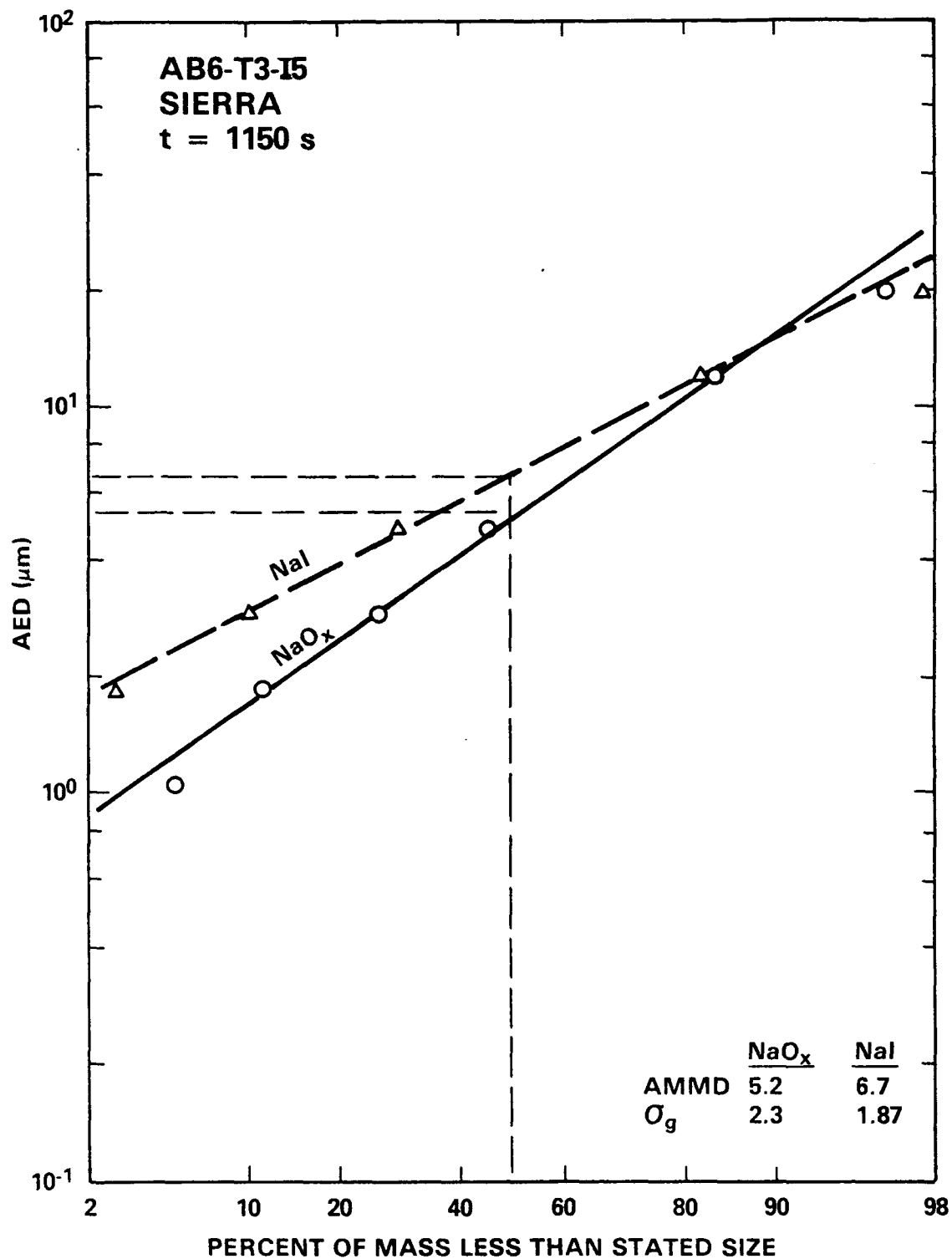
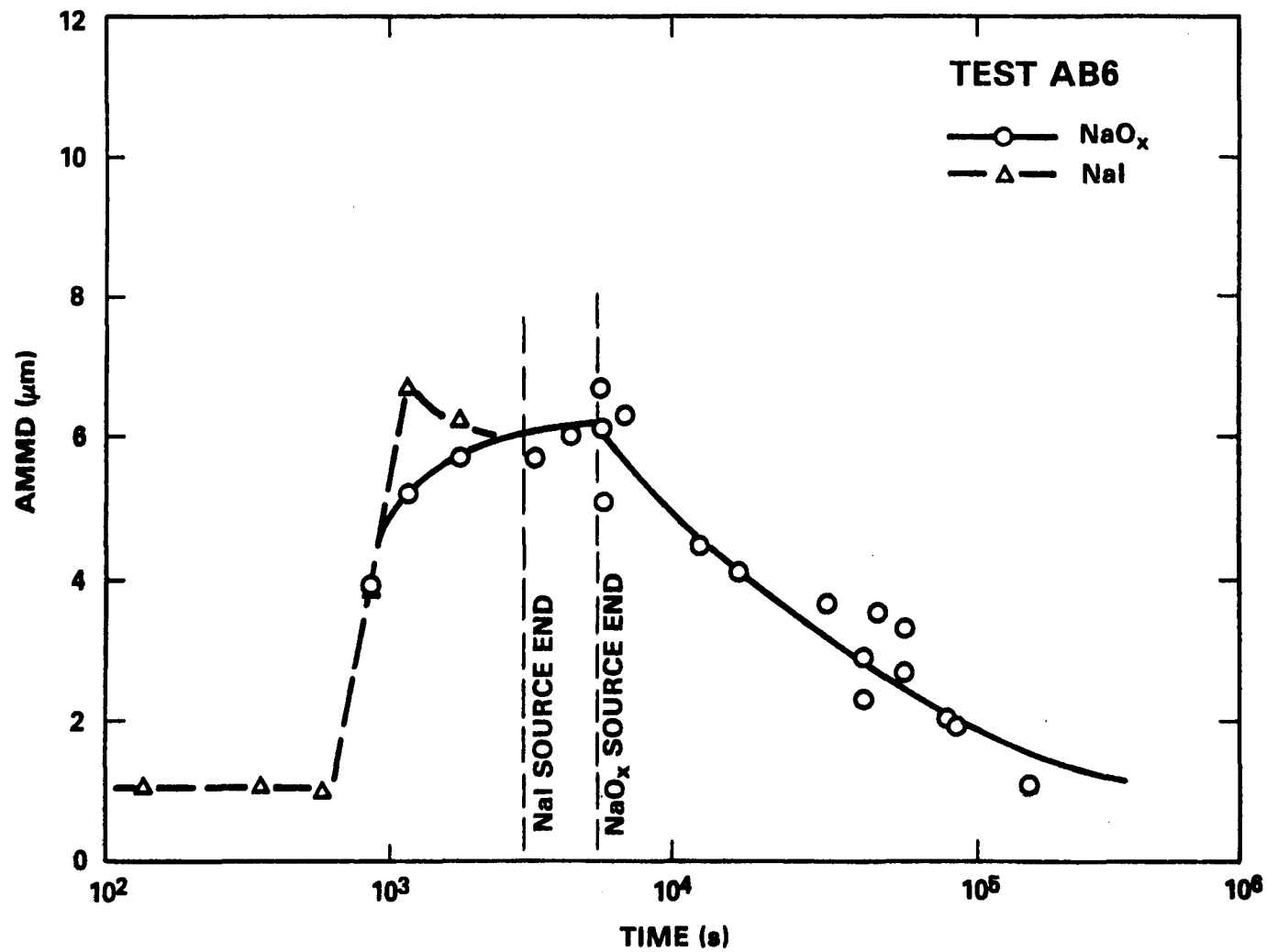


FIGURE 4-21. Typical Cascade Impactor Data Plotted on Log-Probability Paper.



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FIGURE 4-22. Plot of AMMD as a Function of Time.

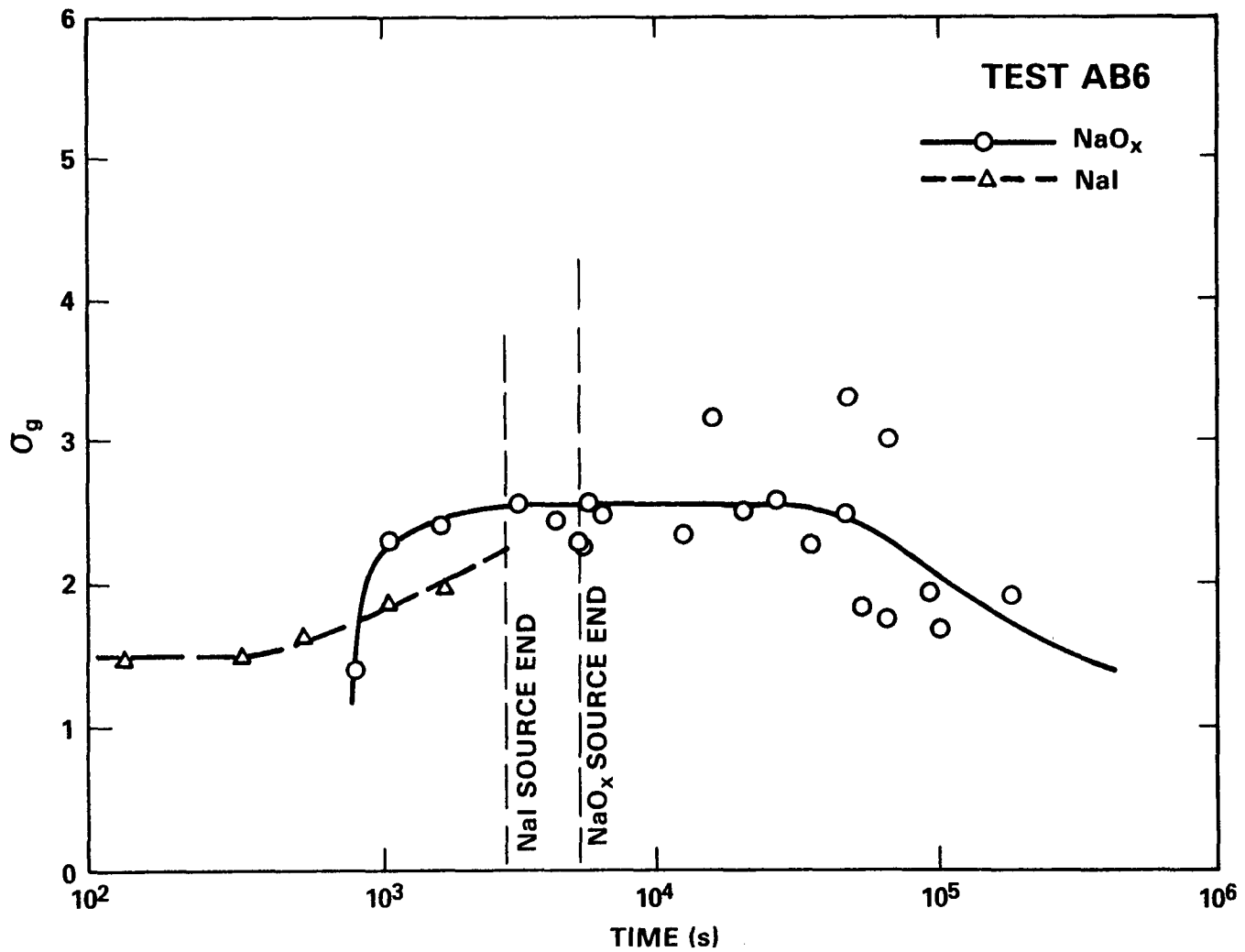


FIGURE 4-23. Plot of Geometric Standard Deviation as a Function of Time.

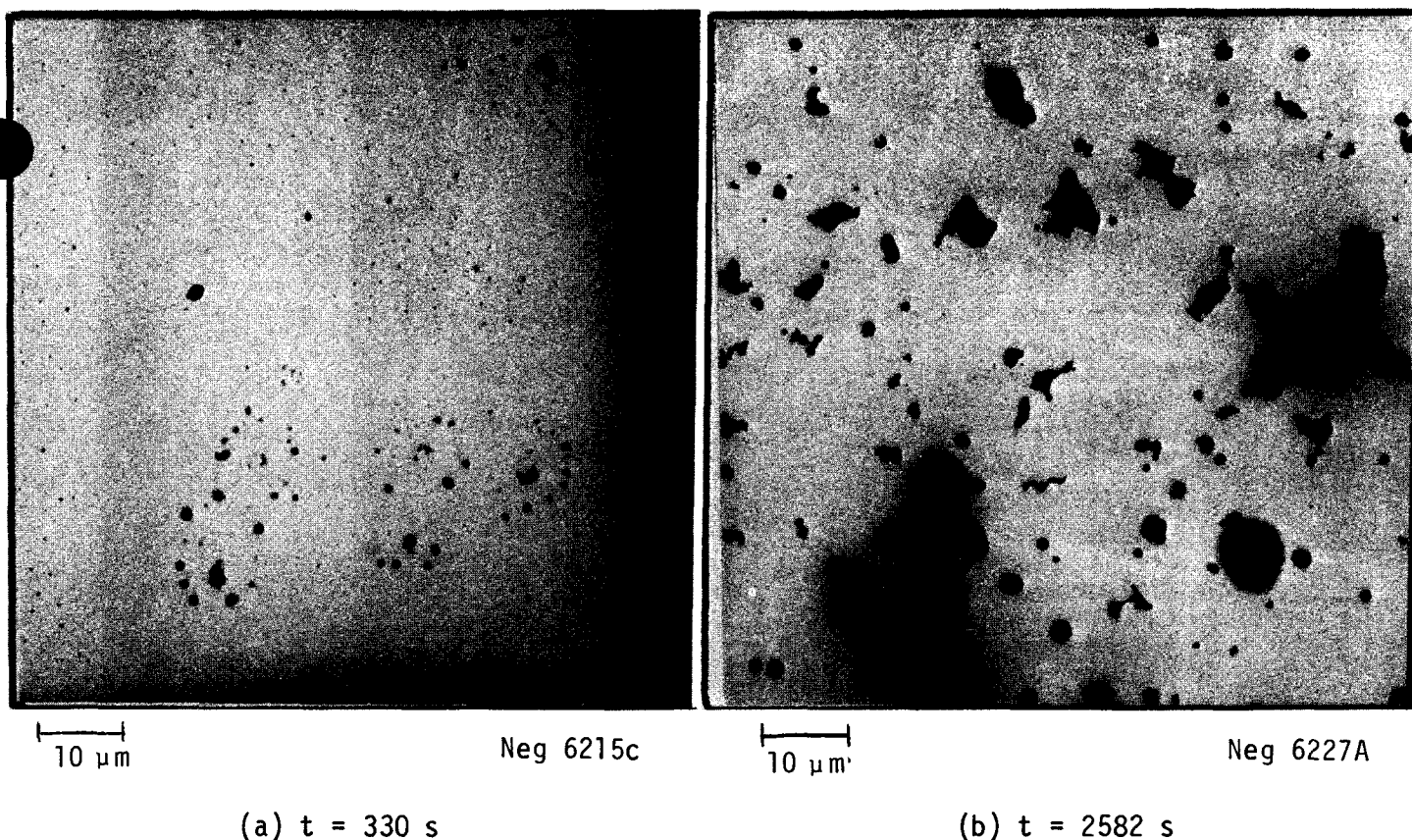


FIGURE 4-24. Electron Microscope Photographs.

nearly spherical singlets. The sample in Figure 4-24b was exposed at 2580 s, during the period when both aerosol species were being released. The mass concentration of NaO_x was 200 times greater than NaI at this time. The particles are much larger and more irregular than the NaI particles, and many agglomerates are visible. The EM samples generally support the cascade impactor data.

4.10.3 Size Calculated from Deposition Coupon Data

Differential deposition rates were obtained by inserting horizontal stainless steel coupons (19.3 cm^2 upward horizontal surface) into the containment atmosphere for short periods of time. The aerosol deposited on the upper surface was washed off and analyzed for sodium and NaI. Based on exposure time and suspended mass concentration, a deposition velocity, u_t , was calculated from Equation (3).

$$u_t = \frac{\text{deposition flux}}{\text{suspended mass concentration}} \quad (3)$$

Assuming that gravity settling greatly exceeds plate-out by diffusion (see Section 4.7.3), the settling mean diameter was calculated from Stokes' law:

$$d_s = \left(\frac{18\mu_f u_t}{g \rho_p} \right)^{0.5} \quad (4)$$

where:

- d_s = settling mean diameter (cm)
- μ_f = fluid viscosity (g/cm s)
- g = acceleration due to gravity (cm/s²)
- ρ_p = effective particle density (g/cm³)

In order to compare the data with the aerodynamic data obtained with the cascade impactors, the particle density was assigned a value of unity. The values for the settling mean diameter calculated from deposition coupons are listed in Table 4-15.

The settling mean diameters listed in Table 4-15 are plotted as a function of time in Figure 4-25. The values for NaO_x and NaI are approximately equal until ~2500 seconds, when the d_s for NaO_x began to decrease, while the d_s for NaI remained constant. After the end of the sodium spray, the d_s for both species decreased, but that for NaI remained significantly higher than for NaO_x.

Figure 4-25 also shows that the settling mean diameters of samples collected in the lower mixing cell (station T4) were significantly higher than for samples collected in the upper cell. Resuspended aerosol falling onto the deposition coupons may have caused this phenomenon, as well as the effect of gravitational agglomeration.

TABLE 4-15

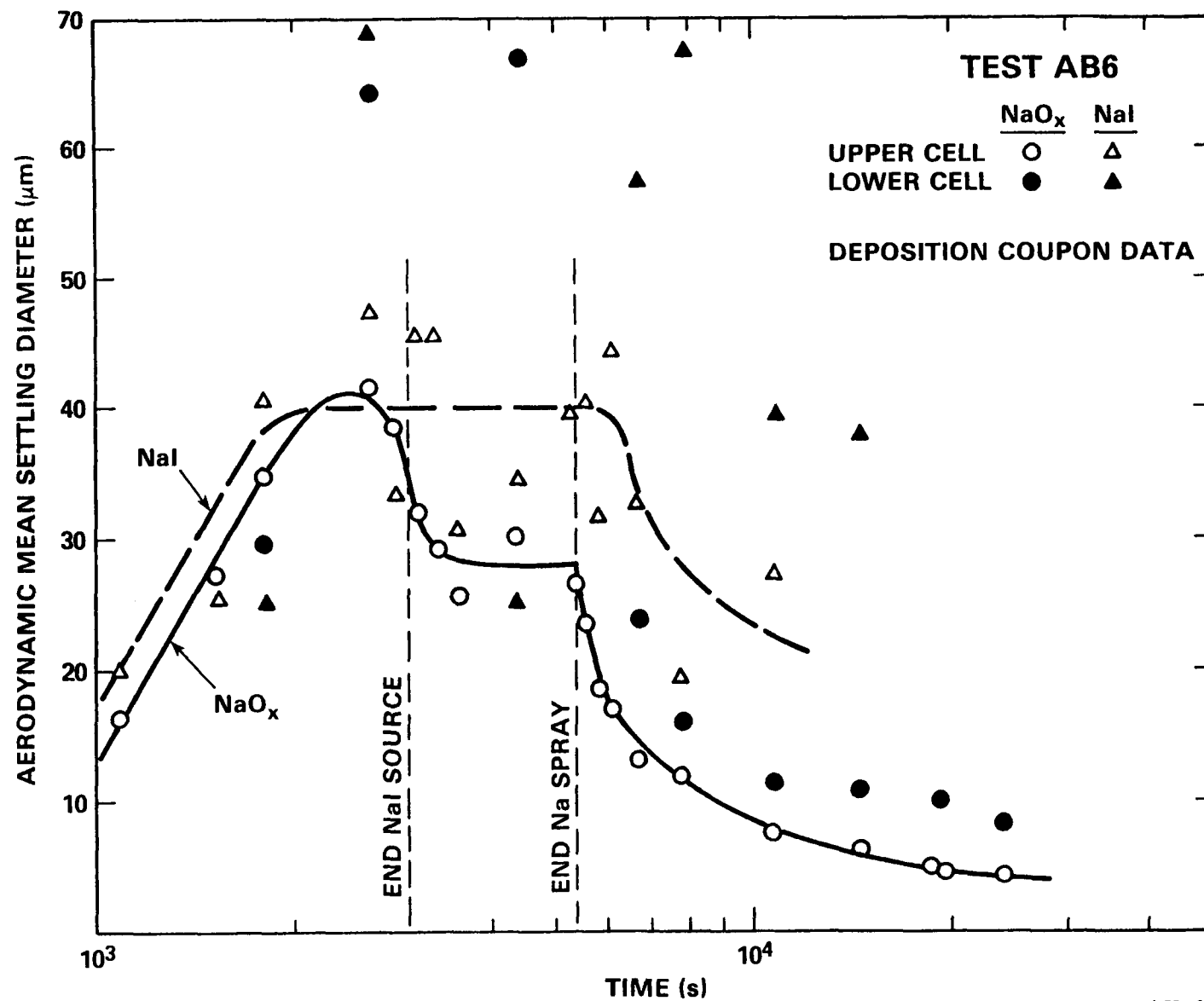
SIZE CALCULATED FROM DEPOSITION COUPON DATA

Time (s)	Sample No.	Sample Elevation (m)	NaO _x		NaI	
			Deposition Velocity (cm/s)	Aerodynamic Settling Mean Diameter (μ m)	Deposition Velocity (cm/s)	Aerodynamic Settling Mean Diameter (μ m)
1.17(3)(a)	T2-D1	+1.4	0.67	16.2	1.02	20.0
1.55(3)	T3-D1	+1.4	1.86	27.2	1.59	25.2
1.80(3)	T1-D1	+6.1	3.95	39.9	4.10	40.7
1.80(3)	T4-D1	-5.8	2.50	29.7	1.78	25.1
2.61(3)	T1-D2	+6.1	5.33	47.6	6.76	53.6
2.61(3)	T2-D2	+1.4	2.97	35.5	4.04	41.4
2.61(3)	T4-D2	-5.8	11.5	64.4	13.4	69.4
2.85(3)	T2-D3	+1.4	1.94	28.9	3.54	39.0
2.85(3)	T3-D2	+1.4	1.72	27.3	1.76	27.6
3.09(3)	T2-D4	+1.4	2.44	32.4	4.85	45.6
3.30(3)	T2-D5	+1.4	1.98	29.1	4.81	45.5
3.52(3)	T2-D6	+1.4	1.52	25.6	2.22	30.9
4.38(3)	T1-D3	+6.1	2.39	32.4	1.93	29.1
4.38(3)	T2-D7	+1.4	1.80	28.1	3.61	39.8
4.38(3)	T4-D3	-5.8	15.1	74.7	1.63	24.5
5.32(3)	T2-D8	+1.4	1.54	26.4	3.47	39.3
5.56(3)	T2-D9	+1.4	1.25	23.6	3.73	40.5
5.80(3)	T2-D10	+1.4	0.835	18.8	2.38	31.7
6.06(3)	T2-D11	+1.4	0.714	17.0	4.82	44.3
6.66(3)	T1-D4	+6.1	0.338	11.4	2.26	29.8
6.66(3)	T2-D12	+1.4	0.539	14.6	3.22	35.6
6.66(3)	T4-D4	-5.8	1.61	24.1	9.21	57.8
7.78(3)	T1-D5	+6.1	0.278	10.3	0.270	10.2
7.78(3)	T2-D13	+1.4	0.507	14.0	2.92	33.6

TABLE 4-15 (Cont'd)

Time (s)	Sample No.	Sample Elevation (m)	NaO _x		NaI	
			Deposition Velocity (cm/s)	Aerodynamic Settling Mean Diameter (μ m)	Deposition Velocity (cm/s)	Aerodynamic Settling Mean Diameter (μ m)
7.78(3)	T3-D3	+1.4	0.332	11.3	0.539	14.4
7.78(3)	T4-D5	-5.8	0.669	16.1	65.2	159.
1.14(4)	T1-D6	+6.1	0.138	7.24		
1.14(4)	T2-D14	+1.4	0.159	7.78		
1.14(4)	T3-D4	+1.4	0.139	7.28	1.95	27.2
1.14(4)	T4-D6	-5.8	0.347	11.5	4.14	39.7
1.46(4)	T1-D7	+6.1	0.0965	6.20	4.38	40.7
1.46(4)	T2-D15	+1.4	0.156	7.68		
1.46(4)	T3-D5	+1.4	0.0860	5.70		
1.46(4)	T4-D7	-5.8	0.315	10.9	3.90	38.4
1.88(4)	T1-D8	+6.1	0.0599	4.74		
1.93(4)	T2-D16	+1.4	0.0551	4.54		
1.94(4)	T4-D8	+1.4	0.266	9.98		
2.41(4)	T1-D9	+6.1	0.0325	3.47		
2.41(4)	T2-D17	+1.4	0.0528	4.43		
2.41(4)	T3-D6	+1.4	0.0649	4.91		
2.41(4)	T4-D9	-5.8	0.188	8.36		

(a) Numbers in parenthesis are exponents of ten.



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FIGURE 4-25. Settling Mean Diameter Calculated from Deposition Coupon Data.

4.10.4 Size Calculated from Mass Balance on Containment Atmosphere

A mass balance on the containment atmosphere during a constant source release period in a well-mixed containment gives:

$$\lambda_t = \frac{I - V \frac{dC}{dt}}{VC} \quad (5)$$

where:

λ_t = overall removal rate constant at time t , s^{-1}
 I = aerosol release rate, g/s
 V = containment volume, m^3
 C = suspended aerosol concentration, g/m^3
 t = time, s

For short time steps, Equation (5) can be approximated by:

$$\lambda_t = \frac{1}{C_{avg}} \left(\frac{I}{V} - \frac{\Delta C}{\Delta t} \right) \quad (6)$$

where:

C_{avg} = average value for concentration during time step Δt
 ΔC = change in concentration during time step Δt

After the aerosol source cutoff, Equation (6) simplifies to:

$$\lambda_t = \frac{\Delta C}{C_{avg} \Delta t} \quad (7)$$

The overall removal rate constant, λ_t , is equal to the sum of the removal rate constants for the three removal processes of importance:

$$\lambda_t = \lambda_s + \lambda_p + \lambda_d \quad (8)$$

where:

λ_s = rate constant due to gravity settling

λ_p = rate constant due to plating

λ_l = rate constant due to leakage

For test AB6, it can be shown that, for $t > 1000$ s,

$$\lambda_s \gg \lambda_p \gg \lambda_l \quad (9)$$

so that λ_s is approximately equal to the overall rate constant for times > 1000 s.

The gravitational rate constant due to settling is related to the deposition velocity, u_t , by Equation (10):

$$u_t = \frac{\lambda_s V}{A_s} \quad (10)$$

where:

A_s = surface area available for settling.

Finally, the settling mean diameter, d_s , can be computed from Stokes' law (Equation 4) when u_t is known.

The removal rate constants and the aerodynamic settling mean diameters were calculated by the use of Equations (4), (6), (7) and (10) by numerically differentiating the curves in Figure 4-16 for suspended concentration.

These data are presented in Table 4-16 for NaO_x and NaI.

TABLE 4-16

REMOVAL RATE CONSTANT AND SETTLING MEAN
DIAMETER COMPUTED FROM MATERIAL BALANCE
ON CONTAINMENT ATMOSPHERE

Time (s)	NaOx		NaI	
	λ_s (a) (s ⁻¹)	d_s (b) (μ m)	λ_s (s ⁻¹)	d_s (μ m)
7.5(2)(c)	1.53(-3)	23.3	2.80(-4)	9.95
9.0(2)	1.32(-3)	22.0	7.00(-4)	16.0
1.0(3)	1.36(-3)	22.4	8.00(-4)	17.2
1.2(3)	3.08(-3)	34.0	9.95(-4)	19.3
1.5(3)	3.36(-3)	35.8	1.51(-3)	24.0
1.8(3)	3.79(-3)	37.8	1.65(-3)	25.3
2.1(3)	3.98(-3)	37.8	1.83(-3)	26.9
2.4(3)	3.98(-3)	40.0	1.93(-3)	27.9
2.7(3)	2.85(-3)	39.7	2.15(-3)	30.4
3.0(3)	3.66(-3)	38.8	2.30(-3)	30.8
3.25(3)	3.34(-3)	37.2	3.82(-3)	39.8
3.5(3)	3.35(-3)	37.5	3.79(-3)	40.0
3.8(3)	3.30(-3)	37.4	2.91(-3)	35.1
4.16(3)	3.26(-3)	37.3	9.00(-4)	19.6
4.5(3)	3.26(-3)	37.4	6.97(-4)	17.3
4.76(3)	3.26(-3)	37.5	6.28(-4)	16.5
5.0(3)	3.26(-3)	37.6	5.84(-4)	15.9
5.4(3)	3.26(-3)	37.7	5.2(-4)	15.0
5.6(3)	1.91(-3)	28.1	1.33(-3)	23.4
5.9(3)	1.75(-3)	26.2	2.54(-3)	31.6
6.15(3)	1.62(-3)	25.0	1.27(-3)	22.1
6.45(3)	1.35(-3)	22.7	1.07(-3)	20.2
6.8(3)	9.55(-4)	19.0	8.62(-4)	18.1
7.2(3)	6.00(-4)	15.0	7.51(-4)	16.8
7.5(3)	5.11(-4)	13.8	6.67(-4)	15.8
8.35(3)	3.35(-4)	11.2	5.43(-4)	14.2
1.0(4)	2.15(-4)	8.92	3.03(-4)	10.6
1.35(4)	1.49(-4)	7.40	2.72(-4)	9.99
1.5(4)	1.21(-4)	6.66	2.45(-4)	9.48
2.0(4)	1.01(-4)	6.05	1.77(-4)	8.01

(a) Computed from Equations (6) and (7) and Figure 4-16.

(b) Computed from Equation (4).

(c) Numbers in parenthesis are exponents of ten.

TABLE 4-16 (Cont'd)

Time (s)	NaOx		NaI	
	λ_s (a) (s ⁻¹)	d_s (b) (μm)	λ_s (s ⁻¹)	d_s (μm)
2.8(4)	6.78(-5)	4.96	1.39(-4)	7.06
5.5(4)	4.31(-5)	3.88		
7.8(4)	4.15(-5)	3.77		
1.0(5)	3.26(-5)	3.33		
1.3(5)	2.56(-5)	2.93		
1.75(5)	1.94(-5)	2.54		
2.5(5)	1.23(-5)	2.02		
3.5(5)	9.54(-6)	1.77		
4.0(5)	7.25(-6)	1.54		

(a) Computed from Equations (6) and (7) and Figure 4-16.

(b) Computed from Equation (4).

(c) Numbers in parenthesis are exponents of ten.

4.10.5 Comparison of Particle Size Measurements

The output of the cascade impactor measurements is the AMMD and σ_g (Section 4.10.1), while the settling mean diameter, d_s , is the output of the deposition coupon and mass balance computations. In order to compare the three methods, the cascade impactor data were converted to settling mean diameters. If the particle size distribution is log-normal, the aerodynamic settling mean diameter can be calculated from the cascade impactor data by Equation (11):

$$d_s = \text{AMMD} \exp(\ln^2 \sigma_g) \quad (11)$$

The settling mean diameters calculated from cascade impactor data, deposition coupon data, and from a mass balance on the containment atmosphere are listed in Table 4-17. The data of Table 4-17 show that the settling mean diameters calculated from cascade impactor measurements were significantly lower than those calculated from deposition coupon and mass balance data during the sodium spray period. After the end of the sodium spray, there was generally good agreement between the three methods. The two methods of deposition coupon and mass balance on the atmosphere were in good agreement. It is possible that particle fracturing and bounce occurred in the cascade impactors. The aerosol was fluffier and of a much lower bulk density in this test than in previous tests (see Section 4.9).

4.10.6 Chemical Composition of Aerosol As a Function of Particle Size

Three cascade impactor samples were taken which gave reliable data for both Na and NaI. Impactor samples taken at times after the NaI source cutoff gave unreliable data for NaI because the NaI was near background detection limits. Table 4-18 lists the mass of Na, NaO_x and NaI found on each stage of the three impactor samples which gave valid NaI data. The right hand column is the mass ratio of NaI to NaO_x . These ratios are plotted as a function of the impactor cut diameter (aerodynamic) in Figure 4-26.

TABLE 4-17

COMPARISON OF AEROSOL SIZE IN CONTAINMENT ATMOSPHERE
AS MEASURED BY VARIOUS METHODS

Time (s)	d_s for NaO_x (μm)			d_s for NaI (μm)		
	Cascade Impactor(a)	Dep. Coupon(b)	Mass Balance(c)	Cascade Impactor(a)	Dep. Coupon(b)	Mass Balance(c)
1.00(3)(d)	8.62		22.4	7.53		17.2
1.17(3)	10.2	16.2	31.0	9.78	20.0	17.8
1.55(3)	12.1	27.2	36.1	9.84	25.2	24.5
1.80(3)	12.8	39.9	37.8	9.94	40.7	25.3
2.40(3)	14.0		40.0	10.5		27.9
2.61(3)	14.2	41.5(e)	39.9	10.9	47.5(e)	29.4
2.85(3)	14.4	28.1(e)	39.2	11.2	33.3(e)	30.6
3.09(3)	14.7	32.4	38.6		45.6	34.0
3.30(3)	14.7	29.1	37.3		45.5	39.9
3.52(3)	14.6	25.6	37.5		30.9	39.8
4.0(3)	14.7		37.3			27.0
4.38(3)	14.8	30.2(e)	37.3		39.3	18.5
5.32(3)	15.0	26.4	37.7		39.3	15.4
5.56(3)	14.8	23.6	28.0		40.5	21.7
6.06(3)	14.0	17.0	25.6		44.3	26.9
6.66(3)	13.6	13.0(e)	20.8		32.7(e)	19.1
7.78(3)	13.0	11.3(e)	12.8		19.4(e)	15.0
1.14(4)	11.3	7.43(e)	8.31			
1.46(4)	10.4	6.53(e)	6.86			
1.88(4)	9.55	4.74	6.26			
1.93(4)	9.60	4.54	6.12			
2.41(4)	8.76	4.27(e)	6.51			
3.00(4)	8.04		4.75			
5.50(4)	5.60		3.88			
1.00(5)	3.35		3.33			
2.50(5)	2.08		2.02			
4.00(5)	1.28		1.54			

(a) Calculated by Equation (11) using Figures 4-22 and 4-23.

(b) From Table 4-15.

(c) From Table 4-16.

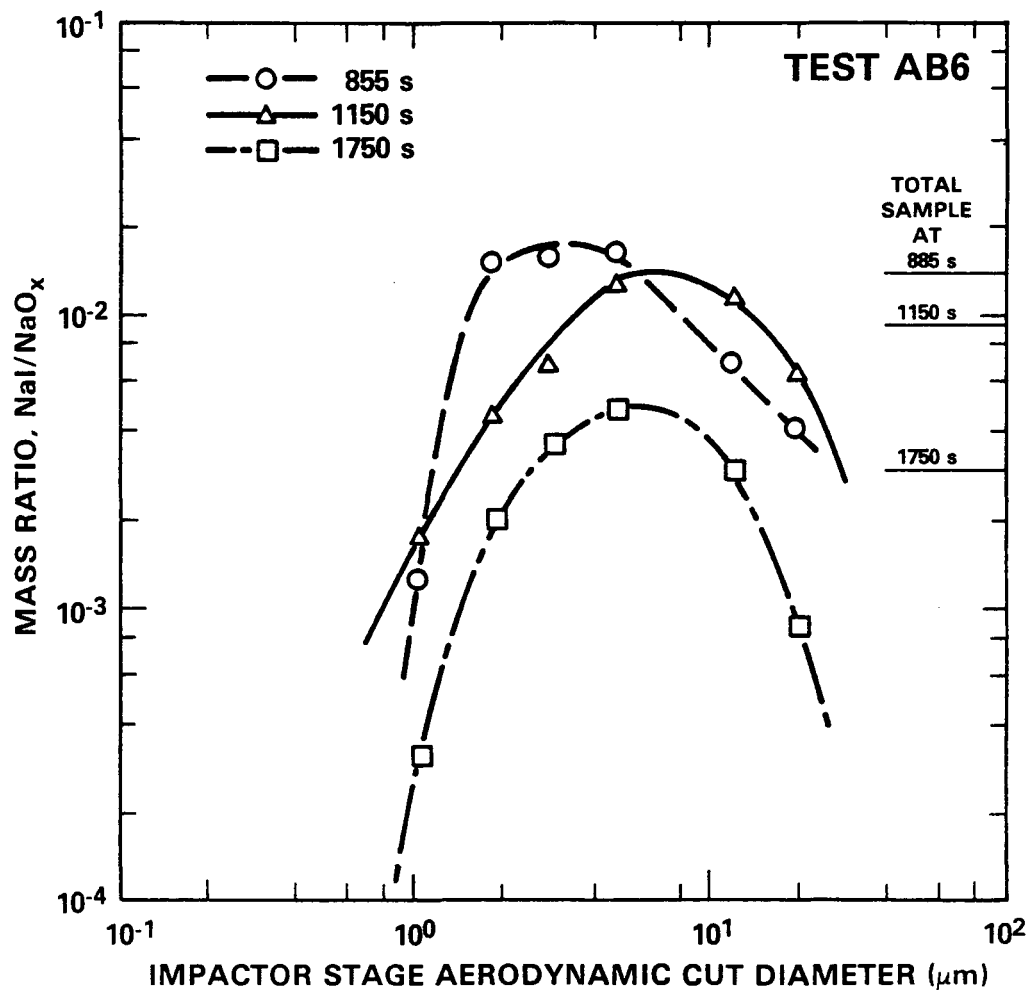
(d) Numbers in parenthesis are exponents of ten.

(e) Average of multiple measurements.

TABLE 4-18

NaI/NaO_x MASS RATIO ON IMPACTOR STAGES

Time (s)	Sample No.	Aerodynamic Cut Diam. (μ m)	Mass on Stage Collection Paper (mg)				Mass Ratio x 100 NaI/NaO _x
			Na	Ratio NaO _x /Na	NaO _x	NaI	
8.55(2)	T3-I4-1	19.6	0.24	2.12	0.509	0.0021	4.13
	-2	12.0	0.42	2.12	0.890	0.0062	6.94
	-3	4.79	1.03	2.12	2.18	0.0350	16.1
	-4	2.88	15.55	2.12	33.0	0.5172	15.7
	-5	1.85	4.15	2.12	8.80	0.1335	15.2
	-6	1.03	1.71	2.12	3.62	0.0046	1.27
	BU Filter	<1.03	0.96	2.12	2.04	0.0063	3.10
	TOTAL				51.03	0.7049	13.81
1.15(3)	T3-I5-1	19.8	0.78	1.91	1.49	0.0094	6.33
	-2	12.1	2.81	1.91	5.37	0.0615	11.5
	-3	4.84	8.45	1.91	16.1	0.2044	12.7
	-4	2.92	4.35	1.91	8.31	0.0728	6.94
	-5	1.87	3.21	1.91	6.13	0.0289	4.72
	-6	1.05	1.36	1.91	2.60	0.0046	1.77
	BU Filter	<1.05	1.11	1.91	2.12	0.0063	2.97
	TOTAL				40.63	0.3785	9.32
1.75(3)	T3-I6-1	20.3	1.32	1.81	2.39	0.0021	0.88
	-2	12.4	2.93	1.81	5.30	0.0155	2.93
	-3	4.96	4.65	1.81	8.42	0.0400	4.76
	-4	2.99	4.15	1.81	7.51	0.0264	3.51
	-5	1.92	3.73	1.81	6.75	0.0137	2.03
	-6	1.07	1.06	1.81	1.92	0.0006	0.31
	BU Filter	<1.07	0.56	1.81	1.01	<0.0005	<0.49
	TOTAL				33.30	0.0985	2.96



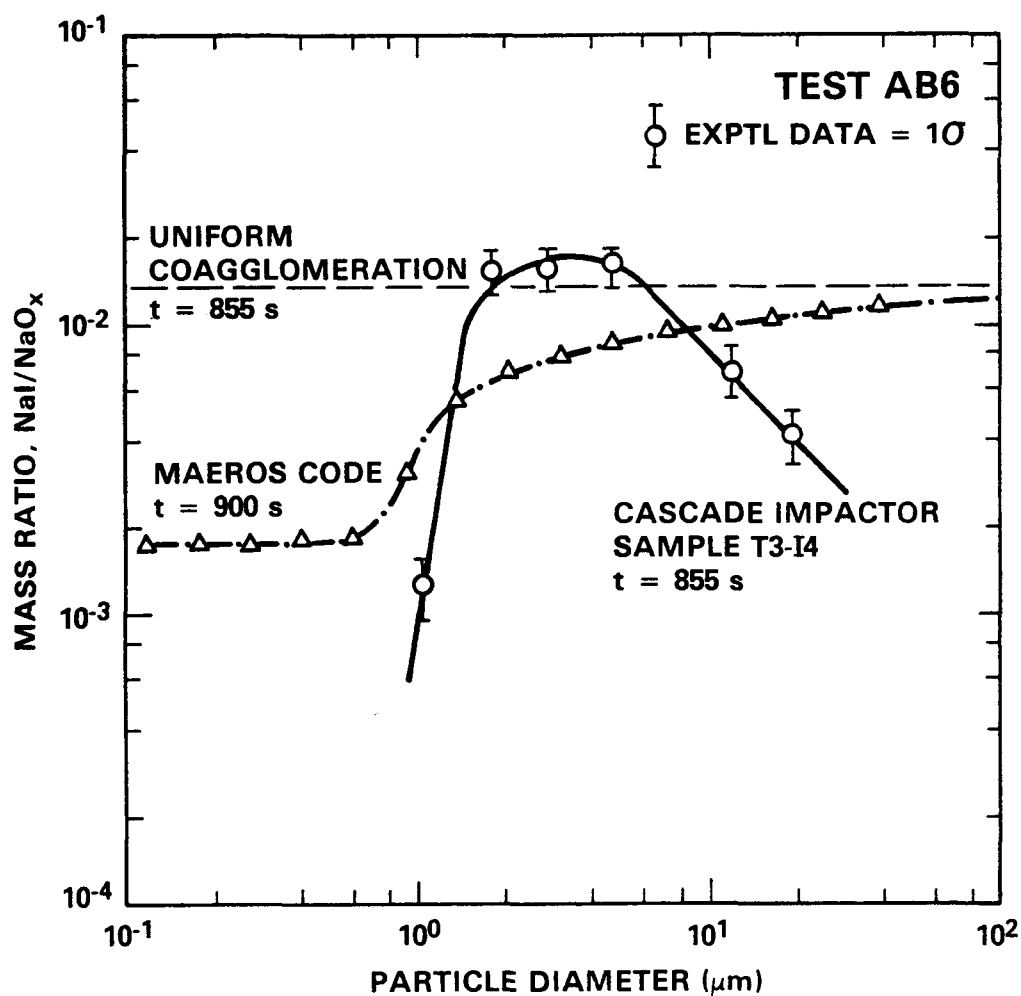
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FIGURE 4-26. Mass Ratio of NaI/NaO_x on Cascade Impactor Stages.

The data of Table 4-18 and Figure 4-26 show that the relative proportions of NaI and NaO_x were not constant as a function of particle size. However, the shapes of the curves in Figure 4-26 are not as predicted by sectionally uniform codes. To illustrate the latter fact, the ratio of suspended NaI mass concentration divided by the suspended NaO_x concentration predicted by the MAEROS code (a sectionally uniform code) is plotted in Figure 4-27 for an early time when both sources were on, but before equilibrium suspended concentration had been reached (~ 900 s). The cascade impactor data show that the middle sizes of the particle size spectrum are rich in NaI relative to the largest and smallest particle size. For the uniform coagglomeration assumption, the NaI/NaO_x ratio remains constant at all values of particle size.

A second method of inferring species concentration at different particle size was the use of small deposition coupons inserted into the containment atmosphere for brief periods of time. The deposition coupon data suggested that the aerosol which had settled onto the coupons was generally richer in NaI than the suspended aerosol from which it settled. Since larger particles settle faster than small ones, this shows that the larger particles had higher than average NaI content. This is shown by the curves in Figure 4-28, where the mass ratio of NaI to NaO_x on the deposition coupons is plotted as a function of time. The mass ratio of NaI/NaO_x of total suspended aerosol as sampled by Gelman^(a) filter papers inserted through-the-wall is also plotted. The third curve in Figure 4-28 is the ratio of the deposition coupon data to the filter data. Figure 4-28 shows that during the period when both sources were on, the ratio of NaI/NaO_x was approximately the same on settled and suspended aerosol. After the NaI source was terminated, the ratio of NaI/NaO_x decreased rapidly in both types of samples, but the settled aerosol had a higher proportion of NaI than the suspended aerosol at all times after the end of the NaI source.

(a) Type AE Glass Fiber, Gelman Sciences, Inc., Ann Arbor, MI 48106.



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FIGURE 4-27. Comparison of Sectionally Uniform Code and Uniform Coagglomeration Assumption with Cascade Impactor Data.

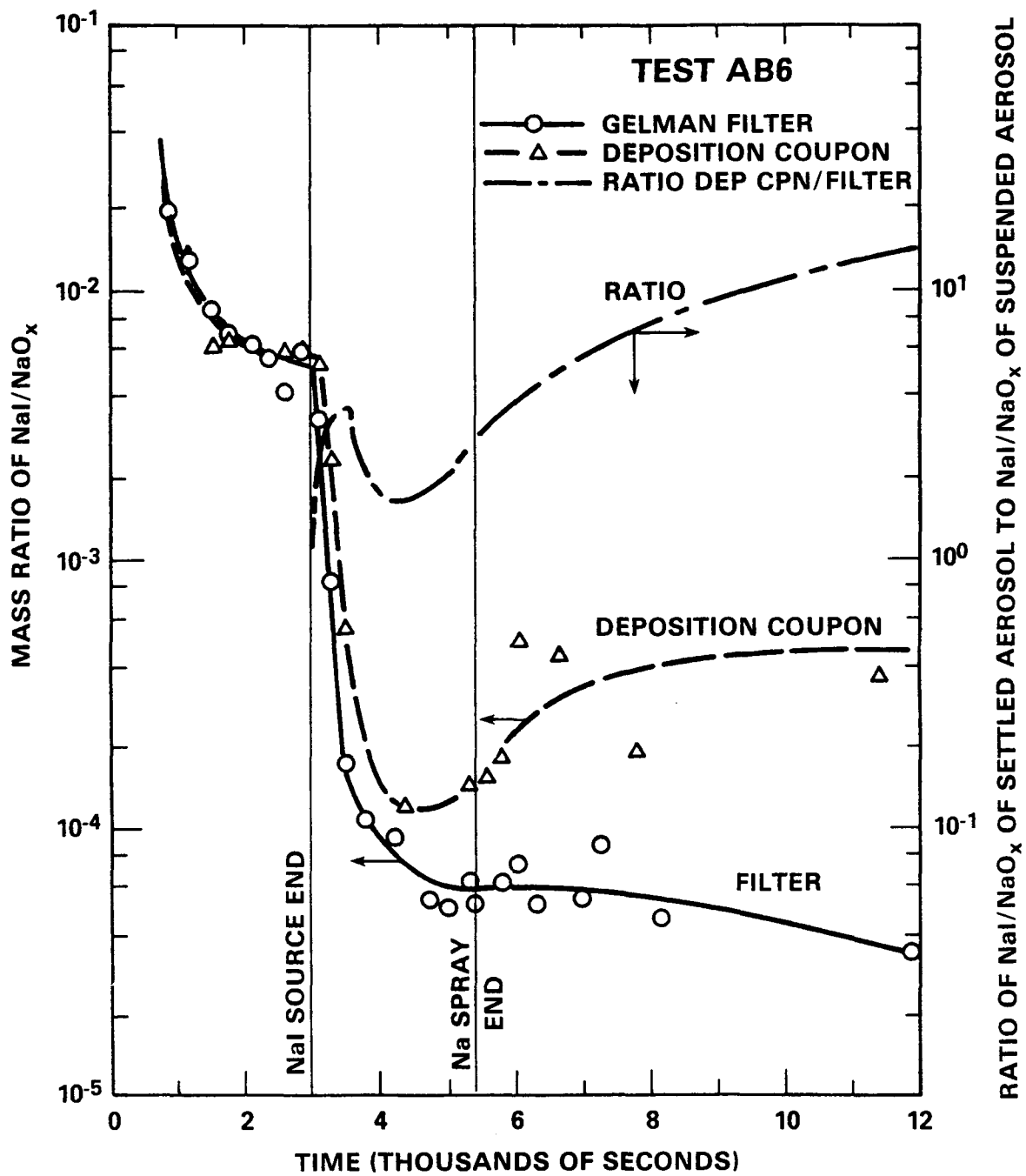


FIGURE 4-28. Mass Ratio of NaI/NaO_x on Gelman Filters and Deposition Coupons.

4.11 LEAKED MASS

The actual quantity of aerosol leaked from the containment vessel was not measured directly. For the purpose of comparing leaked mass with code predictions, a calculation was made using the same assumption used in the computer code cases--that aerosol leaked at a constant 1% of the suspended mass per day. The data of Table 4-19 were computed by Equation (12), using concentration data taken from Figure 4-16.

$$M_l = \sum_0^n L V C_{avg} \Delta t \quad (12)$$

where:

$$\begin{aligned} M_l &= \text{mass of aerosol leaked, g} \\ L &= \text{leak rate, s}^{-1} \\ V &= \text{containment volume, m}^3 \\ C_{avg} &= \text{average suspended conc. during time step, g/m}^3 \\ \Delta t &= \text{duration of time step, s} \end{aligned}$$

The data of Table 4-19 are plotted in Figure 4-29. Table 4-19 and Figure 4-29 show that by the end of the NaI source period, 94.9% of the computed NaI leaked mass had already occurred. By the end of the NaO_x source period, 78.5% of the computed NaO_x leaked mass had occurred.

It should be reemphasized that the data of Table 4-19 and Figure 4-29 are not based on actual measurement but on calculations based on experimentally measured suspended concentration and the assumption of a constant 1%/day leakage rate.

4.12 SETTLED MASS

The settled mass was measured by placing 22 deposition trays at various locations throughout the containment vessel, as discussed in Section 4.7. Each tray had 266 cm² of upward facing surface area available for settling. After the test, the content of each tray was analyzed for sodium and NaI and

TABLE 4-19

LEAKED MASS COMPUTED FROM SUSPENDED CONCENTRATION
AND ASSUMED 1% PER DAY LEAKAGE

Time (Seconds)	Leaked Mass (g)	
	NaO _x	NaI
0	0.00	0.0000
200	0.00	0.0007
400	0.00	0.0033
600	0.00	0.0076
800	0.13	0.0128
1000	0.55	0.0182
1200	1.14	0.0233
1400	1.76	0.0281
1500	2.05	0.0303
2400	4.27	0.0442
3000	5.65	0.0500
3250	6.26	0.0514
4000	8.23	0.0522
5000	10.99	0.0525
5400	12.10	0.0526
6000	13.04	0.0526
7000	13.60	0.0526
8000	13.90	0.0527
9000	14.10	0.0527
10000	14.24	0.0527
12000	14.46	0.0527
14000	14.62	0.0527
17000	14.79	0.0527
21000	14.94	0.0527
25000	15.04	0.0527
30000	15.13	0.0527
35000	15.20	0.0527
40000	15.25	0.0527
45000	15.28	0.0527
50000	15.31	0.0527
55000	15.33	0.0527
60000	15.35	0.0527
70000	15.37	0.0527
80000	15.39	0.0527
90000	15.40	0.0527
100000	15.41	0.0527

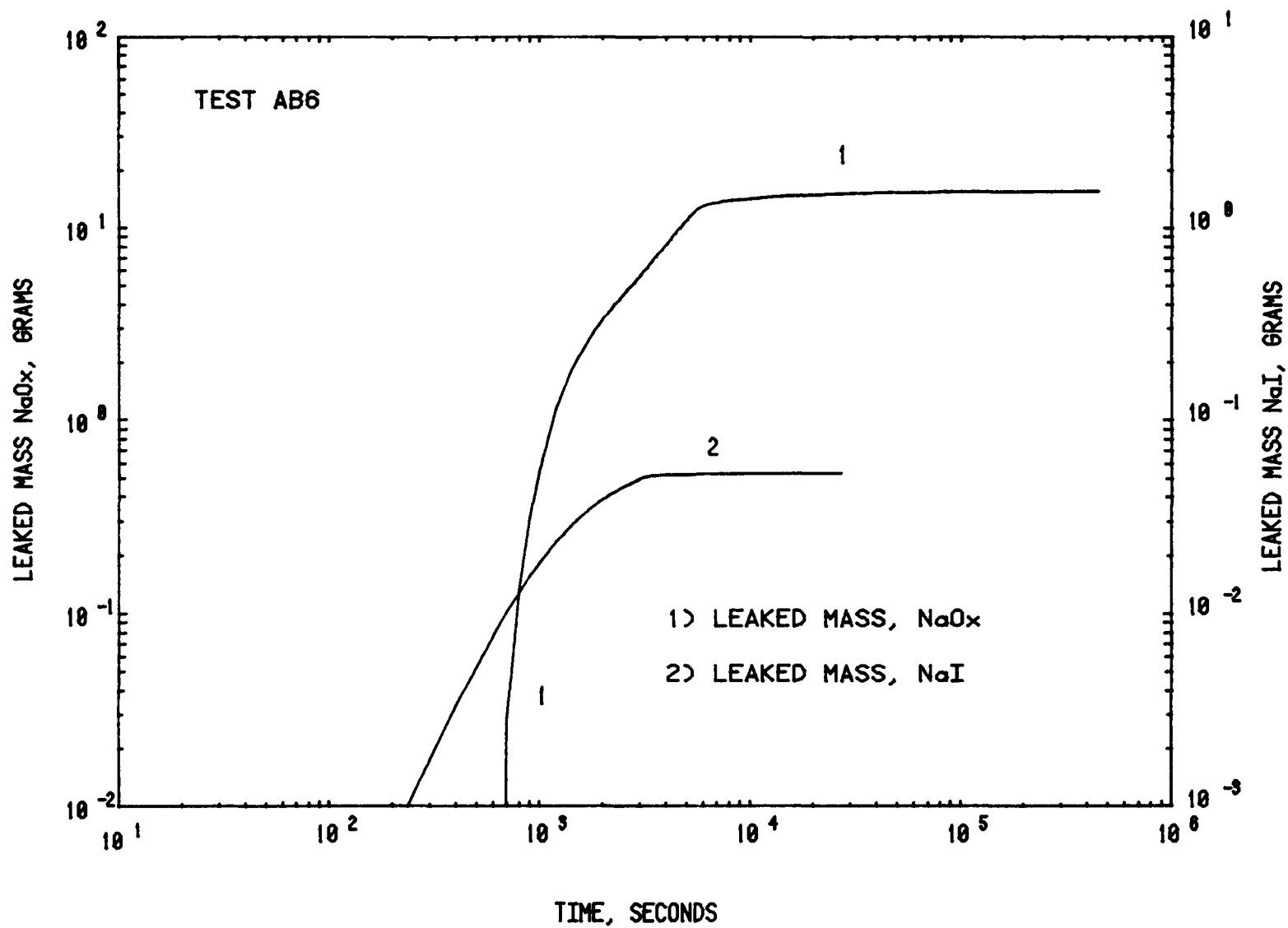


FIGURE 4-29. Leaked Aerosol Mass Computed With Assumption of Constant 1% per Day Leakage Rate.

the surface deposition at that location was calculated by dividing the sodium mass by the tray surface area. The settled mass for the entire vessel was calculated by dividing the vessel upward facing surfaces into four categories as shown in Tables 4-10 and 4-20.

This parameter was measured only at the end of the test.

4.13 PLATED MASS

For the purpose of making experimental measurements, plated mass is defined as the mass of aerosol deposited on vertical and downward facing surfaces and remaining on these surfaces at the end of the test. Some of the deposited aerosol may have fallen off the walls and ceiling during the test, as discussed in Section 4.6.4.

The method used to measure the plated mass was to wipe a measured area of vessel wall and ceiling with a series of damp cloths and analyzing for sodium, as discussed in Section 4.7.1. The surface concentration of sodium at seven different locations is presented in Table 4-9. The total plated mass on vertical walls and ceiling of the containment vessel was calculated as shown in Table 4-21.

4.14 INSTANTANEOUS COMBINED REMOVAL RATE

The instantaneous combined removal rate constant, λ_t , was calculated by differentiating the suspended mass concentration curve of Figure 4-16, as discussed in Section 4.10.4. The computed values of λ_t are listed in Table 4-16 and plotted in Figure 4-30 as a function of time. Figure 4-30 shows that, for NaI, the removal rate increased continuously with time until the end of the NaI source, at which time it increased rapidly to a value ~65% greater than what it was at the source cutoff. This increased rate lasted only for ~500 s, then λ_t decreased rapidly until the end of the NaO_x source, when it again increased for ~600 s and then fell continuously for the rest of the test. The NaI removal rate was greater than that of NaO_x.

TABLE 4-20
EXPERIMENTAL MEASUREMENT OF SETTLED MASS

Type of Surface	Surface Area (m ²)	NaO _x (a)		NaI (a)	
		Surface Conc. (g NaO _x /m ²)	Deposited Mass (kg NaO _x)	Surface Conc. (g NaI/m ²)	Deposited Mass (g NaI)
Catch Pan	11.2	7207	80.71	7.37	82.5
Bottom Head	36.7	4252	156.07	5.33	195.6
Personnel Platform	4.2	2231	9.37	3.25	13.6
Internal Components	<u>36.0</u>	2470	<u>88.92</u>	2.12	<u>76.5</u>
TOTAL	88.1		335.07		368.2

(a) Taken from Table 4-10, with adjustment to give same mass as released to containment.

TABLE 4-21
PLATED MASS CALCULATION

Type of Surface	Surface Area (m ²)	NaO _x (a)		NaI (a)	
		Surface Conc. (g NaO _x /m ²)	Deposited Mass (g NaO _x)	Surface Conc. (g NaI/m ²)	Deposited Mass (g NaI)
Ceiling	63.0	25.1	1580	0.0267	1.68
Vertical	690.	52.0	<u>35800</u>	0.0674	<u>46.51</u>
TOTAL			37380		48.19

(a) Taken from Table 4-9, with adjustment to give same total mass as released to containment.

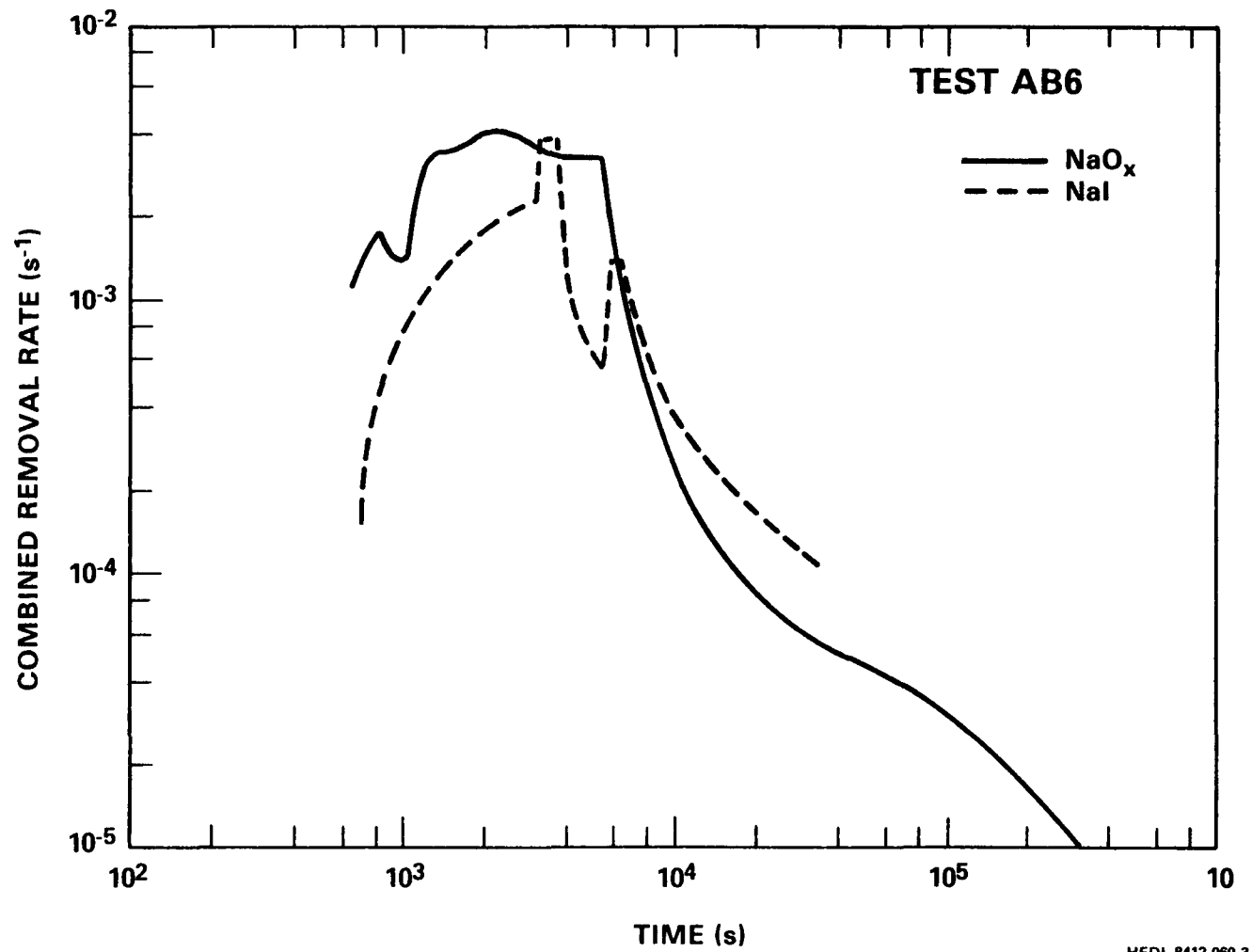


FIGURE 4-30. Removal Rate Constants for NaO_x and NaI as a Function of Time.

for a short while immediately after the NaI source cutoff and at all times >6000 s.

The NaO_x removal rate increased erratically for the initial 400 s after start of sodium spraying. Then it increased to a maximum value of 0.004 s^{-1} at 2000 s and then decreased to a steady value of $3.25 \times 10^{-3} \text{ s}^{-1}$ until the end of the sodium spray. After the end of the NaO_x source, λ_t decreased monotonically for the rest of the test.

TABLE 3-7 (Cont'd)

Test Condition	Value
<u>NaI Aerosol Source</u>	
Start time	0
Stop time	3000
Release rate	0.14 g NaI/s
Total NaI released	420 g
N ₂ flow rate to CV	0.0124 std. m ³ /s
Total N ₂ released to CV	37.1 std. m ³
Temperature of carrier gas to CV	210 + 10°C
Material density	3.67 g/cm ³
Source 50% radius	0.272 μm
Source sigma	1.55
Initial concentration	0

5.0 COMPARISON OF EXPERIMENTAL RESULTS WITH COMPUTER CODE PREDICTIONS

5.1 IDENTIFICATION OF CODES AND USERS

Five individuals participated in making computer code predictions of test AB6. These people, their affiliations, and mailing addresses are listed in Table 5-1.

TABLE 5-1
LIST OF PARTICIPANTS FOR ABOVE TEST AB6

<u>Participant</u>	<u>Affiliation</u>	<u>Address</u>
R. K. Hilliard	Hanford Engineering Development Laboratory	P.O. Box 1970 Richland, WA 99352
Hans Jordan	Battelle Columbus Laboratories	505 King Avenue Columbus, OH 43201
K. K. Murata	Sandia National Laboratories	P.O. Box 5800 Albuquerque, NM 87115
J. M. Otter	Rockwell International Energy Systems Group	8900 DeSoto Avenue Canoga Park, CA 91304
L. J. Petrosky	Westinghouse Electric Co. Advanced Energy Systems Division	P.O. Box 158 Madison, PA 15663

The aerosol codes used to predict aerosol behavior, along with the corresponding participants, are identified in Table 5-2. Each code was exercised by only one participant, so no information was obtained on variation between users of the same code, as was done for test AB5.⁽¹⁾ However, it should be pointed out that the MAEROS⁽¹⁰⁾ Code is a stand-alone version of the aerosol behavior calculation part of CONTAIN.⁽¹¹⁾ The code cases are assigned identification numbers, as shown in Table 5-2, to facilitate discussions and comparisons with data in subsequent sections of this report.

TABLE 5-2
CODE CASES FOR ABCOVE TEST AB6

Code Case No.	Code	User	Log-Normal or Discrete	Coagglomeration Assumption
1	HAA-3C	HEDL/SSD	Log-Normal	Uniform
2	HAA-4	Rockwell/ESG	Log-Normal	Uniform
3	HAARM-3	HEDL/SSD	Log-Normal	Uniform
4	SOFIA	Westinghouse/AESD	Log-Normal	Uniform
5	QUICKM	BCL	Discrete	Sectionally Uniform
6	MAEROS	HEDL/SSD	Discrete	Sectionally Uniform
7	CONTAIN-1B, Mod 415	SNL	Discrete	Sectionally Uniform

Four of the codes (HAA-3,⁽⁵⁾ HAA-4,⁽⁷⁾ HAARM-3,⁽⁶⁾ and SOFIA⁽⁸⁾) are termed "log-normal" because they use the assumption that the suspended aerosol always has a log-normal size distribution. Three of the codes (QUICKM,⁽⁹⁾ MAEROS,⁽¹⁰⁾ and CONTAIN⁽¹¹⁾) are termed "discrete" because they divide the suspended aerosol size spectrum into a finite number of groups, normally 20 to 40 groups with user-specified size range for each group. QUICKM was previously designated as MSPEC.⁽⁹⁾

Different methods of handling multiple species aerosol are also used by various codes. It has been common in the past to use the assumption that a multiple species aerosol is uniformly coagglomerated; i.e., that each particle has the same composition regardless of size. All of the log-normal codes used in the present study use this assumption. Recently, several multiple species codes have been developed which treat a mixture of species mechanistically by assuming that all particles within a given size group can

be characterized by the same average composition. The QUICKM, MAEROS, and CONTAIN codes used in the present study are of this class. Not all "discrete" codes are multispecies codes. For instance, the QUICK⁽¹⁹⁾ and NAUA⁽²⁰⁾ codes are discrete, but use the uniform coagglomeration assumption.

The seven individual code cases listed in Table 5-2 were run both prior to the test and after the test. The post-test runs were done "blind," in that no experimental data on aerosol behavior per se was made available; only information on thermal conditions and aerosol mass generation was made available to reflect the actual conditions.

5.2 CODE INPUTS

Pretest predictions were made by users on the basis of a test plan supplied by the test performer and inputs chosen by the user. Inputs that were related to the conditions of test AB6 were transmitted to code users prior to the test. These data are presented in Table 5-3 and in Figure 5-1.

After the test was completed, test data related to aerosol generation and thermal conditions were transmitted to the participants. Key test parameters for use in post-test calculations are summarized in Table 5-4. Thermal conditions in the CSTF vessel were supplied in tabular digital form as described in Section 4.4 and Appendix C.

Numerical values of code input parameters that were used in the seven code cases were submitted by each participant and are listed in Tables 5-5 through 5-7. In some instances, the input parameters listed in Tables 5-5 through 5-7 are equivalent ones derived from the actual ones to provide a common format.

Input parameters related to the aerosol source are listed in Table 5-5.

TABLE 5-3
PRETEST INPUT PARAMETERS TRANSMITTED TO
CODE USERS BY THE TEST PERFORMER

Parameter	Value
Component 1 (NaI) source rate (g/s)	0.2
Component 1 (NaI) source 50% radius (μm)	0.25
Component 1 (NaI) source sigma	2.0
Component 1 (NaI) density (g/cm^3)	3.67
Component 1 (NaI) initial concentration	0
Component 1 (NaI) source start time	0
Component 1 (NaI) source cutoff time (s)	3000
Component 2 (NaO_x) source rate (g/s)	76.5
Component 2 (NaO_x) source 50% radius (μm)	0.25
Component 2 (NaO_x) source sigma	2.0
Component 2 (NaO_x) density (g/cm^3)	2.50
Component 2 (NaO_x) initial concentration	0
Component 2 (NaO_x) source start time (s)	600
Component 2 (NaO_x) source cutoff time (s)	5400
Leakage rate (%/day, constant)	1.0
Settling area (cm^2)	8.82×10^5
Plating area (cm^2)	7.52×10^6
Volume (cm^3)	8.52×10^8
Temperature of atmosphere	Figure 5-1
Temperature of steel walls	Figure 5-1
Pressure	Figure 5-1

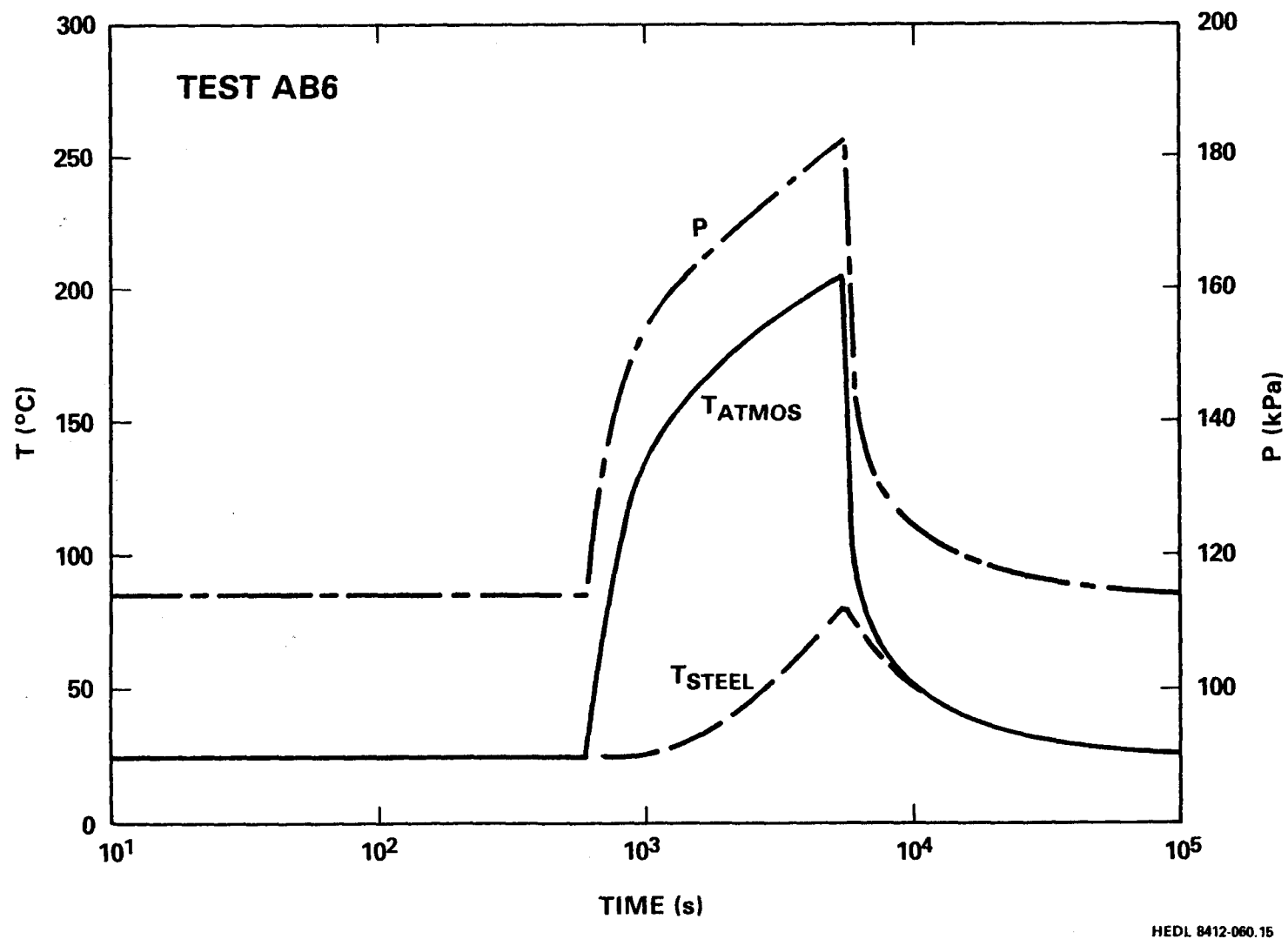


FIGURE 5-1. Pretest Estimates of Temperatures and Pressure Provided by the Test Performer.

TABLE 5-4

TEST CONDITIONS TRANSMITTED TO CODE USERS
FOR USE IN MAKING BLIND POST-TEST PREDICTIONS

<u>Parameter</u>	<u>Pretest Test Plan</u>	<u>Actual Measured or Estimated</u>
<u>NaI Aerosol Source</u>		
Start time (s)	0	0
Stop time (s)	3000	3000
Release rate (g NaI/s)	0.2	0.14
Total NaI released (g)	600	420
N ₂ flow rate to CV (m ³ /s STP)	0.007	0.0124
Material density (g/cm ³)	3.67	3.67
Source 50% radius (μm)	0.25	0.272
Source sigma	2.0	1.55
Initial concentration	0	0
<u>NaO_x Aerosol Source</u>		
Start time (s)	600	620
Stop time (s)	5400	5400
Release rate (g NaO _x /s)	76.5	77.9
Total NaO _x released (kg)	365.4	372.4
Material density (g/cm ³)	2.50	2.45
Source 50% radius (μm)	0.25	0.25
Source sigma	2.0	2.0
Initial concentration	0	0
Mass ratio, total to Na	1.74	1.82

TABLE 5-5

CODE INPUT PARAMETERS RELATED TO THE AEROSOL SOURCE

Code Case No.	Code	Material Density (g/cm ³)		Source d ₅₀ (μm)		Source σ _g		Source Rate			
		NaO _x	NaI	NaO _x	NaI	NaO _x	NaI	(No./s cm ³)		(g/s m ³)	
								NaO _x	NaI	NaO _x	NaI
1	HAA-3C Pretest	2.5	2.5	0.5	0.5	2.0	2.0	4.76(6) ^(a)	--	--	2.35(-4)
	HAA-3C Post-test	2.45	2.45	0.5	0.5	2.0	2.0	4.97(6)	--	--	1.64(-4)
2	HAA-4 Pretest	2.5	3.67	4.4	0.5	1.4	2.0			8.98(-2)	2.35(-4)
	HAA-4 Post-test	2.45	3.67	4.4	0.544	1.4	1.55			9.14(-2)	1.63(-4)
3	HAARM-3 Pretest	2.5	2.5	0.5	0.5	2.0	2.0	4.76(6)	--	--	2.35(-4)
	HAARM-3 Post-test	2.45	2.45	0.5	0.5	2.0	2.0	4.86(6)	--	--	1.64(-4)
4	SOFIA Pretest	2.5	--	2.0	0.5	2.0	2.0			8.98(-2)	2.35(-4)
	SOFIA Post-test	2.5	--	2.0	0.5	2.0	2.0			9.15(-2)	1.64(-4)
5	QUICKM Pretest	2.5	3.67	0.5	0.5	2.0	2.0			8.98(-2)	2.35(-4)
	QUICKM Post-test	2.45	3.67	0.5	0.544	2.0	1.55			9.14(-2)	1.64(-4)
6	MAEROS Pretest	2.5	2.5	0.5	0.5	2.0	2.0			8.98(-2)	2.35(-4)
	MAEROS Post-test	2.45	2.45	0.5	0.5	2.0	2.0			9.14(-2)	1.63(-4)
7	CONTAIN Pretest	2.5	2.5	0.5	0.5	2.0	2.0			8.98(-2)	2.35(-4)
	CONTAIN Post-test	2.5	2.5	0.5	0.544	2.0	1.55			9.14(-2)	1.64(-4)

(a) Numbers in parenthesis are exponents of 10.

TABLE 5-6

CODE INPUT PARAMETERS RELATED TO AGGLOMERATE BEHAVIOR

Code Case No.	Code	CHI	GAMMA	ALPHA	EPSILON	Non-Stoksien Correction
1	HAA-3C pretest	---	---	0.2	1.0	Klyachko
	HAA-3C post-test	---	---	0.2	1.0	Klyachko
2	HAA-4 pretest	1.2	3.0	---	0.016	Klyachko
	HAA-4 post-test	1.2	3.0	---	0.016	Klyachko
3	HAARM-3 pretest	1.3	3.0	---	(a)	Klyachko
	HAARM-3 post-test	1.3	3.0	---	(a)	Klyachko
4	SOFIA pretest	---	---	0.2	1.0	None
	SOFIA post-test	---	---	0.2	1.0	None
5	QUICKM pretest	1.3	2.5	---	(a)	(b)
	QUICKM post-test	1.3	2.5	---	(a)	(b)
6	MAEROS pretest	1.5	2.25	---	(a)	None
	MAEROS post-test	1.5	2.25	---	(a)	None
7	CONTAIN pretest	1.5	2.25	---	(a)	None
	CONTAIN post-test	1.5	2.25	---	(a)	None

(a) Internally coded Fuchs approximation, $1.5 (r_j/r_j+r_i)^2$

(b) Empirical friction factor correlation.

TABLE 5-7

CODE INPUT PARAMETERS RELATED TO ATMOSPHERE TEMPERATURES
AND WALL DEPOSITION MECHANISMS

Code Case No.	Code	Atm Temp Variable or Constant	Diffusion Delta (m)	Wall Gradient (°K/m)	Gas/Particle Conductivity Ratio
1	HAA-3C pretest	Variable	1.0(-7) (a)	---	---
	HAA-3C post-test	Variable	1.0(-7)	---	---
2	HAA-4 pretest	Variable	2.0(-4)	Variable(b)	5.0(-2)
	HAA-4 post-test	Variable	2.0(-4)	Variable(b)	5.0(-2)
3	HAARM-3 pretest	Variable	1.0(-7)	1.0(2)	1.0(-1)
	HAARM-3 post-test	Variable	1.0(-7)	1.0(2)	1.0(-1)
4	SOFIA pretest	Variable	Variable	Flux/Gas Cond.	6.25(-2)
	SOFIA post-test	Variable	Variable	Flux/Gas Cond.	6.25(-2)
5	QUICKM pretest	Constant	1.0(-4)	0	5.0(-3)
	QUICKM post-test	Constant	1.0(-4)	Variable(c)	5.0(-3)
6	MAEROS pretest	Constant	2.0(-5)	5.0(3)	1.0(-1)
	MAEROS post-test	Constant	2.0(-5)	2.3(3) Ceiling 5.4(3) Wall, floor	1.0(-1)
7	CONTAIN pretest	Variable	1.0(-5)	1.04(4)(d)	5.0(-2)
	CONTAIN post-test	Variable	1.0(-5)	1.04(4)(d)	5.0(-2)

(a) Numbers in parenthesis are exponents of 10.

(b) Atmosphere temperature 1 cm from wall minus surface temperature divided by constant 0.004 m boundary layer.

(c) Calculated from heat balance and heat flux to surface.

(d) During Na spray period; zero at other times.

Pretest and post-test values are given for material density, source size, geometric standard deviation, and particle source rate. Inspection of the listed inputs indicates that most of the code cases used identical or very similar numerical values. The notable exception is the source size employed in the HAA-4 and SOFIA cases, where code users chose to use source size parameters for NaO_x which agreed with previous experiments and were not those specified by HEDL.

Code input parameters that are related to the behavior of agglomerated particles are listed in Table 5-6. Because of differences in modeling, the same input parameters for different codes may not infer the same calculations. The parameters listed in Table 5-6 are defined as follows.

CHI

CHI is a dynamic shape factor that allows the particle drag to be related to Stokes' law for spheres. CHI is a denominator factor in Stokes' law, and because non-spherical agglomerates settle more slowly than spherical agglomerates, CHI is equal to or larger than unity.

GAMMA

GAMMA is a factor which relates the effective collision radius of a particle to the actual particle radius. Because non-spherical agglomerates are able to collide more effectively, GAMMA is equal to or larger than unity.

ALPHA

ALPHA is a density modification factor used to account for the reduced settling velocity of agglomerates compared to solid spheres. Generally, it is a numerator factor in Stokes' law and its value is less than or equal to unity.

EPSILON

EPSILON is a gravitational collision efficiency used in all of the codes. It relates to the fraction of particles in a swept volume that is captured by a falling particle.

KLYACHKO

The KLYACHKO parameter allows deviations from Stokes' drag that occur at high Reynolds numbers to be taken into account. This factor becomes important for particles larger than $\sim 100 \mu\text{m}$. The dashes in Table 5-6 indicate that the parameter is not used in the code, or else is computed internally.

The numerical values for aerosol parameters listed in Table 5-6 were not specified by the test performer. They were selected by the code user, based on the user's experience. Most users selected the parameters on the basis of code fits with earlier large-scale sodium fire aerosol tests in the CSTF.

Code input parameters related to atmosphere temperatures, diffusional deposition, and thermophoretic plating are summarized in Table 5-7. Inspection of the data of Table 5-7 shows that the variables selected by the users covered a significant numerical range. Diffusional plating boundary layer thickness was assigned values from $1 \times 10^{-7} \text{ m}$ to $2 \times 10^{-4} \text{ m}$. The small value for delta used in the HAA-3 code results from the assumption that all plateout is caused by diffusion, and delta is assigned an empirical value to match previous experiments. The wall temperature gradient values ranged from $1 \times 10^2 \text{ }^\circ\text{K/m}$ to $1 \times 10^4 \text{ }^\circ\text{K/m}$, a range two orders of magnitude.

Some of the codes used variable gradients and two calculated the gradient from the heat flux to surfaces. The assigned values of the ratio of gas to particle thermal conductivity varied from 0.005 to 0.1, a factor of 20.

5.3 PRETEST PREDICTIONS

Pretest predictions submitted by each participant are listed in Appendix E. The calculated results submitted by the various participants were not of identical format and, for this reason, the tables in Appendix E are not of uniform format.

5.4 BLIND POST-TEST PREDICTIONS

Blind post-test predictions submitted by each participant are tabulated in Appendix F. These predictions were made with the benefit of test data on thermal conditions and aerosol mass generation rate. No information or aerosol behavior per se was made available, hence the predictions were "blind" to aerosol behavior data.

5.5 COMPARISON OF CODE PREDICTIONS WITH EACH OTHER AND WITH TEST RESULTS

Predictions of key aerosol behavior parameters are compared with each other and with key results in the following sections by listing numerical values of parameters at 16 discrete times. Tables of code predictions and experimental results are provided in Appendices G through M.

As tools for evaluating the accuracy of individual code case predictions, two indices are listed in the tables in Appendices G through M for each code case. The first is the ratio of the individual code prediction to the average of all codes. This index has only marginal value in assessing a code, but does show how it relates to the other code cases. The second index is the ratio of the individual code prediction (based on blind post-test prediction only) to the experimental value. It should be noted that experimental measurements were not always made at the precise times reported by the code users. In these instances, the experimental values listed in the tables were obtained by plotting the experimental data, drawing a smooth

curve through the data points and interpolating. This index is useful for comparing the code prediction with the experimental measurement. Comparisons are made separately for NaO_x and NaI .

An effort is made to quantify the overall performance of each code case by tabulating the number of times the code predicted the experimental value within specified limits.

5.5.1 Suspended Mass Concentration

5.5.1.1 Suspended NaO_x Concentration

The suspended mass concentration of NaO_x aerosol predicted by the seven code cases (blind post-test) are plotted in Figure 5-2 for the full time period of the experiment. The experimental measurements are also plotted for comparison with the code predictions. Two observations are apparent from Figure 5-2. First, all the codes overpredicted the concentration by factors of 1.7 to 2.8 during the source release period. This fact is shown more clearly in Figure 5-3, where the concentrations during the source release period are plotted on an expanded scale for easier visualization. The MAEROS/CONTAIN pair predicted nearly identical concentrations and, along with QUICKM and HAA-4, gave the best agreement with the experimentally measured values. Three of the log-normal codes, HAA-3, HAARM-3 and SOFIA, gave similar results, being high by factors of 2.5 to 2.8. Only HAA-4 predicted a decrease in the suspended concentration during the source period after an initial brief time at a higher concentration. Evidence of this behavior is seen in the experimental data (see Figure 4-16).

The second observation shown by Figure 5-2 is that the discrete codes were in better agreement with the test measurements after the end of the NaO_x source than the log-normal codes. As in test AB5, the log-normal codes HAA-3 and HAARM-3 underpredicted significantly after the source cutoff. HAA-4 predicted the NaO_x concentration very well until 4600 s after the end of the source ($t=10$ s), after which it underpredicted significantly. SOFIA behaved differently from the other log-normal codes, predicting low for a short time immediately after the source cutoff, but being high by a factor of 10 at 10^5 seconds.

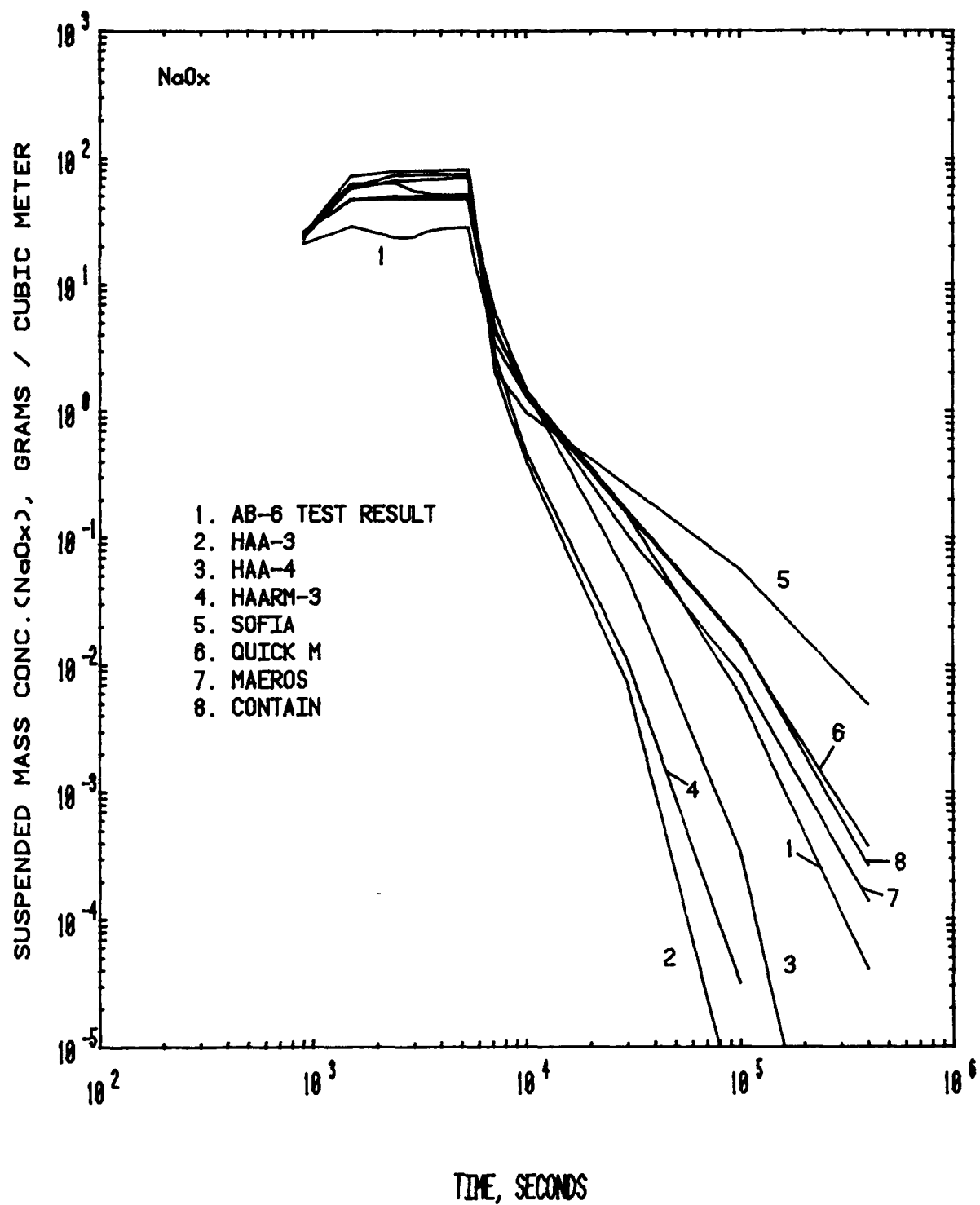


FIGURE 5-2. Plot of Code Predictions of NaO_x Suspended Mass Concentration for the Entire Test Period.

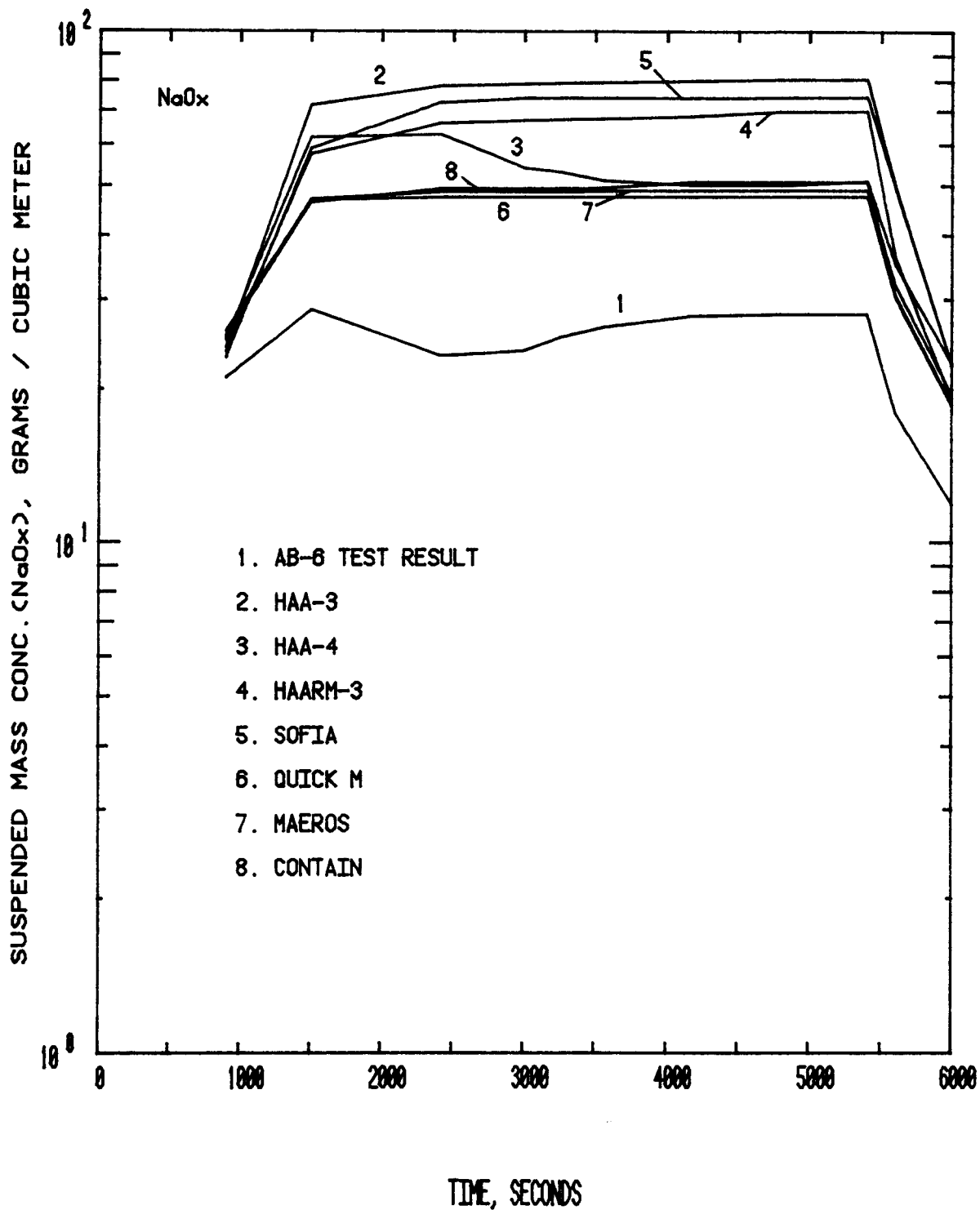


FIGURE 5-3. Plot of Code Predictions of Suspended NaO_x Concentration During the Source Period.

Detailed digital information on the suspended NaO_x mass concentrations predicted for the seven code cases is given in Appendix G. Each table in Appendix G relates to one of the 16 specified code reporting times. Both the pretest and post-test predictions are listed, and the arithmetic average value for the code predictions are shown in the table. Experimental measurements for suspended mass concentration were extracted from the data presented in Section 4.6 and listed as a footnote in the Appendix G tables. The ratios of the individual code predictions (blind post-test) to the experimental result are given in the last column of the Appendix G tables.

The Appendix G tables show that the blind post-test predictions were very close to the pretest predictions at all times, being only 6% different at the end of the reporting period. This near duplication is no doubt due to the close similarity of the actual test conditions to the pretest estimates. For example, the NaO_x source release rate was only 2% greater than the test plan value.

The number of times that each code case predicted the experimental value within a factor of two is tabulated in Table 5-8. The factor of two should not be inferred as a universally accepted criterion for adequate validation, but is believed to provide a reasonable basis for the present study.

5.5.1.2 Suspended NaI Concentration

The suspended mass concentration of NaI aerosol predicted by the seven code cases (blind post-test) are plotted in Figure 5-4 for the full time period of the experiment. The experimental measurements are also plotted for the times they are available. Figure 5-4 shows that reasonably good agreement with experimental measurements was obtained by all the codes during the source release period, but large divergences occurred after the end of the source. The data taken during the source release period are plotted on an expanded time scale in Figure 5-5. The QUICKM, MAEROS and CONTAIN codes predicted the NaI fairly well during the source period, but underpredicted greatly after the end of the NaI source. The HAA-4 code followed the

TABLE 5-8

CODE CASES WITH CORRECT PREDICTIONS FOR SUSPENDED CONCENTRATIONS

Time (s)	NaO _x (b)							NaI(b)						
	1(a)	2	3	4	5	6	7	1	2	3	4	5	6	7
6.00 (2)	-	-	-	-	-	-	-	Y	Y	Y	Y	Y	Y	Y
9.00 (2)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.50 (3)	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2.40 (3)	N	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
3.00 (3)	N	N	N	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y
3.25 (3)	N	Y	N	N	Y	Y	Y	N	Y	N	N	Y	Y	Y
3.55 (3)	N	Y	N	N	Y	Y	Y	N	N	N	N	Y	N	N
4.16 (3)	N	Y	N	N	Y	Y	Y	N	N	N	N	N	N	N
4.76 (3)	N	Y	N	N	Y	Y	Y	N	Y	N	N	N	N	N
5.40 (3)	N	Y	N	N	Y	Y	Y	N	Y	N	N	N	N	N
5.60 (3)	N	Y	Y	N	Y	Y	Y	N	Y	N	N	N	N	N
7.20 (3)	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	N	N	N
1.00 (4)	N	Y	N	Y	Y	Y	Y	N	Y	N	N	N	N	N
3.00 (4)	N	N	N	Y	Y	Y	Y	N	Y	N	N	N	N	N
1.00 (5)	N	N	N	N	N	Y	N	(c)	(c)	(c)	(c)	(c)	(c)	(c)
4.00 (5)	N	N	N	N	N	N	N	(c)	(c)	(c)	(c)	(c)	(c)	(c)
Total														
Correct	2	10	4	5	12	12	11	5	12	5	6	7	6	6

(a) Code Case: Refer to Table 5-2 for identification.

(b) Y indicates code predicted with a factor of 2 for the indicated time.

N indicates code predicted greater than a factor of 2 from measured value.

A dash indicates that no predictions were made for that time.

(c) No experimental measurement made at this time.

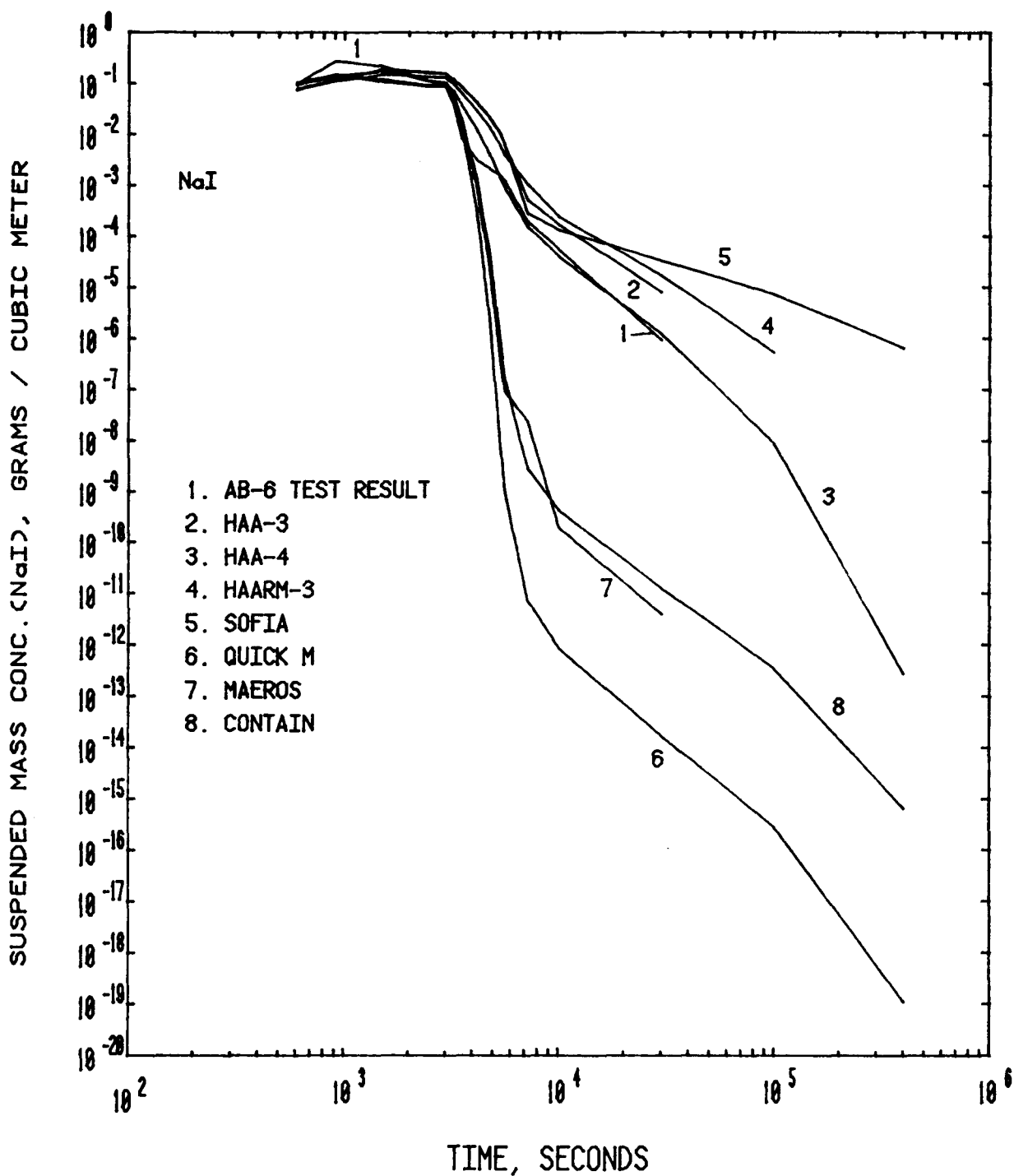


FIGURE 5-4. Plot of Code Predictions of NaI Suspended Mass Concentration for the Entire Test Period.

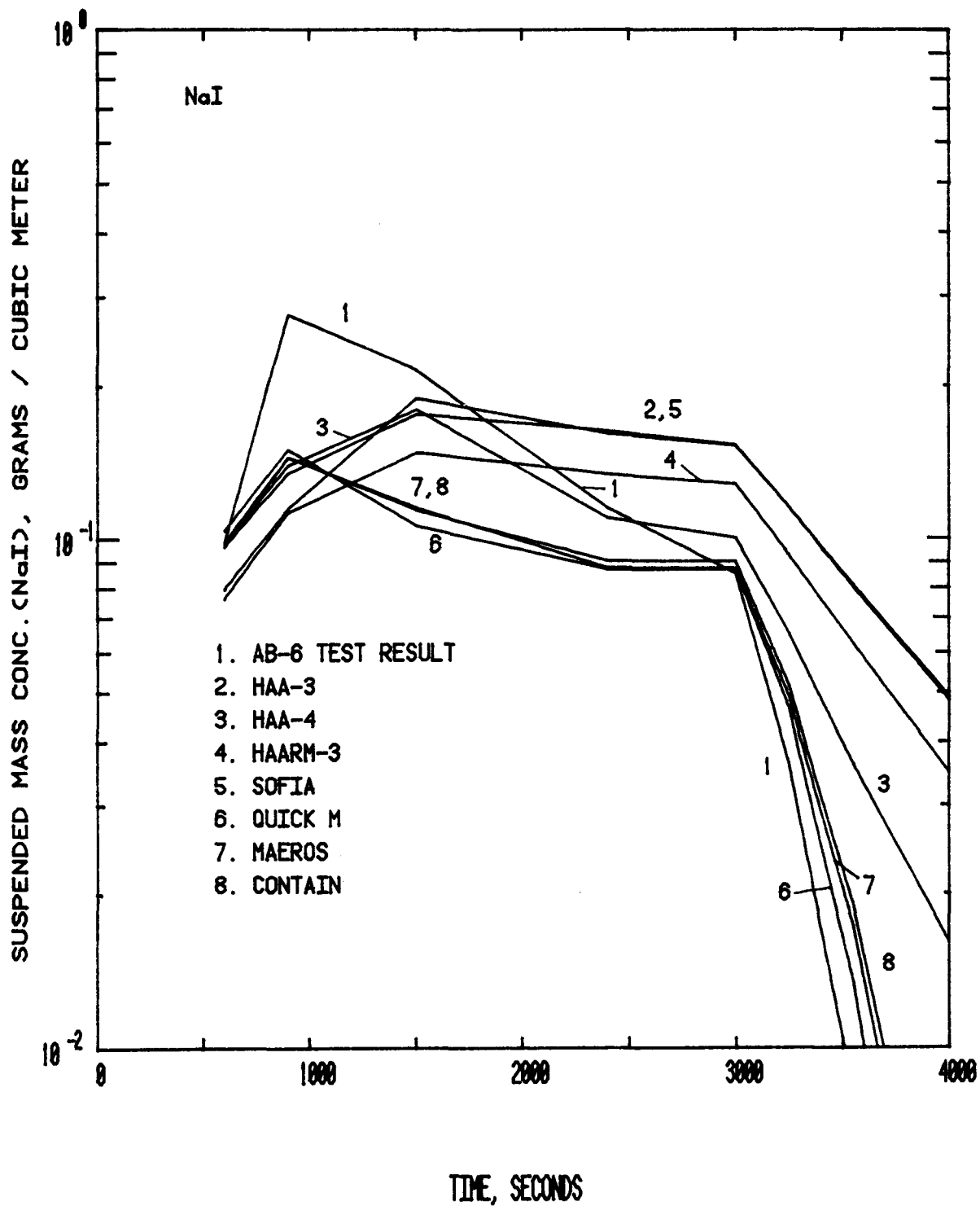


FIGURE 5-5. Plot of Code Predictions of Suspended NaI Concentration During the Source Period.

experimental measurements remarkably well for the entire period to 3×10^4 s, the latest time that experimental measurement was made. As a group, the log-normal, uniform coagglomeration codes predicted the post-source concentration of NaI much better than the discrete, multiple species codes did.

Detailed digital information on the suspended NaI concentration predicted for the seven code cases is given in Appendix G.

The number of times that each code case predicted the experimental value within a factor of two is tabulated in Table 5-8.

5.5.2 Aerodynamic Mass Median Diameter

5.5.2.1 AMMD of NaO_x Aerosol

The aerodynamic mass median diameters (AMMD), based on NaO_x analysis, predicted by the codes are plotted in Figure 5-6. During the source period the log-normal codes overpredicted the magnitude of the NaO_x AMMD, while the discrete codes underpredicted the AMMD slightly. After the source cutoff, all of the log-normal codes continued to overpredict the AMMD, while the discrete codes were in good agreement with experimental measurement. This behavior is generally the same as noted for test AB5.⁽¹⁾

A comparison of NaO_x size distributions predicted by the codes with cascade impactor measurements is provided as a log-probability plot in Figure 5-7. To enable a direct comparison to be made, the code data were plotted as aerodynamic diameter. Cascade impactor samples were not taken at the exact time that the codes reported (1500 s), so impactor data obtained just before and just after the code reporting time are shown. Figure 5-7 shows that all three discrete codes (QUICKM, MAEROS, CONTAIN) predicted nearly identical size distributions, while there was considerable scatter among the log-normal codes. The curves for the log-normal codes are, of course, straight lines on the log-probability plot in Figure 5-7. The discrete code curves are skewed toward a higher mass fraction for large particles. None of the codes fit the cascade impactor data very well for the full distribution.

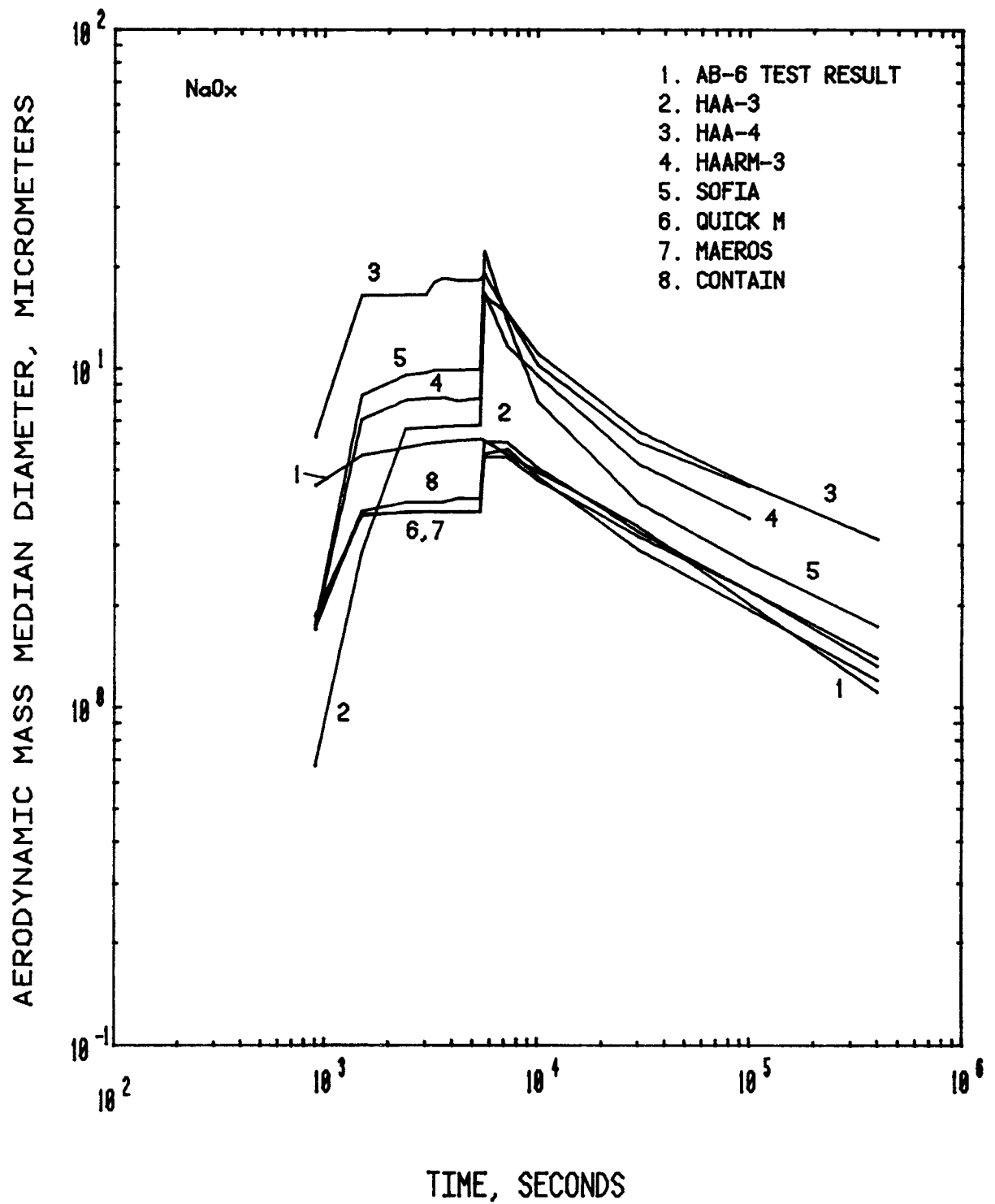


FIGURE 5-6. Plot of Code Predictions of AMMD for NaO_x .

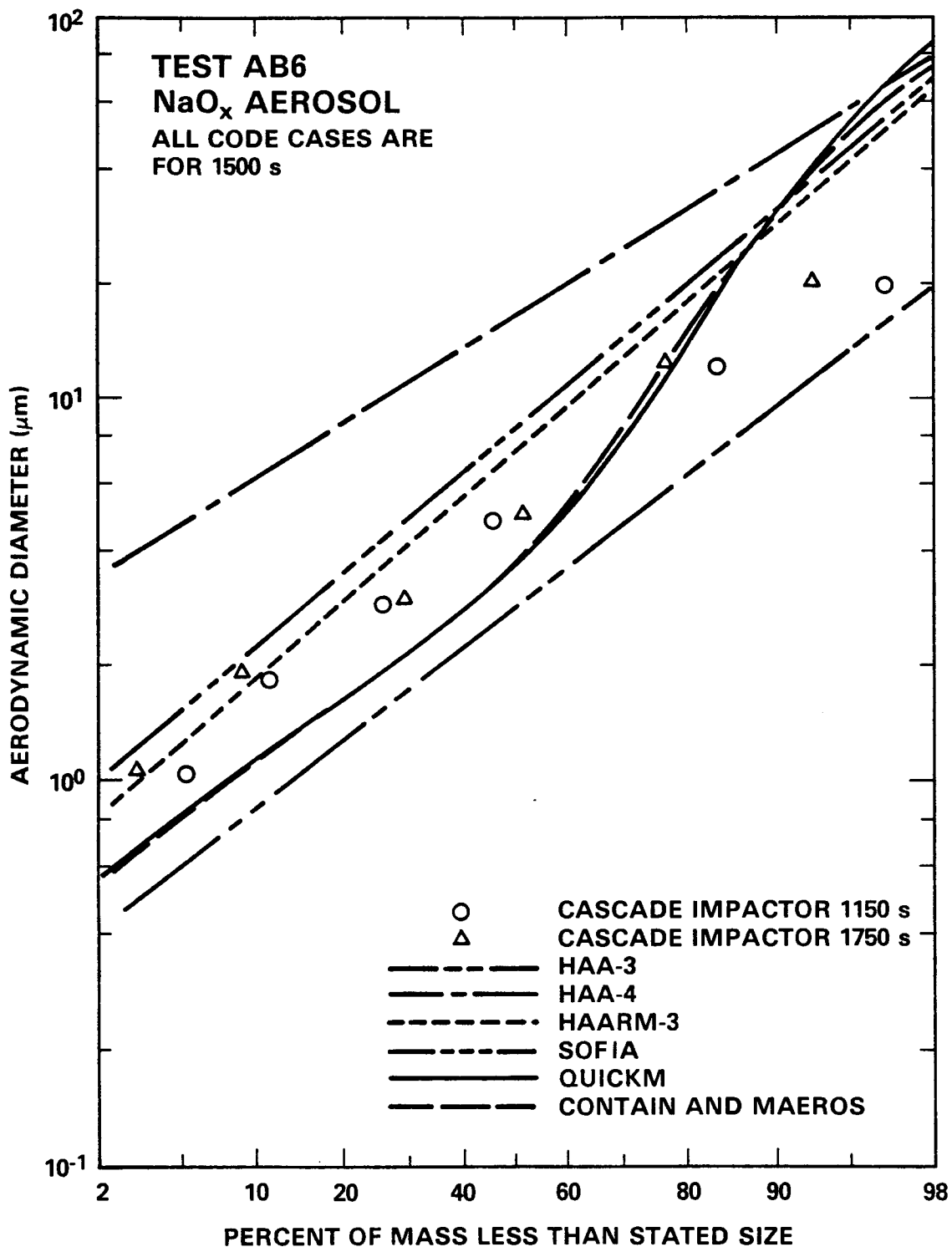


FIGURE 5-7. Log-Probability Plot of Code-Predicted NaO_x Size Distributions and Cascade Impactor Measurements During the Source Period.

It is of interest to note that all the codes except HAA-4 predicted a rapid increase in AMMD immediately after the NaO_x source cutoff, while the HAA-4 code and the experimental result (cascade impactor measurement) showed essentially constant AMMD.

Detailed digital information on the NaO_x AMMD predicted by each code case is presented in Appendix H for the 16 specified reporting times. The AMMD was not reported by the MAEROS code user. The values for MAEROS were calculated by the test performer by plotting the size distribution reported by MAEROS on log-probability paper. The mass median diameter (MMD) obtained from this plot was converted to AMMD by the use of Equation (13).

$$\text{AMMD} = \text{MMD} \left(\frac{\rho}{x} \right)^{1/2} \quad (13)$$

where:

ρ = material density of aerosol particle

x = dynamic shape factor

The experimental values listed as footnotes in Appendix H tables were obtained from cascade impactor measurements reported in Section 4.10.1. Since the impactor measurements were not made precisely at the times reported by the computer codes, the measured values were extracted from Figure 4-22, which is a plot of experimental AMMD as a function of time.

The number of times that individual code cases predicted the experimental value within a factor of 1.5 are shown in Table 5-9. Note that a factor of 1.5 is used for evaluating particle size parameters, rather than a factor of two as is done for other parameters. Particle sizes and standard deviations do not vary over as wide a range as other parameters and, for this reason, the error band was assigned a value of 1.5, rather than 2.0.

TABLE 5-9

CODE CASES WITH CORRECT PREDICTIONS
FOR AERODYNAMIC MASS MEDIAN DIAMETER

Time (s)	NaO _x (b)							NaI(b)						
	1(a)	2	3	4	5	6	7	1	2	3	4	5	6	7
6.00 (2)	-	-	-	-	-	-	-	N	Y	Y	N	Y	Y	Y
9.00 (2)	N	Y	N	N	N	N	N	-	-	-	-	N	N	N
1.50 (3)	N	N	Y	Y	Y	Y	Y	-	-	-	-	Y	Y	Y
2.40 (3)	Y	N	Y	N	Y	Y	Y	-	-	-	-	Y	Y	Y
3.00 (3)	Y	N	Y	N	Y	Y	Y	-	-	-	-	N	Y	Y
3.25 (3)	Y	N	Y	N	N	N	Y	-	-	-	-	(c)	(c)	(c)
3.55 (3)	Y	N	Y	N	N	N	Y	-	-	-	-	(c)	(c)	(c)
4.16 (3)	Y	N	Y	N	N	N	Y	-	-	-	-	(c)	(c)	(c)
4.76 (3)	Y	N	Y	N	N	N	Y	-	-	-	-	(c)	(c)	(c)
5.40 (3)	Y	N	Y	N	N	N	Y	-	-	-	-	(c)	(c)	(c)
5.60 (3)	N	N	N	N	Y	Y	Y	-	-	-	-	(c)	(c)	(c)
7.20 (3)	N	N	N	N	Y	Y	Y	-	-	-	-	(c)	(c)	(c)
1.00 (4)	N	N	N	N	Y	Y	Y	-	-	-	-	(c)	(c)	(c)
3.00 (4)	N	N	Y	Y	Y	Y	Y	-	-	-	-	(c)	(c)	(c)
1.00 (5)	N	N	N	Y	Y	Y	Y	-	-	-	-	(c)	-	(c)
4.00 (5)	-	N	-	Y	Y	Y	Y	-	-	-	-	(c)	(c)	(c)
Total														
Correct	7	1	9	4	9	9	14					3	4	4

(a) Code Case: Refer to Table 5-2 for identification.

(b) Y indicates code predicted with a factor of 1.5 for the indicated time.

N indicates code predicted greater than a factor of 1.5 from measured value.

A dash indicates that no predictions were made for that time.

(c) No experimental measurement made at this time.

5.5.2.2 AMMD of NaI Aerosol

The AMMD based on NaI analysis predicted by the codes are plotted in Figure 5-8. The experimentally determined curve extends only to 3000 s, the end of the NaI source period. The log-normal curves did not report AMMD specifically for NaI, except for the reporting time at 600 s, when NaI was the only aerosol. Thus, the log-normal code predictions at 600 s are reported as single points in Figure 5-8. It is interesting to note that most of the codes underpredicted the measured value at 600 s, even though the experimentally measured NaI source particle size was given in the test plan and agglomeration should have been minimal during the 600-s period of low suspended concentration before the start of the sodium spray. Since the log-normal codes used the assumption of uniform coagglomeration, the AMMD reported for NaO_x (Section 5.5.2.1) apply for NaI also for the log-normal codes.

Figure 5-8 shows that the discrete codes all predicted a large increase in AMMD for NaI immediately after the NaI source cutoff, even though they predicted that the NaO_x AMMD would remain constant. This seems intuitively reasonable, since the source of small NaI particles was stopped and agglomeration would increase the size of all particles containing NaI. It is unfortunate that cascade impactor samples taken after the NaI source cutoff were too low in NaI for reliable analysis.

A comparison of NaI size distributions predicted by the codes with cascade impactor measurements made during the NaI source period is provided in Figure 5.9. The cascade impactor data indicate that the NaI sized distribution at 1500 s was nearly log-normal, while the discrete, multiple species codes predicted a distribution skewed toward larger particles. None of the codes predicted the impactor data very well for the entire distribution.

The number of times that each code case predicted the experimental value of NaI AMMD within a factor of 1.5 is tabulated in Table 5-9.

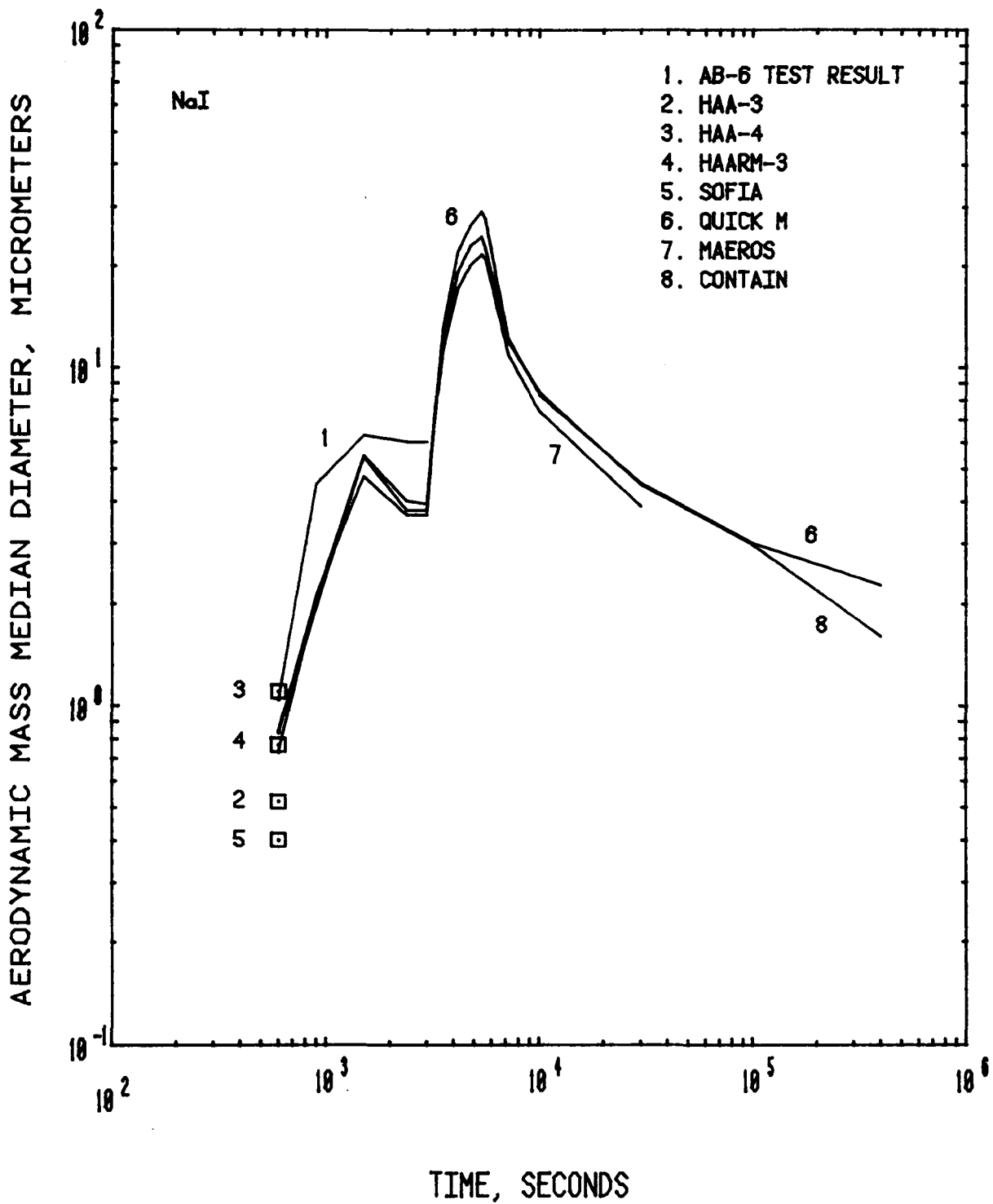


FIGURE 5-8. Plot of Code Predictions of AMMD for NaI.

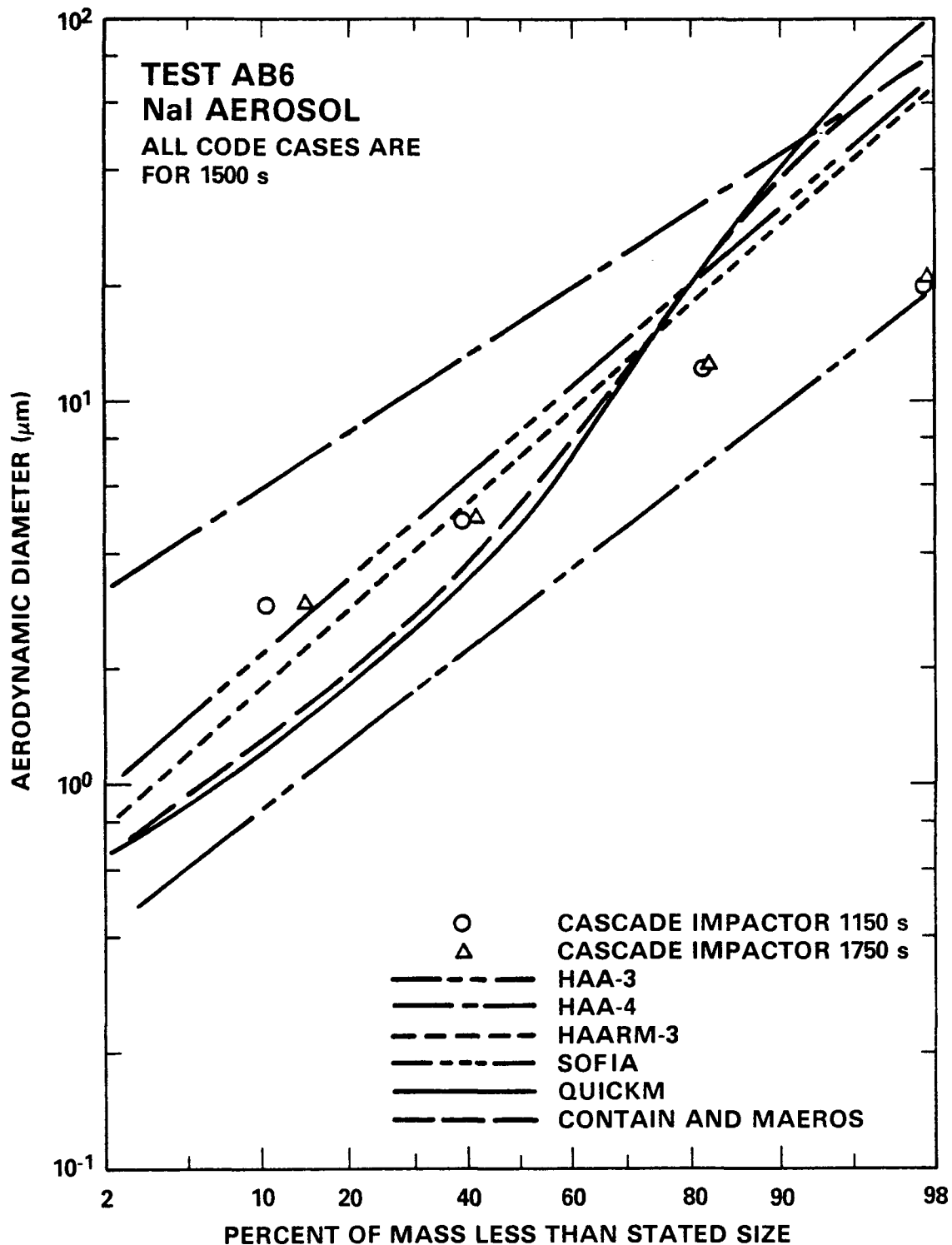


FIGURE 5-9. Log-Probability Plot of Code-Predicted NaI Size Distributions and Cascade Impactor Measurements During the Source Period.

Detailed digital information on the NaI AMMD predicted by the codes is presented in Appendix H.

5.5.3 Geometric Standard Deviation

5.5.3.1 Geometric Standard Deviation for NaO_x Aerosol

The code predictions for geometric standard deviation of the NaO_x aerosol, σ_g , are plotted in Figure 5-10. All of the codes except HAA-4 over-predicted σ_g during the source release period, compared to cascade impactor test measurements. The exceptionally high values predicted by MAEROS is due to the method of calculating σ_g for that code. Values for σ_g were not reported by the MAEROS code. The values for MAEROS were calculated by the test performer by plotting the reported size distributions on log-probability paper and using the relationship defined by Equation (14) to determine an approximate value for σ_g .

$$\sigma_g = \frac{84.1\% \text{ size}}{50\% \text{ size}} \quad (14)$$

This method is known to calculate high for size distributions that are not log-normal and have a smaller proportion of large particles than log-normal, as in the present case. For example, at 3000 s, CONTAIN reported a value for NaO_x σ_g of 3.62, while a value of 5.11 is calculated by Equation (14).

After the NaO_x source cutoff, all the codes predicted low values of σ_g compared with the cascade impactor results.

Detailed digital information on σ_g predicted by each code case is presented in Appendix I for the 16 reporting times. The experimental values listed in the tables were obtained from cascade impactor measurements, as reported in Section 4.10.1. Since the experimental measurements were not made at precisely the times reported for the computer codes, the measured values for σ_g were plotted as a function of time in Figure 4-23 and the experimental values were picked from this curve for the desired times.

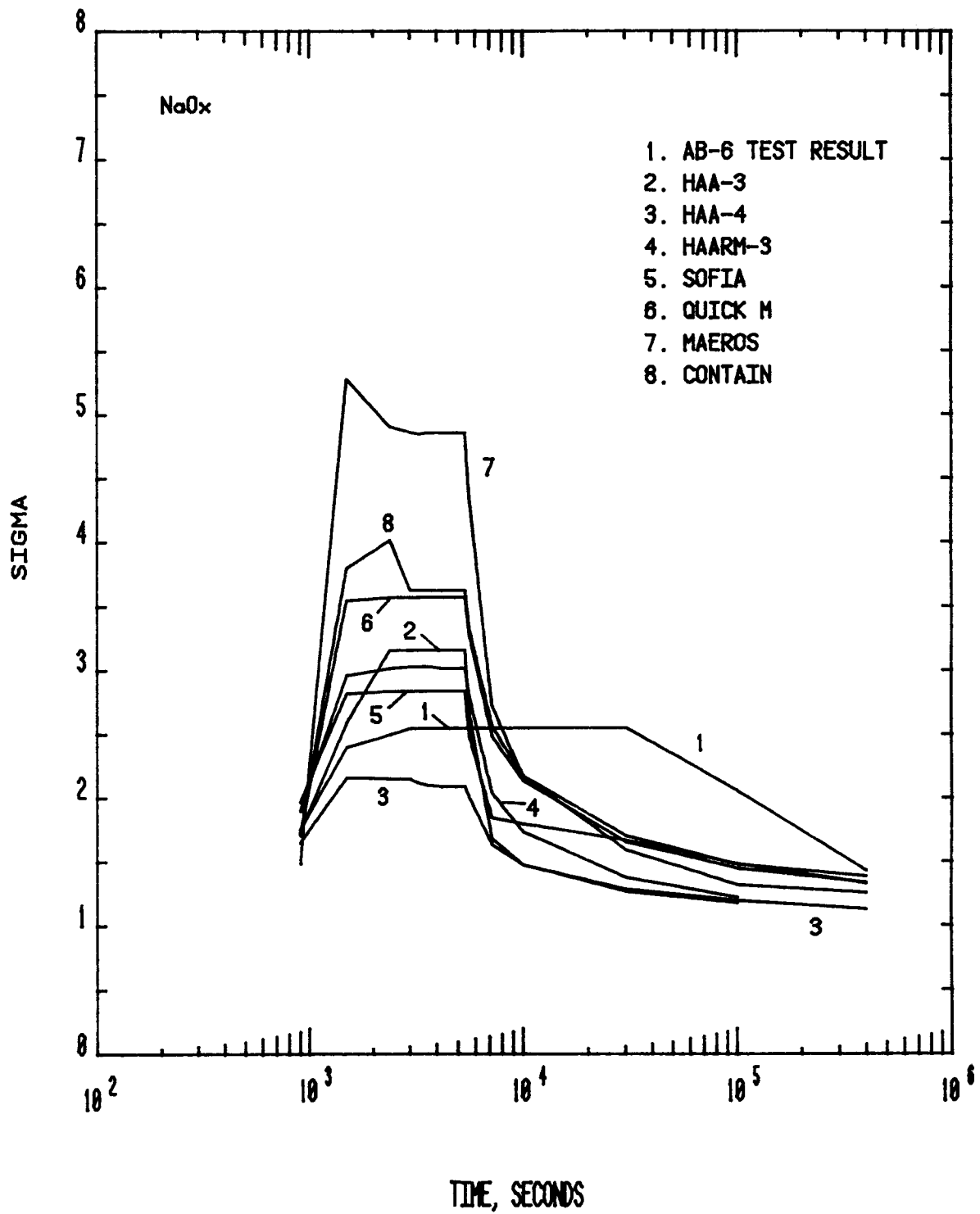


FIGURE 5-10. Plot of Code Predictions of Geometric Standard Deviation for NaO_x.

The number of times that individual code cases predicted the experimental value within a factor of 1.5 is shown in Table 5-10. The MAEROS code performed better than indicated in Table 5-10 because of the error in calculating σ_g for this code, as discussed above. It predicted essentially the same size distribution as CONTAIN, as shown in Figures 5-7 and 5-9 and in Appendix D.

5.5.3.2 Geometric Standard Deviation for NaI Aerosol

None of the codes reported values for σ_g based on NaI content, except for the 600-s reporting period when only NaI was being released. All of the codes were within 20% of the experimental value at 600 seconds. The predicted distribution are compare with cascade impactor data in a log-probability plot in Figure 5-9.

5.5.4 Leaked Mass

5.5.4.1 Leaked NaO_x Mass

The code predictions for the mass of NaO_x aerosol leaked from the containment vessel are plotted as a function of time in Figure 5-11. An estimate of leaked mass was not provided by the MAEROS code. The experimental values from which curve 1 was drawn were calculated, using the same assumption as used in the code cases - that aerosol leaked at a constant 1% of the suspended mass per day. A discussion of the experimental results for leaked mass is provided in Section 4.11.

Detailed digital information on the mass of NaO_x aerosol predicted to have leaked from the containment vessel at the sixteen specified times is listed in Appendix J.

All of the codes overpredicted the leaked mass of NaO_x, by factors ranging from 1.7 to 2.4. The discrete codes were in better agreement with the experimental result than the log-normal codes. The number of times that individual code cases predicted within a factor of two the experimental value

TABLE 5-10

CODE CASES WITH CORRECT PREDICTIONS
FOR GEOMETRIC STANDARD DEVIATION

Time (s)	NaO _x (b)							NaI(b)						
	<u>1(a)</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
6.00 (2)	-	-	-	-	-	-	-	Y	Y	Y	Y	Y	Y	Y
9.00 (2)	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-
1.50 (3)	Y	Y	Y	Y	Y	N	N	-	-	-	-	-	-	-
2.40 (3)	Y	Y	Y	Y	Y	N	N	-	-	-	-	-	-	-
3.00 (3)	Y	Y	Y	Y	Y	N	Y	-	-	-	-	-	-	-
3.25 (3)	Y	Y	Y	Y	Y	N	Y	-	-	-	-	-	-	-
3.55 (3)	Y	Y	Y	Y	Y	N	Y	-	-	-	-	-	-	-
4.16 (3)	Y	Y	Y	Y	Y	N	Y	-	-	-	-	-	-	-
4.76 (3)	Y	Y	Y	Y	Y	N	Y	-	-	-	-	-	-	-
5.40 (3)	Y	Y	Y	Y	Y	N	Y	-	-	-	-	-	-	-
5.60 (3)	Y	Y	Y	Y	Y	N	Y	-	-	-	-	-	-	-
7.20 (3)	Y	N	Y	Y	Y	Y	Y	-	-	-	-	-	-	-
1.00 (4)	N	N	Y	Y	Y	Y	Y	-	-	-	-	-	-	-
3.00 (4)	N	N	N	N	N	N	N	-	-	-	-	-	-	-
1.00 (5)	N	N	N	Y	Y	N	Y	-	-	-	-	-	-	-
4.00 (5)	-	Y	-	Y	Y	Y	Y	-	-	-	-	-	-	-
Total														
Correct	11	11	12	14	14	4	12	1	1	1	1	1	1	1

(a) Code Case: Refer to Table 5-2 for identification.

(b) Y indicates code predicted with a factor of 1.5 for the indicated time.
N indicates code predicted greater than a factor of 1.5 from measured value.

A dash indicates that no predictions were made for that time.

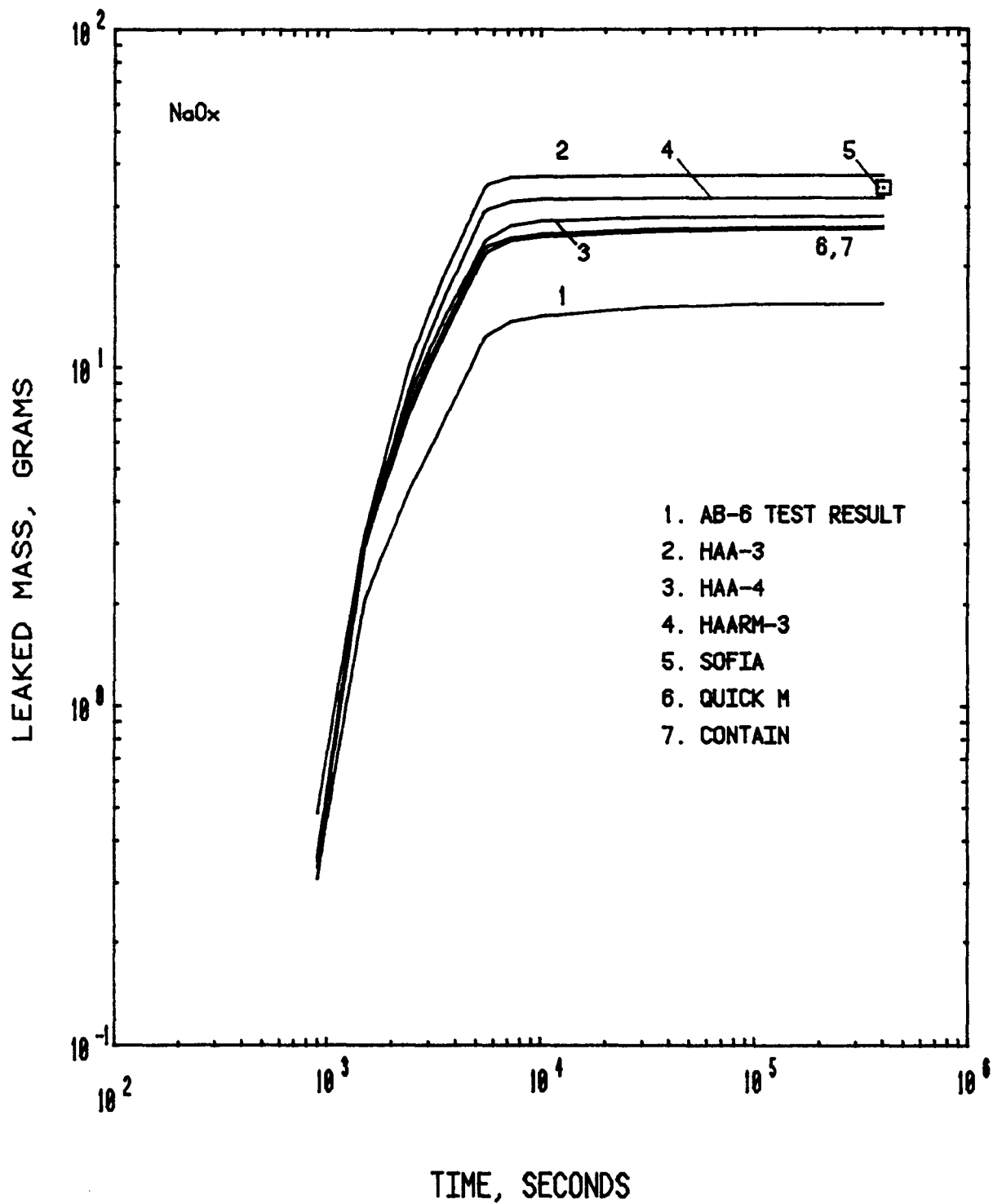


FIGURE 5-11. Plot of Code Predictions of Leaked NaO_x Mass.

is shown in Table 5-11. It is of interest to note that the codes were generally more accurate in predicting leaked mass than they are in predicting suspended mass concentration at discrete times.

5.5.4.2 Leaked NaI Mass

The code predictions for the mass of NaI leaked from the containment vessel are plotted as a function of time in Figure 5-12. The MAEROS code did not report leaked NaI mass. The SOFIA code reported only the total leaked NaI mass at 4×10^5 s. All 6 codes which did report leaked NaI mass were in good agreement with the experimental value, ranging from 28% low to 20% high. The number of times that individual code cases predicted the experimental value within a factor of two is shown in Table 5-11.

Detailed digital information on the mass of NaI aerosol predicted to have leaked from the containment vessel at the 16 specified times is listed in Appendix J.

5.5.5 Settled Mass

5.5.5.1 Settled NaO_x Mass

The code predictions for the mass of NaO_x aerosol collected on horizontal surfaces by gravitational settling are plotted in Figure 5-13. This parameter was measured experimentally only at the end of the experiment. The method of determining settled mass is discussed in Section 4.12. Figure 5-13 shows that all of the codes predicted settled mass very well. Detailed digital information in Appendix K shows that all seven code cases predicted the measured value of final settled NaO_x mass within 12%.

The number of times that individual code cases predicted the experimental value within $\pm 15\%$ is shown in Table 5-12.

TABLE 5-11
CODE CASES WITH CORRECT PREDICTIONS FOR LEAKED MASS

Time (s)	NaO _x (b)							NaI(b)						
	<u>1(a)</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
6.00 (2)	-	-	-	-	-	-	-	Y	Y	Y	-	Y	-	Y
9.00 (2)	Y	Y	Y	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
1.50 (3)	Y	Y	Y	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
2.40 (3)	N	Y	Y	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
3.00 (3)	N	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
3.25 (3)	N	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
3.55 (3)	N	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
4.16 (3)	N	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
4.76 (3)	N	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
5.40 (3)	N	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
5.60 (3)	N	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
7.20 (3)	N	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
1.00 (4)	N	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
3.00 (4)	N	Y	N	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
1.00 (5)	N	Y	Y	-	Y	-	Y	Y	Y	Y	-	Y	-	Y
4.00 (5)	N	Y	Y	N	Y	-	Y	Y	Y	Y	Y	Y	-	Y
Total Correct	2	15	5	0	15		15	16	16	16	1	16	-	16

(a) Code Case: Refer to Table 5-2 for identification.

(b) Y indicates code predicted with a factor of 2 for the indicated time.
N indicates code predicted greater than a factor of 2 from measured value.

A dash indicates that no predictions were made for that time.

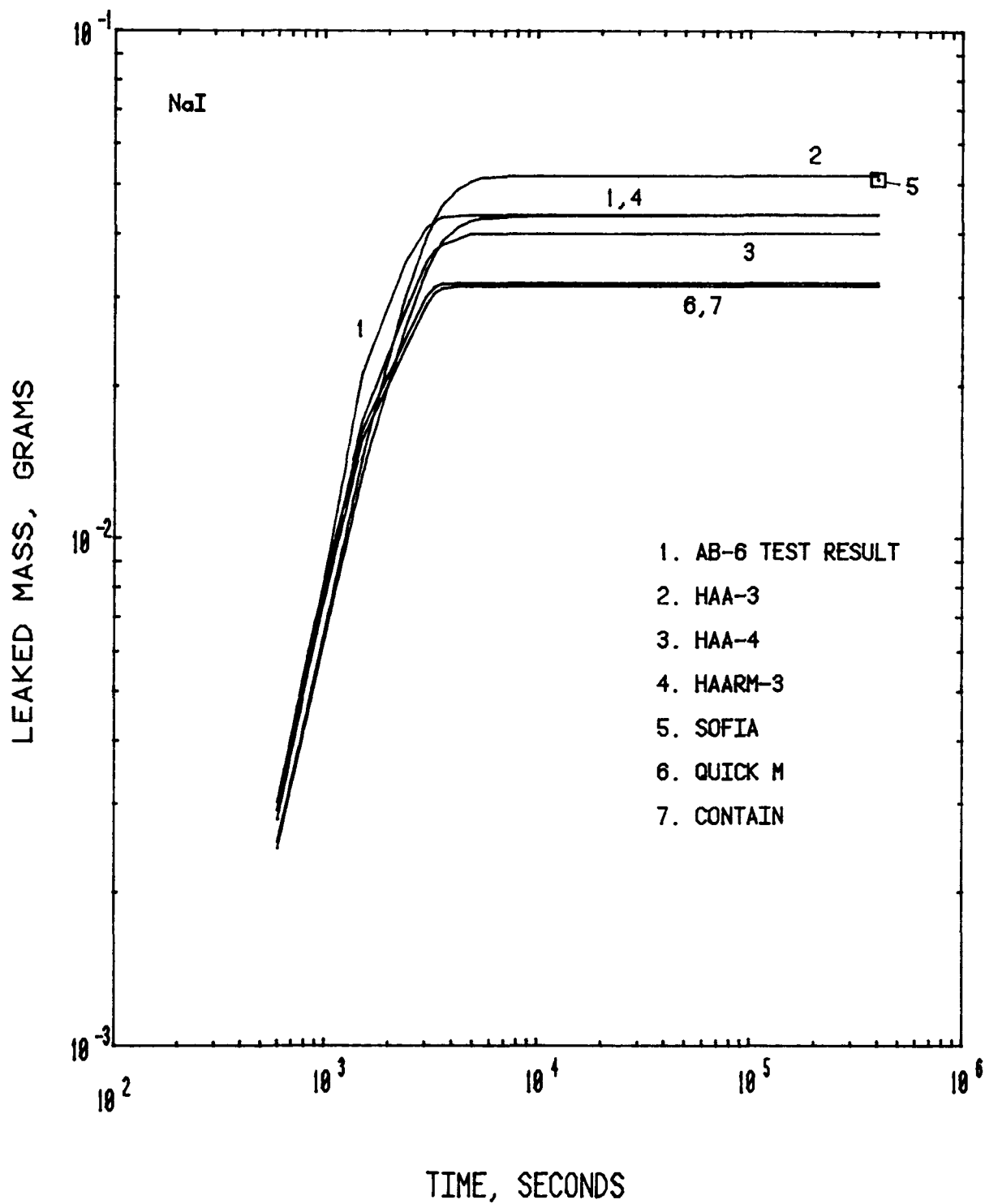


FIGURE 5-12. Plot of Code Predictions of Leaked NaI Mass.

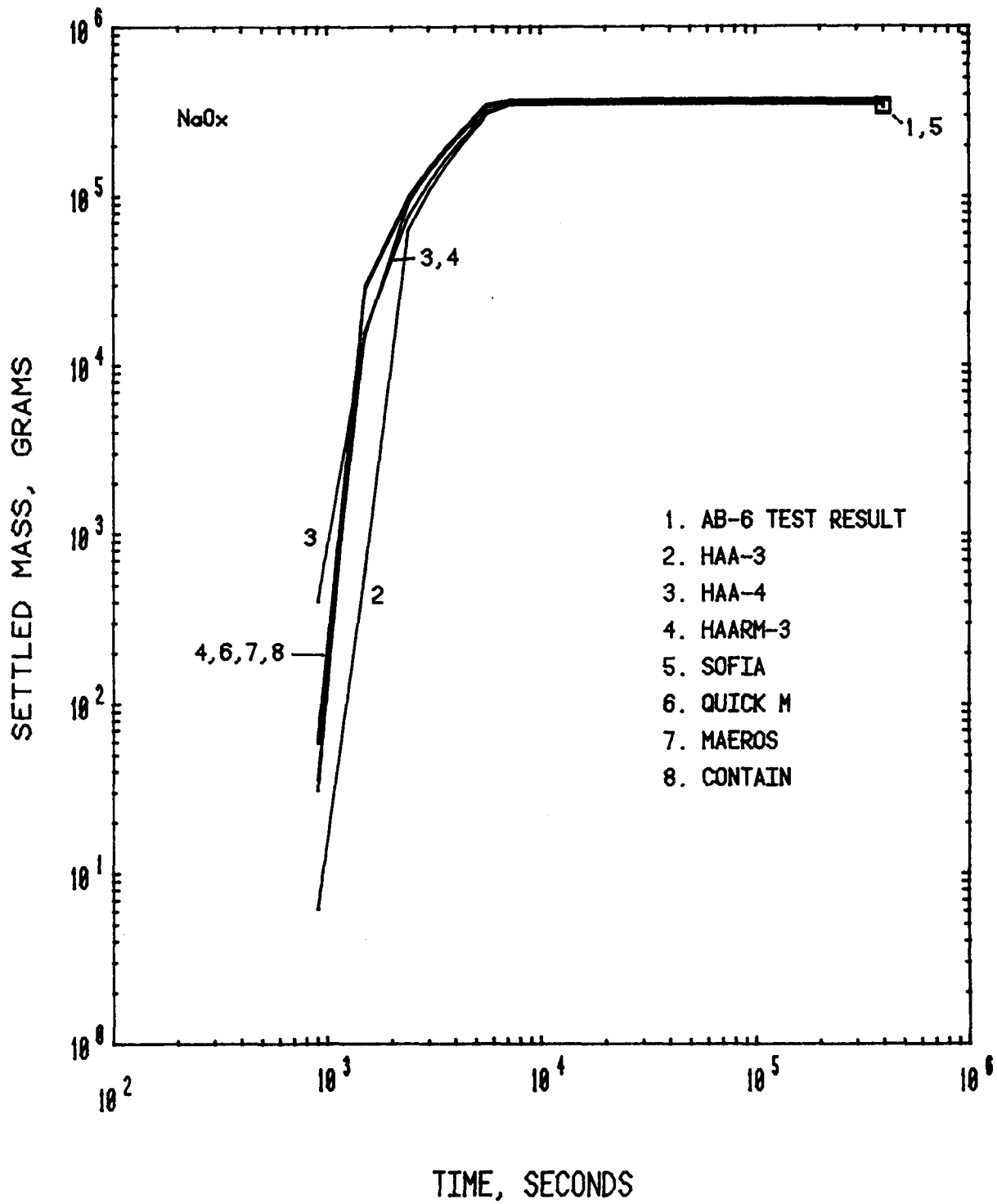


FIGURE 5-13. Plot of Code Predictions of Settled NaO_x Mass.

TABLE 5-12

CODE CASES WITH CORRECT PREDICTIONS FOR SETTLED MASS

Code Case ^(c)	Predicted Settled Mass ^{(a)(b)} Within +15% of Measured	
	NaO _x	NaI
1	Y	Y
2	Y	Y
3	Y	Y
4	Y	Y
5	Y	Y
6	Y	Y
7	Y	Y

^(a)At end of test.

^(b)Y indicates yes; N indicates no;
dash indicates that a prediction
was not made.

^(c)Refer to Table 5-2 for identification.

5.5.5.2 Settled NaI Mass

The code predictions for the mass of NaI collected on horizontal surfaces by gravitational settling are plotted as a function of time in Figure 5-14.

All seven codes predicted the settled NaI mass very well, with predictions ranging from 5% low to 15% high.

5.5.6 Plated Mass

5.5.6.1 Plated NaO_x Mass

The code predictions for plated mass are plotted in Figure 5-15. This parameter was measured only at the end of the test, as discussed in Section 4.13.

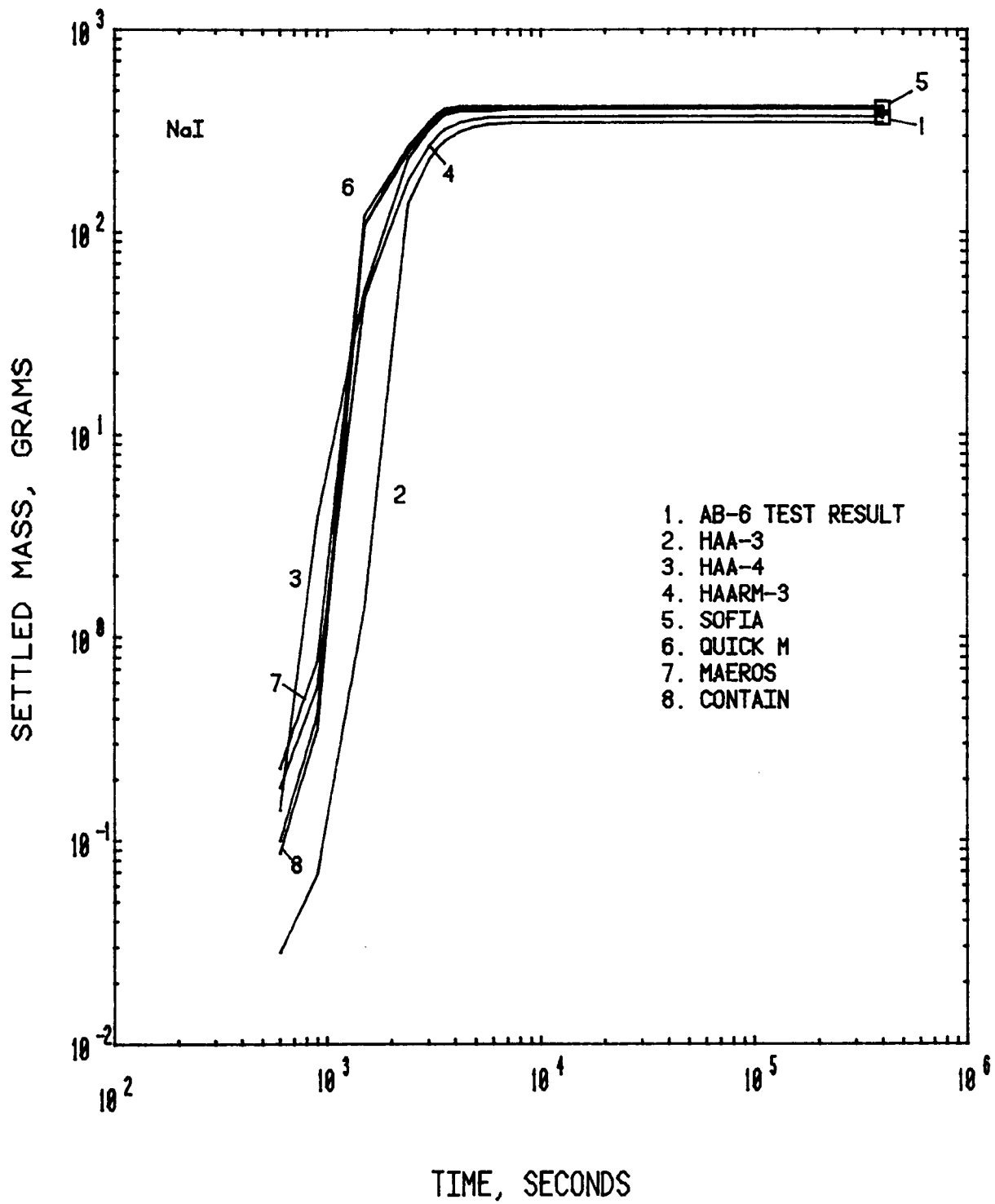


FIGURE 5-14. Plot of Code Predictions of Settled NaI Mass.

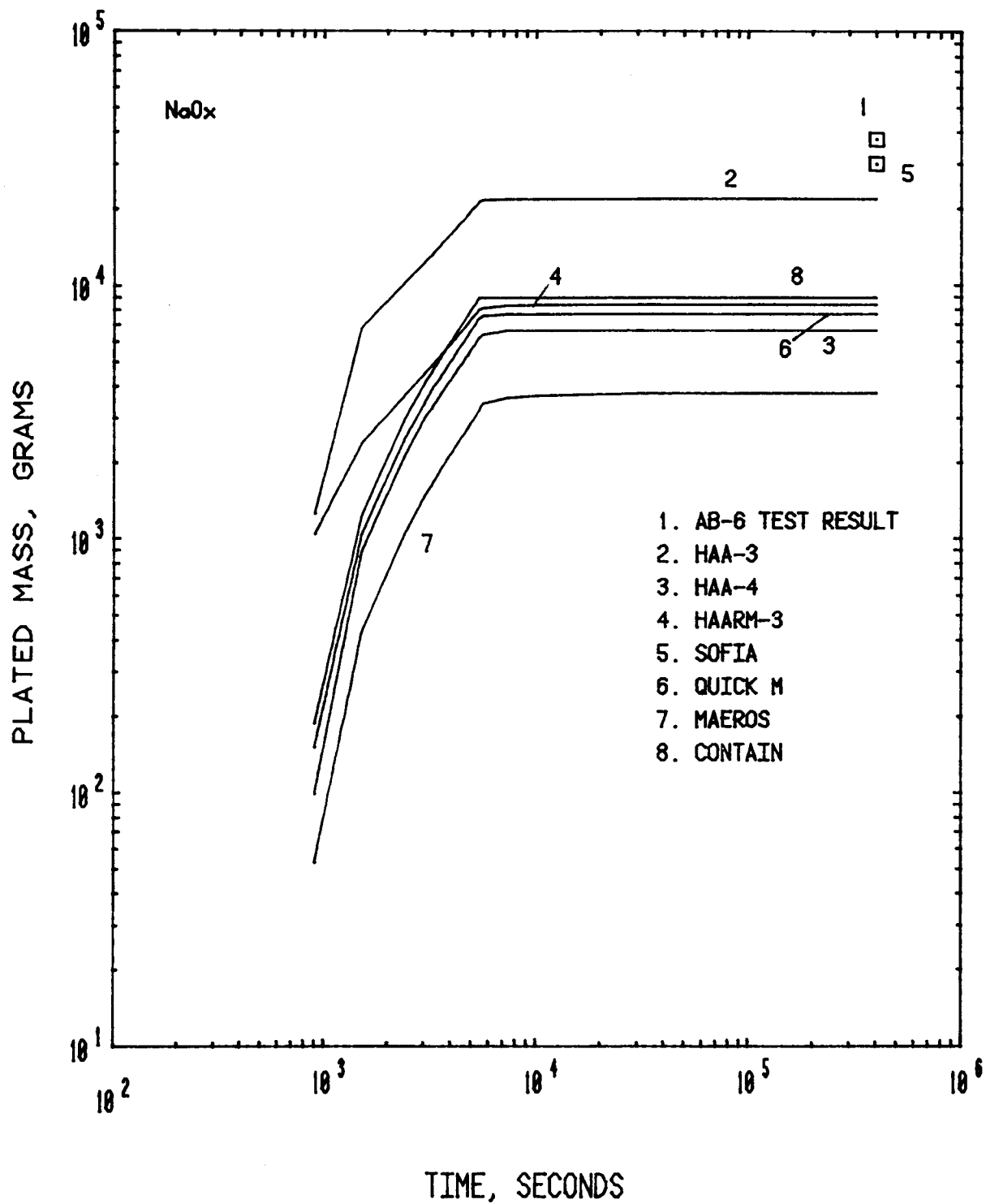


FIGURE 5-15. Plot of Code Predictions of Plated NaO_x Mass.

All of the code predictions underpredicted the plated NaO_x mass by factors ranging from 1.7 (for HAA-3) to 10 (for MAEROS). The average of all seven code cases predicted that 2.5% of the NaO_x would be plated on vertical walls and ceiling, whereas 10.0% was measured. One explanation for this discrepancy is that the aerosol density was much lower than in previous tests (see Section 4.9) and interception and impaction on vessel surfaces may have been important. The codes do not model interception or impaction by convection.

Table 5-13 shows that only the HAA-3 and SOFIA codes predicted the measured value within a factor of 2.

TABLE 5-13
CODE CASES WITH CORRECT PREDICTIONS FOR PLATED MASS

Code Case(c)	Predicted Settled Mass(a)(b) Within a Factor of 2 from Measured	
	NaO_x	NaI
1	Y	Y
2	N	N
3	N	Y
4	Y	Y
5	N	N
6	N	N
7	N	N

(a) At end of test.

(b) Y indicates yes; N indicates no;
dash indicates that a prediction
was not made.

(c) Refer to Table 5-2 for identification.

Detailed digital information on code predictions of plated NaO_x mass is provided in Appendix L.

5.5.6.2 Plated NaI Mass

The code predictions for plated NaI mass are plotted as a function of time in Figure 5-16. The experimental measurement was made only at the end of the experiment, and this is plotted as the single point in Figure 5-16. Detailed digital information on code predictions is provided in Appendix L.

Figure 5-16 and Appendix L show that there was considerable scatter among the code predictions for plated NaI. Three codes (HAA-3, HAARM-3 and SOFIA) were within 40%, while the other codes were all low by factors of 4 to 10.

5.5.7 Instantaneous Combined Removal Rate

5.5.7.1 Removal Rate for NaO_x Aerosol

The predicted values for the combined instantaneous removal rates of suspended NaO_x aerosol are plotted in Figure 5-17. Detailed digital information is provided in Appendix M. The experimental values were calculated from the rate of change of suspended mass concentration and a knowledge of the source release rate by the use of a mass balance on the containment atmosphere, as discussed in Section 4.14.

For several of the code cases, the removal rate was reported in terms of mass rate rather than fractional rate. For these cases, the mass rate was converted to fractional removal by Equation (15).

$$\lambda_t = \frac{R}{VC} \quad (15)$$

where:

λ_t = removal rate, s⁻¹

R = mass removal rate, g/s

V = 852 m³

C = suspended mass conc, g/m³

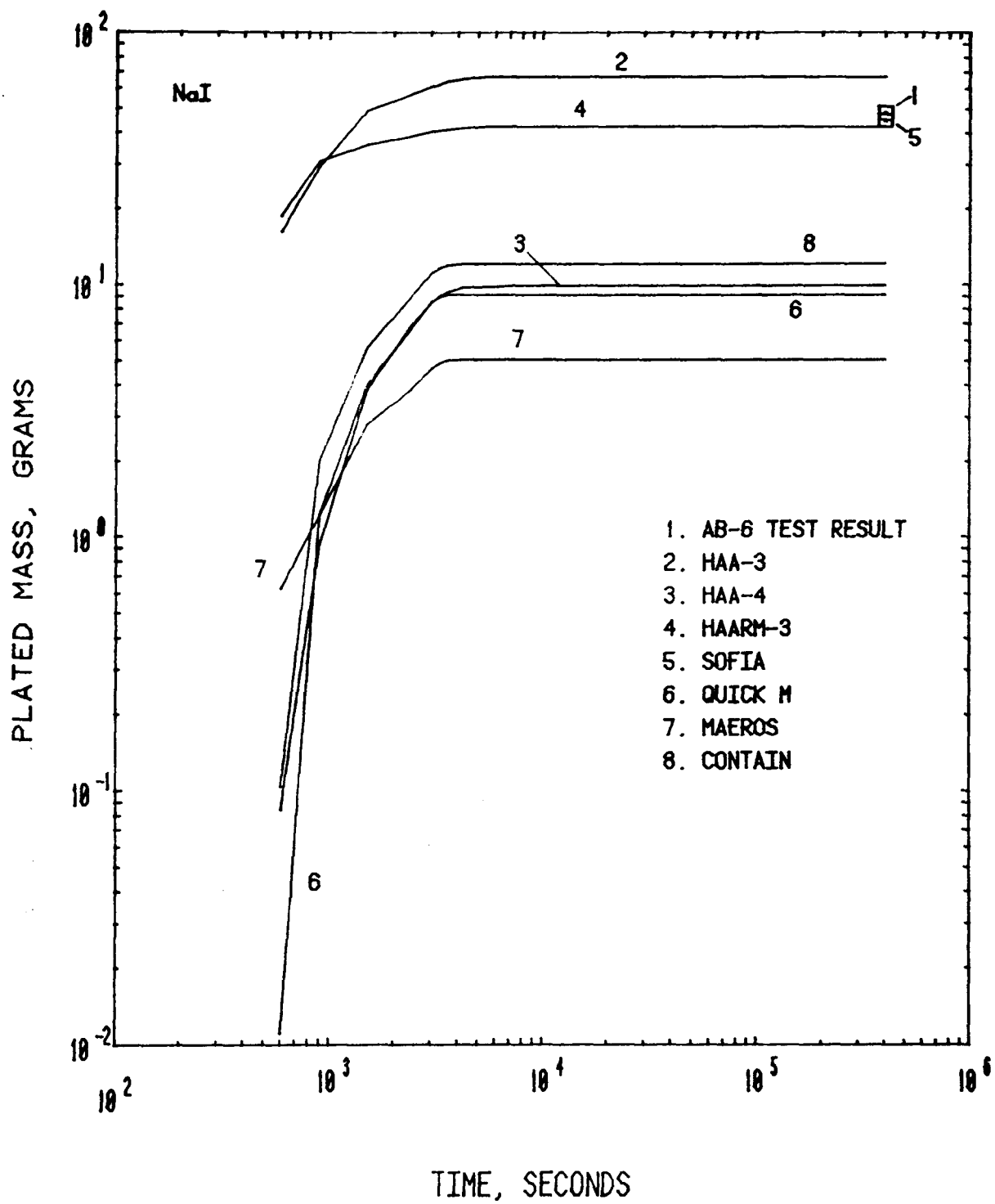


FIGURE 5-16. Plot of Code Predictions of Plated NaI Mass.

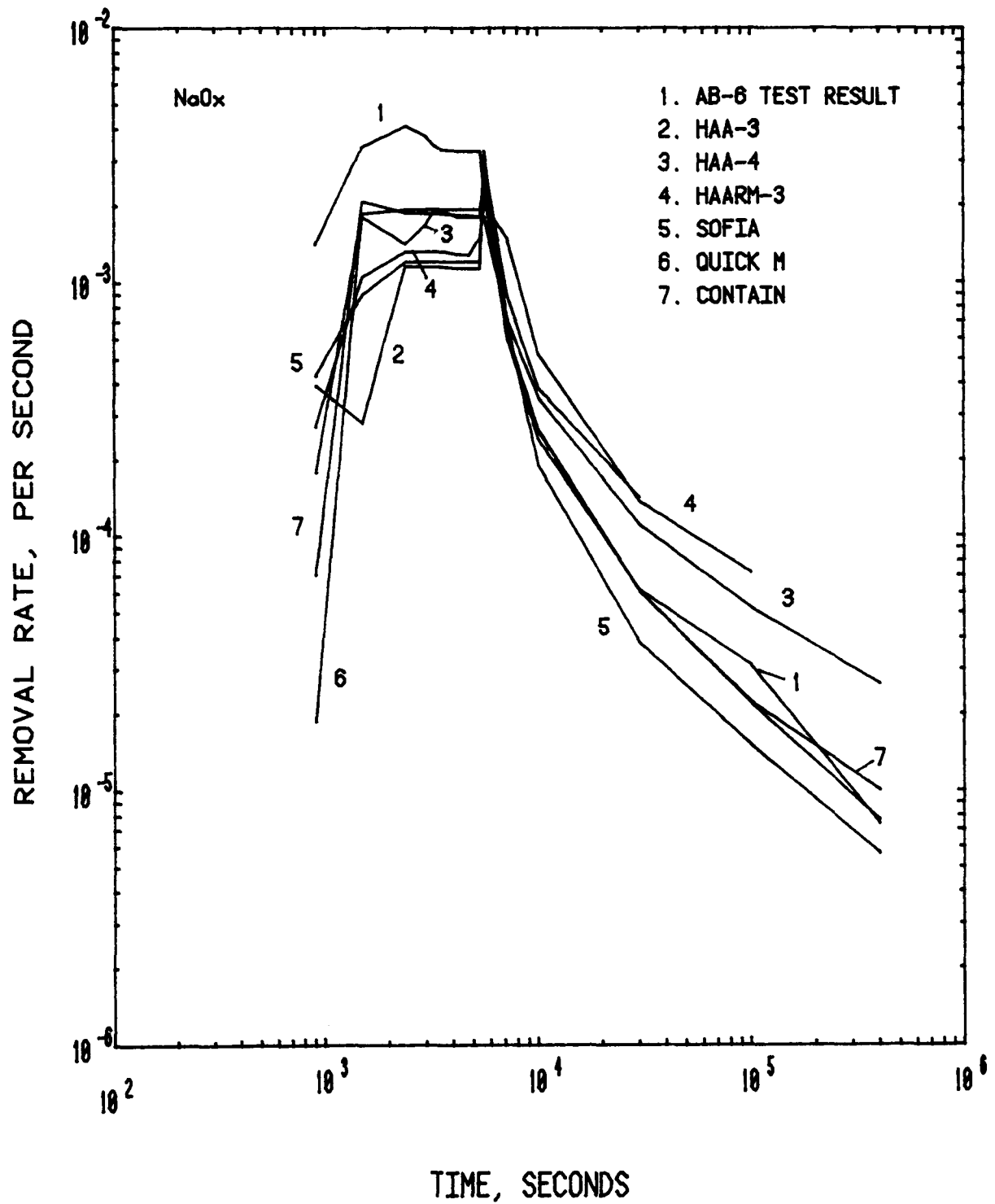


FIGURE 5-17. Plot of Code Predictions of Instantaneous Combined Removal Rate for NaO_x.

Figure 5-17 shows that all of the codes underpredicted the NaO_x removal rate during the source release period by factors of 2 to 3. This behavior is consistent with the overprediction of suspended mass concentration by the codes (Section 5.5.1). One possible explanation for this behavior is that the aerosol shape factors may have been significantly different for this test than in previous tests. Most of the codes used shape factors which fit previous CSTF sodium fire test data. As discussed in Section 4.9, the bulk density of the settled aerosol was approximately 15% of aerosol in previous tests. This implies that the aerosol particle shapes may have been significantly different in this test.

Another possibility is that less than 100% of the burning sodium was converted to aerosol, and thus the source release rate was lower than reported to the code users for use as code input. This may have been the case to some extent because a crusty nodule was observed on the spray nozzle at the end of the test. The nodule was estimated to consist of sintered oxide and hydroxide and to weigh ~1 kg. Also, the temperature of the catch pan immediately under the spray nozzle reached a temperature higher than the surrounding air, peaking at 286°C at 4200 s. However, the catch pan contained only slightly more sodium per unit area at the end of the test than other horizontal surfaces. In the opinion of the authors, the fraction of sprayed sodium converted to aerosol was essentially 100%, though this cannot be conclusively demonstrated.

The number of times that each code case predicted the experimental value within a factor of 2 is shown in Table 5-14. MAEROS did not report the removal rate. CONTAIN, QUICKM and HAA-4 were within a factor of 2 for most of the reporting times.

5.5.7.2 Removal Rate for NaI Aerosol

The predicted values for the removal rate of suspended NaI aerosol are plotted as a function of time in Figure 5.18. Detailed digital information is provided in Appendix M. Only two codes (HAA-4 and QUICKM) reported removal rates for NaI at times later than 600 s.

TABLE 5-14

CODE CASES WITH CORRECT PREDICTIONS FOR REMOVAL RATE

Time (s)	NaO _x (b)							NaI(b)						
	1(a)	2	3	4	5	6	7	1	2	3	4	5	6	7
6.00 (2)	-	-	-	-	-	-	-	(c)	(c)	(c)	(c)	(c)	(c)	(c)
9.00 (2)	N	N	N	N	N	-	N	-	N	-	-	N	-	-
1.50 (3)	N	Y	N	N	Y	-	Y	-	Y	-	-	Y	-	-
2.40 (3)	N	N	N	N	N	-	N	-	Y	-	-	Y	-	-
3.00 (3)	N	N	N	N	Y	-	Y	-	N	-	-	Y	-	-
3.25 (3)	N	Y	N	N	Y	-	Y	-	Y	-	-	Y	-	-
3.55 (3)	N	Y	N	N	Y	-	Y	-	Y	-	-	Y	-	-
4.16 (3)	N	Y	N	N	Y	-	Y	-	Y	-	-	N	-	-
4.76 (3)	N	Y	N	N	Y	-	Y	-	N	-	-	N	-	-
5.40 (3)	N	Y	N	N	Y	-	Y	-	N	-	-	N	-	-
5.60 (3)	Y	Y	Y	Y	Y	-	Y	-	Y	-	-	N	-	-
7.20 (3)	Y	Y	N	Y	Y	-	Y	-	Y	-	-	Y	-	-
1.00 (4)	Y	Y	N	Y	Y	-	Y	-	Y	-	-	Y	-	-
3.00 (4)	N	Y	N	Y	Y	-	Y	-	Y	-	-	Y	-	-
1.00 (5)	-	Y	N	Y	Y	-	Y	-	Y	-	-	Y	-	-
4.00 (5)	-	N	-	Y	Y	-	Y	-	Y	-	-	Y	-	-
Total														
Correct	3	11	1	6	13	-	13	-	11	-	-	10	-	-

(a) Code Case. Refer to Table 5-2 for identification.

(b) Y indicates code predicted with a factor of 2 for the indicated time.

N indicates code predicted greater than a factor of 2 from measured time.

A dash indicates that no predictions were made for that time.

Figure 5-18 shows that the large increase in NaI removal rate predicted by QUICKM, and to a lesser extent by HAA-4, to occur immediately after the NaI source cutoff was not observed in the experiment. However, both HAA-4 and QUICKM predicted the NaI removal rate within a factor of 2 for most of the reporting times, as shown in Table 5-14.

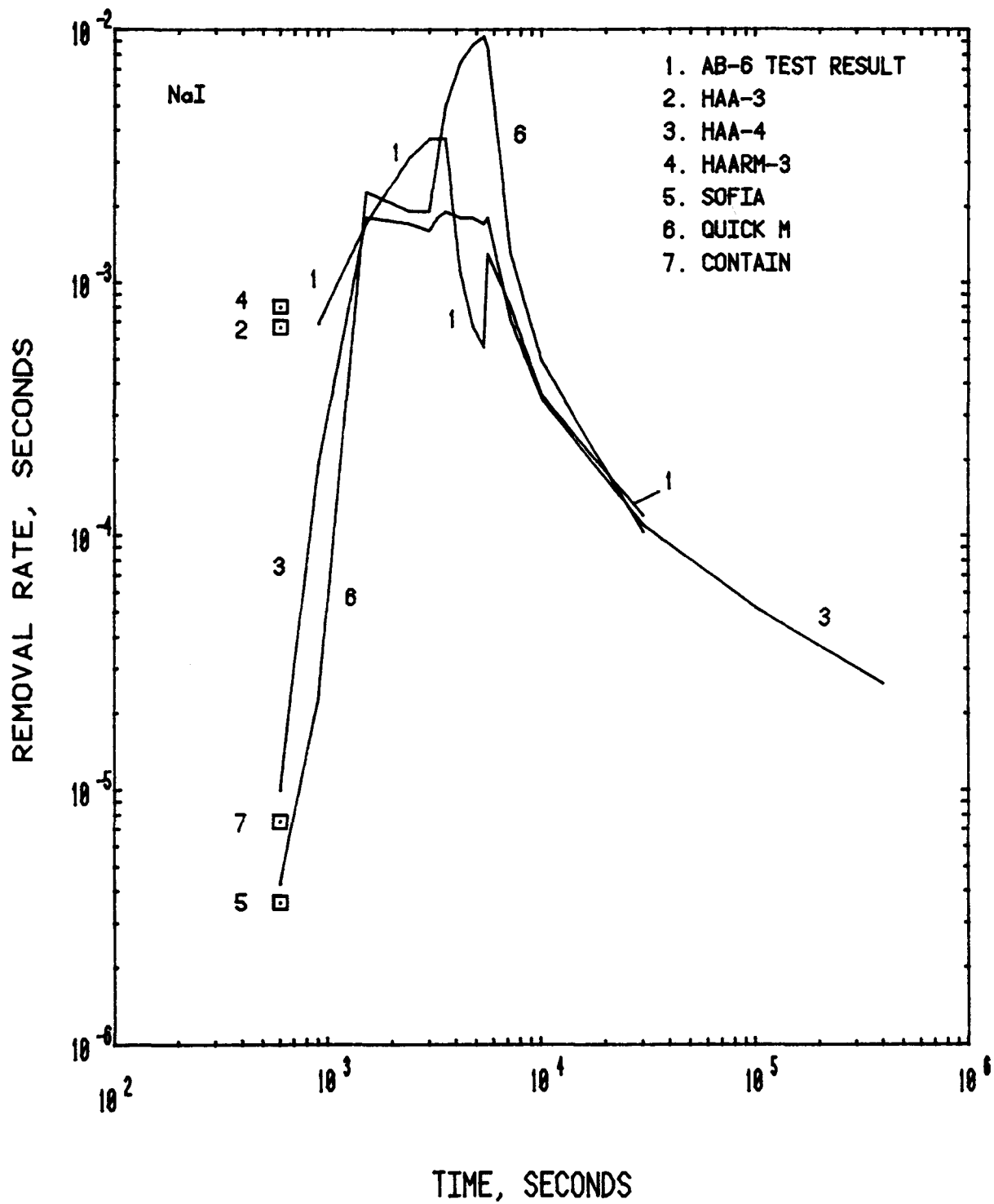


FIGURE 5-18. Plot of Code Predictions of Instantaneous Combined Removal Rate for NaI.

5.6 DISCUSSION OF CODE PREDICTIONS

This discussion highlights some of the more significant aspects of code predictions for test AB6. No attempt is made to arrive at value judgements as to the accuracy of any of the codes. What is given here is intended to assist the reader in reviewing some of the results of the ABCOVE Program for test AB6.

5.6.1 Comparison of Pretest and Post-test Code Predictions

The pretest predictions were made on the basis of a test plan provided by the test performer. Although the test was performed essentially as intended, some deviations from the test plan did occur, requiring blind post-test predictions to be made. The most notable change from the test plan was the aerosol source rate for NaI, which was 0.70 of the test plan value. Other deviations were slight, as shown in Table 5-4. It is of interest to learn if these changes had a significant effect on the code predictions.

Table 5-15 gives a comparison of pretest and post-test predictions for NaO_x behavior, expressed as ratios of the geometric means for the 7 parameters reported in Appendices G through M. Table 5-15 shows that the post-test predictions were very close to the pre-test values, except for plated mass, for which the post-test value was 0.68 of the pretest value.

Table 5-16 gives a similar comparison for NaI predictions. The particle size predictions were nearly the same for pretest and post-test cases, but all of the other parameters were reduced to approximately 70% of the pretest value. This was a direct result of the NaI source release rate being 70% of pretest value.

TABLE 5-15
COMPARISON OF PRETEST AND POST-TEST CODE PREDICTIONS
FOR NaO_x BEHAVIOR^(a)

Time (s)	Geometric Mean of All Codes (Ratio of Post-test/Pretest)						
	Susp. Conc.	AMMD	σ_g	Mass Leaked	Mass Settled	Mass Plated	Removal Rate
9.00(2) ^(b)	0.95	1.04	1.00	0.95	1.09	0.91	0.80
1.50(3)	0.98	1.05	0.93	0.98	1.07	0.75	1.05
2.40(3)	1.00	1.03	0.95	0.95	1.05	0.64	1.01
3.00(3)	0.97	1.03	0.92	0.94	1.04	0.64	1.04
3.25(3)	0.98	0.99	0.94	0.94	1.04	0.65	1.03
3.55(3)	0.99	0.99	0.93	0.94	1.04	0.64	1.03
4.16(3)	0.99	0.99	0.93	0.94	1.04	0.65	1.02
4.76(3)	0.99	0.99	0.93	0.95	1.03	0.67	1.03
5.40(3)	0.99	0.99	0.93	0.96	1.03	0.67	1.04
5.60(3)	0.98	0.98	0.94	0.94	1.02	0.66	0.93
7.20(3)	1.01	1.00	0.96	0.93	1.02	0.67	1.06
1.00(4)	1.03	1.00	0.99	0.94	1.02	0.67	0.99
3.00(4)	1.02	1.01	1.00	0.94	1.02	0.67	1.03
1.00(5)	1.08	1.00	1.00	0.95	1.02	0.67	1.02
4.00(5)	<u>1.06</u>	<u>1.00</u>	<u>1.02</u>	<u>0.94</u>	<u>1.02</u>	<u>0.67</u>	<u>1.03</u>
Average	1.00	1.01	0.96	0.94	1.03	0.68	1.01

(a) Post-test NaO_x source release rate was 1.018 that of the pretest source rate.

(b) Numbers in parenthesis are exponents of 10.

TABLE 5-16

COMPARISON OF PRETEST AND POST-TEST CODE PREDICTIONS
FOR NaI BEHAVIOR^(a)

Time (s)	Geometric Mean of All Codes (Ratio of Post-test/Pretest)						
	Susp. Conc.	AMMD	σ_g	Mass Leaked	Mass Settled	Mass Plated	Removal Rate
6.00(2) ^(b)	0.69	0.95	0.93	0.72	0.63	2.19	1.06
9.00(2)	0.70	0.95	(c)	0.55	0.65	0.97	(c)
1.50(3)	0.68	0.87	(c)	0.60	0.69	0.72	(c)
2.40(3)	0.68	0.93	(c)	0.60	0.70	0.60	(c)
3.00(3)	0.68	0.93	(c)	0.61	0.71	0.56	(c)
3.25(3)	0.67	0.96	(c)	0.61	0.71	0.49	(c)
3.55(3)	0.61	1.00	(c)	0.60	0.71	0.55	(c)
4.16(3)	0.66	1.07	(c)	0.61	0.72	0.55	(c)
4.76(3)	0.66	1.05	(c)	0.61	0.72	0.55	(c)
5.40(3)	0.65	1.09	(c)	0.61	0.72	0.55	(c)
5.60(3)	0.24	1.07	(c)	0.61	0.72	0.55	(c)
7.20(3)	1.24	1.02	(c)	0.61	0.73	0.55	(c)
1.00(4)	1.55	0.99	(c)	0.61	0.73	0.55	(c)
3.00(4)	1.29	1.03	(c)	0.61	0.73	0.55	(c)
1.00(5)	0.85	1.01	(c)	0.61	0.73	0.55	(c)
4.00(5)	<u>0.82</u>	<u>1.00</u>	<u>(c)</u>	<u>0.61</u>	<u>0.73</u>	<u>0.55</u>	<u>(c)</u>
Average	0.79	1.00	(c)	0.61	0.71	0.69	(c)

(a) Post-test NaI source release rate was 0.70 that of the pretest source rate.

(b) Numbers in parenthesis are exponents of 10.

(c) Insufficient number of codes reporting.

An argument can be made that pretest predictions are unnecessary as long as blind post-test predictions are needed. The merit of performing the analyses prior to test performance is that this process eliminates any question as to whether the code user had beneficial knowledge of test results when he made his predictions.

5.6.2 Comparison of Uniform Coagglomeration and Sectionally Uniform Species Codes

As discussed in Section 5.1, some of the codes used in the present study were log-normal, uniform coagglomeration codes, while others were discrete, sectionally uniform codes. It is unfortunate that a discrete code which assumes a particle composition independent of size (uniform coagglomeration) was not used in the present exercise. For purposes of comparison, the SNL participant submitted a supplementary blind post-test prediction of NaI suspended concentration using a modified CONTAIN version with the uniform coagglomeration assumption. The results for the normal CONTAIN and the uniform coagglomeration results are given in Table 5-17, along with the experimental measurement. The data of Table 5-17 are plotted in Figure 5-19.

The data of Table 5-17 and Figure 5-19 show that there was very little difference ($\sim 10\%$) between the two CONTAIN versions during the NaI source release period. However, after the NaI source cutoff, large differences developed. For a period of ~ 1000 s after source cutoff, the normal CONTAIN code predicted the measured NaI suspended concentration quite well, while the uniform coagglomeration case overpredicted by factors up to 4. At times later than 1000 s after source cutoff, the normal CONTAIN gave increasingly lower results than measured, until it was nearly five orders of magnitude lower at 3×10^4 s. This was due to the experimental curve bending to a lower rate of decline, an effect attributed to resuspension in Section 4.6.4.

While the uniform coagglomeration case overpredicted for times shortly after the NaI source cutoff, it was in reasonable agreement with measurements at all times after the end of the sodium spray.

TABLE 5-17

COMPARISON OF NORMAL CONTAIN RESULTS WITH CONTAIN
USING UNIFORM COAGGLOMERATION ASSUMPTION

Time (s)	Suspended Mass Conc. of NaI (g/m ³)		
	Test AB6 Measurement	Normal CONTAIN	CONTAIN with Uniform Coagglomeration
6.00(2) ^(a)	9.86(-2)	9.86(-2)	9.86(-2)
9.00(2)	2.75(-1)	1.45(-1)	1.45(-1)
1.50(3)	2.15(-1)	1.14(-1)	1.34(-1)
2.40(3)	1.15(-1)	9.04(-2)	9.89(-2)
3.00(3)	8.5 (-2)	9.01(-2)	9.23(-2)
3.25(3)	3.6 (-2)	5.13(-2)	5.81(-2)
3.55(3)	8.0 (-3)	1.88(-2)	3.31(-2)
4.16(3)	3.0 (-3)	1.24(-3)	1.13(-2)
4.76(3)	2.0 (-3)	4.19(-5)	3.83(-3)
5.40(3)	1.5 (-3)	7.85(-7)	1.20(-3)
5.60(3)	1.2 (-3)	1.70(-7)	7.25(-4)
7.20(3)	1.9 (-4)	2.75(-9)	1.02(-4)
1.00(4)	5.2 (-5)	4.18(-10)	3.46(-5)
3.00(4)	9.0 (-7)	1.23 (-11)	3.80(-6)
1.00(5)	(b)	3.33(-13)	3.64(-7)
4.00(5)	(b)	6.38(-16)	6.47(-9)

(a) Numbers in parenthesis are exponents of 10.

(b) Not available.

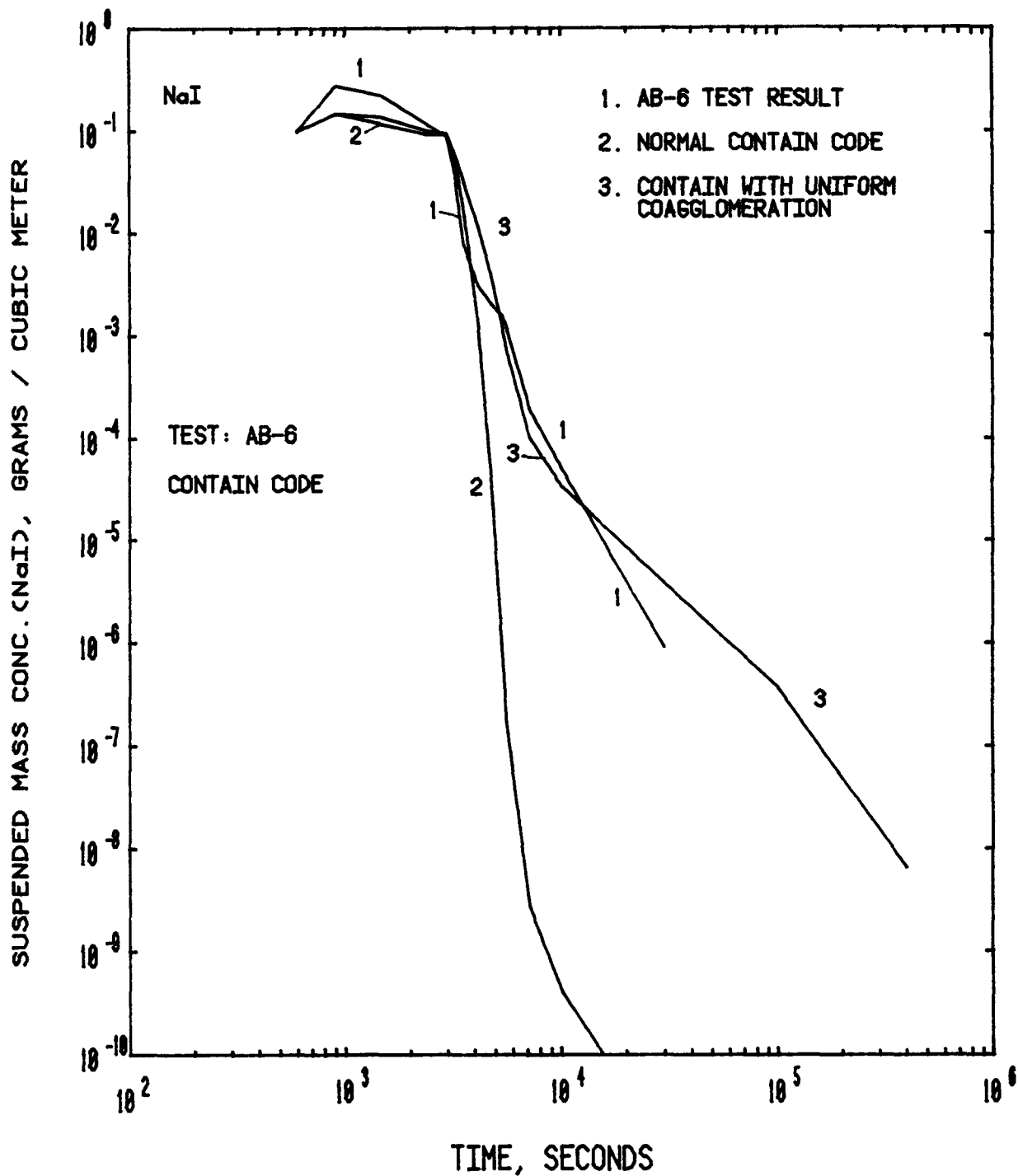


FIGURE 5-19. Comparison of NaI Suspended Concentration Predicted by Normal CONTAIN Code and by CONTAIN with Uniform Coagglomeration.

The authors conclude that the good agreement of the uniform coagglomeration assumption with test results at later times is fortuitous. It is not reasonable that the assumption of uniform coagglomeration is correct, nor does it agree with measurements of NaI composition of various size particle groups on cascade impactor stages (Figure 4-26). It is more reasonable to conclude that one or more phenomena not accounted for in the codes were operative during the test. Some possible, unmodeled phenomena include resuspension, poor mixing, and oxidation of NaI to release molecular I_2 with subsequent adsorption on aerosol surfaces. Poor mixing is not believed to be responsible because mixing was reasonably good after the end of the NaI source (see Table 4-8). Test measurements were not sufficient to determine unequivocally whether the other two phenomena were important.

5.6.3 Comparison of Log-Normal and Discrete Codes

The codes in the ABCOVE program which use the log-normal assumption are HAA-3, HAA-4, HAARM-3 and SOFIA. The codes using discrete particle size groups are QUICKM, MAEROS and CONTAIN. Each type of code has its advantages and disadvantages. Discrete codes are generally considered to be more accurate, whereas log-normal codes are generally more efficient. No comparison of efficiencies is attempted for test AB6 code cases, but some comparisons of accuracy are made in the following paragraphs.

A comparison of the predicted values of the seven parameters reported in Appendices G through M may not provide a direct comparison of the log-normal versus discrete size group approach because of the different methods of treating multiple aerosol components. As discussed in Sections 5.1 and 5.6.2, all of the log-normal codes used the uniform coagglomeration assumption, while the discrete codes assume only that the composition is uniform within each size group. This complicates the assessment of the effect of the log-normal assumption. However, the second component in test AB5 (NaI) was released at <0.2% the rate for NaO_x , so the effect of NaI on NaO_x behavior was probably negligible. Conversely, the effect of NaO_x on NaI behavior may have been large.

The geometric mean values of the suspended concentrations of NaI and NaO_x predicted by each class of codes are given in Table 5-18. Table 5-18 shows that both code classes predicted the NaO_x concentration reasonably well, with the discrete codes being somewhat better. However, an examination of Figure 5.2 shows that the log-normal code SOFIA predicted very high at later times, while the other three log-normal codes predicted very low. If the SOFIA data were removed from the Table 5-18 averages, the log-normal codes would not have compared as well at times $>10^4$ s.

Table 5-18 shows that, as a class, the discrete codes predicted the NaI concentration reasonably well during and immediately after the source release period, but predicted very low at longer times, compared with test AB6 measurements. As discussed in Section 5.6.2, this is probably due to effects in the experiment, rather than the use of discrete size groups.

The log-normal codes, as a class, predicted the NaI concentration fairly well during the source release period, but overpredicted immediately after source cutoff, and then were much closer to the measured values than the discrete codes after the end of the sodium spray. As discussed in Section 5.6.2, this may have been fortuitous.

A more direct assessment of the log-normal versus discrete group assumptions is provided by Table 5-19. The SNL participant submitted a prediction of NaI suspended concentrations with a modified version of CONTAIN, using the uniform coagglomeration assumption. Thus, a comparison of the log-normal codes with this version of CONTAIN provides a direct comparison without the complication of multiple species treatment differences. Table 5-19 shows that the log-normal codes, as a group, were within 40% of the discrete code (modified CONTAIN) during the NaI source, but were higher than the discrete code by factors up to 6 after the NaI source cutoff.

The performance of one of the log-normal codes, HAA-4, was remarkably close to that of the CONTAIN version which used the same assumption of uniform coagglomeration. Table 5-19 shows that the two code cases agreed within

TABLE 5-18

COMPARISON OF LOG-NORMAL AND DISCRETE CODE PREDICTIONS OF SUSPENDED CONCENTRATION

Time (s)	Suspended Concentration of NaO _x (g/m ³)			Suspended Concentration of NaI (g/m ³)		
	Test AB6 Measurement	Average of 4 Log-N Codes (a)	Average of 3 Discrete Codes (b)	Test AB6 Measurement	Average of 4 Log-N Codes (a)	Average of 3 Discrete Codes (b)
6.00(2) ^(c)	(d)	(d)	(d)	9.86(-2)	8.79(-2)	9.98(-2)
9.00(2)	2.10(1)	2.40(1)	2.56(1)	2.75(-1)	1.26(-1)	1.47(-1)
1.50(3)	3.15(1)	6.26(1)	4.68(1)	2.15(-1)	1.73(-1)	1.12(-1)
2.40(3)	2.32(1)	7.00(1)	4.86(1)	1.15(-1)	1.41(-1)	8.82(-2)
3.00(3)	2.38(1)	6.85(1)	4.86(1)	8.5 (-2)	1.33(-1)	8.81(-2)
3.25(3)	2.53(1)	6.84(1)	4.86(1)	3.6 (-2)	9.69(-2)	4.88(-2)
3.55(3)	2.65(1)	6.80(1)	4.87(1)	8.0 (-3)	6.48(-2)	1.64(-2)
4.16(3)	2.78(1)	6.81(1)	4.91(1)	3.0 (-3)	3.03(-2)	8.09(-4)
4.76(3)	2.80(1)	6.86(1)	4.91(1)	2.0 (-3)	1.45(-2)	2.27(-5)
5.40(3)	2.80(1)	6.91(1)	4.91(1)	1.5 (-3)	6.67(-3)	3.78(-7)
5.60(3)	1.80(1)	4.27(1)	3.09(1)	1.2 (-3)	4.31(-3)	8.70(-8)
7.20(3)	3.40(0)	3.19(0)	4.34(0)	1.9 (-4)	4.86(-4)	8.62(-9)
1.00(4)	1.29(0)	8.37(-1)	1.43(0)	5.2 (-5)	1.41(-4)	2.05(-10)
3.00(4)	1.50(-1)	7.96(-2)	1.39(-1)	9.0 (-7)	1.44(-5)	5.43(-11)
1.00(5)	5.72(-3)	1.40(-2)	1.28(-2)	(d)	(e)	1.67(-13)
4.00(5)	4.0 (-5)	(e)	2.56(-4)	(d)	(e)	3.19(-16)

(a)HAA-3, HAA-4, HAARM-3 and SOFIA.

(b)QUICKM, MAEROS and CONTAIN.

(c)Numbers in parenthesis are exponents of 10.

(d)Not available.

(e)All codes did not report for this time.

TABLE 5-19

COMPARISON OF LOG-NORMAL CODES WITH A DISCRETE CODE
WHEN BOTH TYPES USE UNIFORM COAGGLOMERATION ASSUMPTIONS

Time (s)	Suspended Concentration of NaI (g/m ³)			Ratio Log-N/ CONTAIN	Ratio HAA-4/ CONTAIN
	Average of 4 Log-N Codes ^(a)	HAA-4	CONTAIN with Uniform Coag.		
6.00(2)(b)	8.79(-2)	9.8(-2)	9.86(-2)	0.89	0.99
9.00(2)	1.26(-1)	1.4(-1)	1.45(-1)	0.87	0.97
1.50(3)	1.73(-1)	1.8(-1)	1.34(-1)	1.29	1.34
2.40(3)	1.41(-1)	1.1(-1)	9.89(-2)	1.42	1.11
3.00(3)	1.33(-1)	1.0(-1)	9.23(-2)	1.44	1.08
3.25(3)	9.69(-2)	6.5(-2)	5.81(-2)	1.67	1.12
3.55(3)	6.48(-2)	3.6(-2)	3.31(-2)	1.96	1.09
4.16(3)	3.03(-2)	1.2(-2)	1.13(-2)	2.68	1.06
4.76(3)	1.45(-2)	4.0(-3)	3.83(-3)	3.79	1.04
5.40(3)	6.67(-3)	1.3(-3)	1.20(-3)	5.59	1.08
5.60(3)	4.31(-3)	8.7(-4)	7.25(-4)	5.95	1.20
7.20(3)	4.86(-4)	1.5(-4)	1.02(-4)	4.76	1.47
1.00(4)	1.41(-4)	3.8(-5)	3.46(-5)	4.08	1.10
3.00(4)	1.44(-5)	1.2(-6)	3.80(-6)	3.79	0.32
1.00(5)	(c)	8.6(-9)	3.64(-7)	--	2.4(-2)
4.00(5)	(c)	2.7(-13)	6.47(-9)	--	4.2(-5)

(a) HAA-3, HAA-4, HAARM and SOFIA.

(b) Numbers in parenthesis are exponents of 10.

(c) All codes did not report for this time.

~10% during the source period and also to post-source times out to 10^4 s. At times $>10^4$ s, the HAA-4 values were considerably lower than the CONTAIN case.

Section 5.5.2 showed that, while neither code class predicted the cascade impactor data very well, the discrete codes were generally closer to experimental measurements than the log-normal codes.

The overall conclusion is that, for the present test conditions, the discrete group feature gave slightly better overall performance than the log-normal assumption, though there were individual exceptions.

5.6.4 Leaked Mass Predictions

For accident cases where containment integrity is maintained, offsite consequences would be governed mainly by leaked mass. Hence, the suitability of any aerosol code hinges on its ability to realistically predict leaked mass. The MAEROS code didn't report leaked mass for NaI, but the other six codes predicted leaked NaI mass very well, ranging from 28% lower to 20% higher than the experimental measurement.

Prediction of NaO_x leaked mass was not as good as for NaI, as shown by Table 5-20. All six reporting codes overpredicted the test result by factors ranging from 1.7 to 2.4. The discrete codes, QUICKM and CONTAIN, gave the best fit for NaO_x .

5.6.5 Wall Plateout Predictions

All of the codes, except HAA-3, modelled wall plateout by two mechanisms: Brownian diffusion and thermophoresis. HAA-3 used Brownian diffusion only. Table 5-7 gives the magnitude of the wall plating input parameters. It is interesting to note that, in spite of the fact that it did not model thermophoresis, HAA-3 predicted the highest plated mass for both NaO_x and NaI. All of the codes underpredicted the test result, as shown by Table 5-21, except for the NaI prediction of HAA-3.

TABLE 5-20
SUMMARY OF LEAKED MASS PREDICTIONS

Code Case	Code	Ratio. Code to Test ^(a)	
		NaO _x	NaI
1	HAA-3	2.41	1.20
2	HAA-4	1.81	0.92
3	HAARM-3	2.07	1.00
4	SOFIA	2.21	1.17
5	QUICKM	1.68	0.72
6	MAEROS	(b)	(b)
7	CONTAIN	<u>1.69</u>	<u>0.73</u>
Average		1.97	0.96

(a) At 4×10^5 s.

(b) Code did not report.

TABLE 5-21
COMPARISON OF PREDICTIONS OF PLATED MASS

Code Case	Code	Ratio. Code to Test ^(a)	
		NaO _x	NaI
1	HAA-3	0.58	1.39
2	HAA-4	0.18	0.21
3	HAARM-3	0.22	0.88
4	SOFIA	0.80	0.93
5	QUICKM	0.21	0.19
6	MAEROS	0.10	0.11
7	CONTAIN	<u>0.24</u>	<u>0.25</u>
Average		0.33	0.56

(a) At 4×10^5 s.

The QUICKM code cases shed some light on the effect of thermophoresis. Thermophoretic plating calculations were not performed for the QUICKM pre-test case, but were included for the post-test case (see code input Table 5-7). Since there were only minor differences in actual test conditions from the pretest plan, the difference in the QUICKM pretest and post-test predictions give a measure of the thermophoretic effect. Table 5-22 shows that thermophoresis plus Brownian diffusion accounted for 3670 g NaO_x plated, while Brownian diffusion, with a diffusion boundary layer thickness of 10⁻⁴ m, accounted for only 20 g. However, it should be pointed out that Brownian diffusion is really modelled empirically by all the codes, in that the code user must select a value for the input parameter, DELTA, the thickness of the boundary layer in Equation (16).

TABLE 5-22
EFFECT OF WALL PLATING PARAMETERS

	(With Thermophoresis) QUICKM Post-test	No Thermophoresis			Test AB6 Result
		QUICKM Pretest	HAA-3 Pretest	HAA-3 Post-test	
Plated NaO _x (g)	3670	20.6	23000	21800	37400
Wall Gradient (°K/m)	Variable(a)	0	0	0	Variable
Diffusion Delta (m)	1x10 ⁻⁴	1x10 ⁻⁴	1x10 ⁻⁷	1x10 ⁻⁷	(b)

(a) Calculated from heat balance and heat flux to surface.

(b) Not measured.

$$\text{Plateout Rate} = \frac{(C_g - C_w) D A_w}{\Delta} \quad (16)$$

where:

C_g = particle concentration in bulk gas,
 C_w = particle concentration in gas at surface, assumed = zero,
 D = particle diffusivity,
 A_w = wall area for plating
 Δ = thickness of gas boundary layer.

The relatively good agreement of HAA-3 with the test measurement results from the selection of a small value for DELTA (10^{-7} m), based on previous CSTF tests.

As discussed in Section 4.8, deposition on thin vertical stainless steel panels hung at various locations in the containment atmosphere was nearly the same as on the outer, heat sink wall, on a unit area basis. This indicates that a mechanism(s) other than thermophoresis was important. Interception and impaction were suggested as being the dominant mechanisms. This observation was also cited in a previous CSTF report⁽¹⁷⁾, based on visual observations of deposited aerosol. Modeling of turbulent deposition should be considered by code developers as a means of improving wall plating calculations.

Although wall plateout is usually a minor factor in large containment buildings (compared to settling), the amount of aerosol plated onto walls is important for heat transfer purposes, since the layer of aerosol may provide a significant resistance to heat transfer in some cases.

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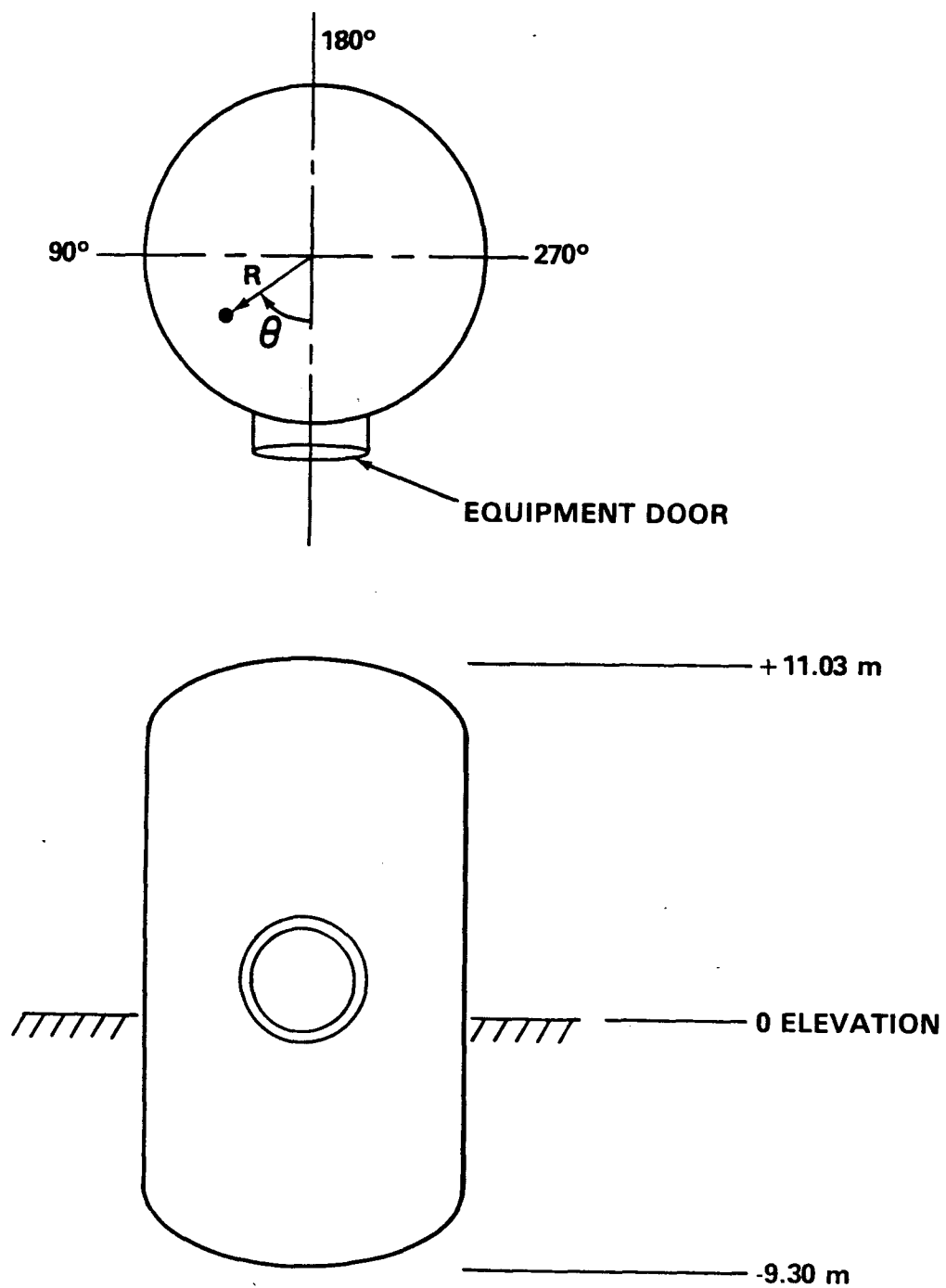
A P P E N D I X A

DATA ACQUISITION SYSTEM CHANNEL IDENTIFICATION

APPENDIX A

DATA ACQUISITION SYSTEM CHANNEL IDENTIFICATION

The identification and location of each data acquisition system (DAS) channel is given in Table A-1. Coordinates used to define the thermocouple locations cited in Table A-1 are illustrated in Figure A-1.



HEDL 8102-113.4

FIGURE A-1. Spatial Coordinates Used to Define Thermocouple Locations in Table A-1.

TABLE A-1
DATA ACQUISITION SYSTEM CHANNEL IDENTIFICATION

<u>DAS No.</u>	<u>Recorder & Point</u>	<u>Measurement</u>	<u>Output</u>	<u>Description and Location</u>
0	-	std temp	°F	Set at 100°F
1	3-1	CV atmos temp	°F	+8.84 m elev, 0 Radius, centerline
2	3-2	CV atmos temp	°F	+5.61 m elev, 0 Radius, centerline
3	3-3	CV atmos temp	°F	+2.44 m elev, 0 Radius, centerline
4	3-4	CV atmos temp	°F	-0.73 m elev, 0 Radius, centerline
5	3-5	CV atmos temp	°F	-3.78 m elev, 0 Radius, centerline
6	3-6	CV atmos temp	°F	-7.01 m elev, 0 Radius, centerline
*7	3-7	CV atmos temp	°F	+8.84 m elev, 1.52 Radius, 180° azimuth
*8	3-8	CV atmos temp	°F	+5.61 m elev, 1.52 Radius, 180° azimuth
*9	3-9	CV atmos temp	°F	+2.44 m elev, 1.52 Radius, 180° azimuth
*10	3-10	CV atmos temp	°F	-0.73 m elev, 1.52 Radius, 180° azimuth
*11	3-11	CV atmos temp	°F	-4.27 m elev, 1.52 Radius, 180° azimuth
12	3-12	CV atmos temp	°F	-7.01 m elev, 1.52 Radius, 180° azimuth
*13	3-13	CV atmos temp	°F	+8.84 m elev, 2.74 Radius, 0° azimuth
*14	3-14	CV atmos temp	°F	+5.61 m elev, 2.74 Radius, 0° azimuth
*15	3-15	CV atmos temp	°F	+2.44 m elev, 2.74 Radius, 0° azimuth
*16	3-16	CV atmos temp	°F	-0.73 m elev, 2.74 Radius, 0° azimuth
*17	3-17	CV atmos temp	°F	-4.27 m elev, 2.74 Radius, 0° azimuth
*18	3-18	CV atmos temp	°F	-7.01 m elev, 2.74 Radius, 0° azimuth
*19	3-19	CV atmos temp	°F	+8.84 m elev, 3.51 Radius, 180° azimuth
*20	3-20	CV atmos temp	°F	+5.61 m elev, 3.51 Radius, 180° azimuth
*21	3-21	CV atmos temp	°F	+2.44 m elev, 3.51 Radius, 180° azimuth
*22	3-22	CV atmos temp	°F	-0.73 m elev, 3.51 Radius, 180° azimuth
*23	3-23	CV atmos temp	°F	-4.27 m elev, 3.51 Radius, 180° azimuth
*24	3-24	CV atmos temp	°F	-7.01 m elev, 3.51 Radius, 180° azimuth

*Used in averaging to obtain mean atmospheric temperature.

TABLE A-1 (Cont'd)

DAS No.	Recorder & Point	Measurement	Output	Description and Location
**25	6-1	CV steel temp	°F	Inside surface, +8.84 m elev, 180° azimuth
**26	6-2	CV steel temp	°F	Inside surface, +8.84 m elev, 0° azimuth
27	6-3	CV steel temp	°F	Inside surface, +4.57 m elev, 30° azimuth
28	6-4	CV steel temp	°F	Inside surface, +4.57 m elev, 210° azimuth
29	6-5	CV steel temp	°F	Inside surface, -0.91 m elev, 30° azimuth
**30	6-6	CV steel temp	°F	Inside surface, -0.91 m elev, 210° azimuth
**31	6-7	CV steel temp	°F	Inside surface, -3.66 m elev, 130°
**32	6-8	CV steel temp	°F	Inside surface, -3.66 m elev, 210°
33	6-9	CV atmos temp	°F	-4.63 m elev, 0.23 radius, 270°
34	6-10	CV atmos temp	°F	At T1 sample station, 0.15 m from wall
35	6-11	18-in I-beam	°F	Embed in flange, 0.46 m radius, 180° azimuth
36	6-12	CV atmos temp	°F	At T2 sample station, 0.15 m from wall
*37	6-13	CV atmos temp	°F	0.41 m above catch pan center, -8.07 m elev
**38	6-14	CV steel temp	°F	Top dome surface, 0.31 m radius
39	6-15	CV atmos temp	°F	0.010 m from dome surface, 0.31 m radius
40	6-16	CV atmos temp	°F	0.019 m from dome surface, 0.31 m radius
41	6-17	CV atmos temp	°F	0.051 m from dome surface, 0.31 m radius
42	6-18	CV atmos temp	°F	0.300 m from dome surface, 0.31 m radius

*Used in averaging to obtain mean atmospheric temperature.

**Used in averaging to obtain mean temp. of CV steel.

TABLE A-1 (Cont'd)

DAS No.	Recorder & Point	Measurement	Output	Description and Location
**43	6-19	CV steel temp	°F	Inside surface -5.79 m elev, 225° azimuth
44	6-20	CV steel temp	°F	Inside surface -9.15 m elev, 300° azimuth
45	6-21	CV steel temp	°F	Inside surface -8.54 m elev, 180° azimuth
**46	6-22	CV steel temp	°F	Inside surface -9.45 m elev, 300° azimuth
47	6-23	CV atmos temp	°F	-5.79 m elev, 1.22 m radius, 95° azimuth
**48	6-24	CV steel temp	°F	Inside surface, +10.7 m elev, 1.22 m radius, 285° azimuth
49	11-1	CV steel temp	°F	Outside surface, top dome center, 11.0 m elev
**50	11-2	CV steel temp	°F	Outside surface, +6.10 m elev, 180° azimuth
**51	11-3	CV steel temp	°F	Outside surface, +1.22 m elev, 180° azimuth
**52	11-4	CV steel temp	°F	Outside surface, -3.05 m elev, 180° azimuth
**53	11-5	CV steel temp	°F	Outside surface, bottom head, 135°
54	11-6	Outside air	°F	+9.15 m elev, 0.30 m from CV, 260° azimuth
55	11-7	Outside air	°F	+2.13 m elev, 0.30 m from CV, 180° azimuth
56	11-8	Outside air	°F	-6.10 m elev, 0.30 m from CV, 180° azimuth
57	11-9	Outside air	°F	Ex-CV room ventilation exhaust
58	11-10	Waste Liquid	°F	TK-1 waste tank
59	11-11	Steam Temp	°F	Steam superheater outlet

**Used in averaging to obtain mean temp. of CV steel.

TABLE A-1 (Cont'd)

DAS No.	Recorder & Point	Measurement	Output	Description and Location
60	11-12	Steam temp	°F	Sat'd steam at orifice
61	11-13	CV atmos temp .	°F	0.010 m from wall, +1.52 m elev, 100° azimuth
62	11-14	CV atmos temp	°F	0.020 m from wall, +1.52 m elev, 100° azimuth
63	11-15	CV atmos temp	°F	0.050 m from wall, +1.52 m elev, 100° azimuth
64	11-16	CV atmos temp	°F	0.305 m from wall, +1.52 m elev, 100° azimuth
**65	11-17	CV steel temp	°F	Inside surface, +1.52 m elev, 100° azimuth
**66	11-18	CV steel temp	°F	Inside surface, +4.27 m elev, 180° azimuth
**67	11-19	CV steel temp	°F	Inside surface, +1.22 m elev, 345° azimuth
**68	11-20	CV steel temp	°F	Inside surface, -5.79 m elev, 30° azimuth
69	11-21	CV insulation	°F	Outer surface, -6.10 m elev, 108° azimuth
70	11-22	CV atmos temp	°F	At T3 sample station, 0.15 m from wall
71	11-23	CV atmos temp	°F	-3.96 m, outer surface, 108°
72	11-24			Spare
73	5-1	Na Temp	°F	TK-3 bottom head
74	5-2	Na Temp	°F	TK-3, 0.91 m above bottom
75	5-3	Na Temp	°F	TK-3 top head
76	5-4	Na Spray Nozzle A	°F	-4.33 m elev, 0.55 m radius, 0° azimuth
77	5-5	CV atmos temp	°F	At T4 sample station, 0.15 m from wall
78	5-6	TK-2 Temp	°F	TK-2 bottom head
79	5-7	Catch pan temp	°F	Top surface, center

**Used in averaging to obtain mean temp. of CV steel.

TABLE A-1 (Cont'd)

<u>DAS No.</u>	<u>Recorder & Point</u>	<u>Measurement</u>	<u>Output</u>	<u>Description and Location</u>
80	5-8	Steel ladder	°F	Surface of cage 4.8 mm thick, +1.52 m elev
81	5-9	18-in. I-Beam	°F	Embed in flange, 3.54 m radius, 180° azimuth
82	5-10	CV steel temp	°F	Outside surface, +8.84 m elev, 270°
83	5-11	CV steel temp	°F	Outside surface, -0.92 m elev, 30°
84	5-12	CV steel temp	°F	Outside surface, -7.01 m elev, 90°
85	7-1	Dew point	°F	G1, 100 mV = 100°F, +6.1 m elev, 3.5-m radius, 255°
86	7-2	Dew point	°F	G2, 100 mV = 100°F, -6.7 m elev, 3.5-m radius, 10°
87	7-3	O ₂ conc	%	G1, 100 mV = 25%
88	7-4	O ₂ conc	%	G2, 100 mV = 25%
89	7-5	H ₂ conc	%	G1
90	7-6	H ₂ conc	%	G2
91	7-7	O ₂ conc	%	G3, 100 mV = 25%, -4.88 m elev, centerline
92	7-8	O ₂ conc	%	G4, 100 mV = 25%, -0.91 m elev, centerline
93	7-9	O ₂ conc	%	G5, 100 mV = 25%, +8.84 m elev, centerline
94	7-10			Spare
95	7-11			Spare
96	7-12	volts	V	Dial-a-volt set at 1 volt
97	FR-3	Flowrate	SCFM	Main CV exhaust duct, 15 V = 1500 SCFM
98	FR-4	Flowrate	SCFM	Bypass air flow, 15 V = 1500 SCFM
99	FR-5	Flowrate	GPM	Pump P-5, 6 V = 60 GPM
100	FR-6	Flowrate	GPM	Pump P-6, 100 V = 100 GPM
101	FR-7	Flowrate	GPM	Pump P-7, 6 V = 6 GPM
102	DPR-1	Pressure Drop	In. water	EACS total, 5 V = 50 in. water
103	DPR-2	Pressure Drop	In. water	Fiber bed, 10 V = 25 in. water
104	PR-2	CV Pressure	In. water	Gauge pressure, 10 V = 20 in. water

A P P E N D I X B

DIGITAL OUTPUT FOR INITIAL 108 MINUTES FOR ALL CHANNELS

APPENDIX B

DIGITAL OUTPUT FOR INITIAL 108 MINUTES FOR ALL CHANNELS

All the digital data recorded on magnetic tape during the initial 108 minutes of test AB6 are listed in Tables B-1 through B-8. After 108 minutes, temperatures were fairly uniform throughout the vessel and the average values given in Appendix C can be used.

Identification of each data acquisition system (DAS) channel is provided in Appendix A.

The contents of Tables B-1 through B-7 are as follows:

<u>Table</u>	<u>Channels</u>
B-1	DAS1 through DAS12
B-2	DAS13 through DAS25
B-3	DAS26 through DAS38
B-4	DAS39 through DAS50
B-5	DAS51 through DAS65
B-6	DAS66 through DAS84
B-7	DAS85 through DAS107
B-8	DAS108 through DAS136

TABLE B-1

DIGITAL OUTPUT FOR CHANNELS 1 THROUGH 12 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 1 DEG C	DAS 2 DEG C	DAS 3 DEG C	DAS 4 DEG C	DAS 5 DEG C	DAS 6 DEG C	DAS 7 DEG C	DAS 8 DEG C	DAS 9 DEG C	DAS 10 DEG C	DAS 11 DEG C	DAS 12 DEG C
-100	33.7	32.6	31.8	30.8	30.7	28.9	34.0	32.4	31.7	30.3	29.4	28.4
-80	33.7	32.6	31.8	30.8	30.7	28.9	34.0	32.5	31.7	30.3	29.4	28.4
-60	33.7	32.6	31.7	30.7	30.7	28.9	34.2	32.6	31.6	30.4	29.6	28.4
-40	33.6	32.6	31.8	30.7	30.7	28.9	34.0	32.5	31.7	30.3	29.4	28.5
-20	33.6	32.6	31.8	30.8	30.8	28.8	34.1	32.7	31.7	30.3	29.4	28.5
0	33.7	32.6	31.8	30.8	30.8	28.9	34.1	32.6	31.6	30.4	29.5	28.5
20	33.6	32.6	31.7	31.2	30.8	28.7	34.0	32.6	31.6	30.5	29.4	28.5
40	33.7	32.6	31.8	31.6	30.8	28.8	34.1	32.7	31.7	30.6	29.4	28.5
60	33.7	32.6	31.8	32.0	30.8	28.8	34.1	32.7	31.9	30.8	29.4	28.6
80	33.7	32.6	31.9	32.3	30.8	28.8	34.2	32.7	31.8	31.1	29.6	28.6
100	33.7	32.6	31.9	32.6	30.7	28.9	34.3	32.7	31.9	31.3	29.6	28.6
120	33.8	32.6	32.0	32.7	30.8	28.9	34.3	32.8	32.1	31.2	29.5	28.6
140	33.8	32.7	32.0	32.8	30.7	29.0	34.3	32.7	32.1	31.3	29.6	28.6
160	33.8	32.7	32.0	33.2	30.8	28.9	34.3	32.8	32.3	31.3	29.5	28.6
180	33.8	32.7	32.1	33.5	30.7	29.1	34.3	32.8	32.3	31.4	29.7	28.7
200	33.9	32.7	32.1	33.7	30.8	29.0	34.3	32.9	32.4	31.6	29.7	28.7
220	33.8	32.7	32.2	33.9	30.8	29.0	34.3	32.9	32.6	31.5	29.6	28.7
240	33.9	32.7	32.2	34.3	30.8	29.1	34.3	33.0	32.5	31.6	29.7	28.8
260	33.9	32.8	32.3	34.5	31.0	29.0	33.9	33.2	32.7	31.6	29.7	28.8
280	33.8	32.8	32.4	34.7	31.0	29.1	33.9	33.2	32.8	31.6	29.7	28.8
300	33.9	32.8	32.4	34.9	31.1	29.1	34.0	33.2	32.9	31.7	29.7	28.7
320	33.9	32.9	32.5	35.0	31.1	29.1	33.8	33.3	32.9	31.8	29.7	28.8
340	33.9	33.0	32.6	35.1	31.0	29.2	33.9	33.3	33.0	31.9	29.7	28.9
360	33.9	33.1	32.7	35.3	31.2	29.1	33.8	33.4	33.2	31.9	29.7	28.9
380	33.9	33.2	32.8	35.3	31.1	29.2	33.9	33.4	33.2	31.9	29.7	28.9
400	33.8	33.1	32.7	35.3	31.0	29.2	33.8	33.5	33.4	32.0	29.7	28.8
446	33.9	33.3	33.0	35.4	31.0	29.3	34.1	33.6	33.4	32.3	29.9	28.9
493	34.0	33.3	32.9	35.4	31.0	29.3	34.0	33.6	33.4	32.3	29.8	29.0
503	34.1	33.4	33.1	35.6	31.1	29.3	33.9	33.6	33.5	32.3	29.8	28.9
520	34.1	33.5	33.2	35.5	31.1	29.3	33.9	33.7	33.6	32.3	29.8	28.9
540	34.1	33.6	33.2	35.6	31.2	29.3	33.9	33.7	33.7	32.3	29.8	28.9
560	34.1	33.6	33.2	35.8	31.2	29.3	33.9	33.7	33.8	32.4	29.9	28.9
580	34.1	33.6	33.3	35.6	31.2	29.4	33.9	33.7	33.8	32.4	29.9	28.9
600	34.1	33.6	33.3	35.8	31.2	29.3	34.1	33.7	33.8	32.4	29.8	29.0
620	34.1	33.6	33.3	35.8	31.9	29.3	34.1	33.8	33.8	32.6	29.8	29.0

TABLE R-1 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 1 THROUGH 12 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 1 DEG C	DAS 2 DEG C	DAS 3 DEG C	DAS 4 DEG C	DAS 5 DEG C	DAS 6 DEG C	DAS 7 DEG C	DAS 8 DEG C	DAS 9 DEG C	DAS 10 DEG C	DAS 11 DEG C	DAS 12 DEG C
640	45.0	42.2	46.7	63.1	151.9	36.2	43.6	39.8	35.3	34.7	32.2	30.2
660	56.4	53.0	67.9	129.8	271.2	57.9	56.4	52.8	40.3	37.1	35.1	32.0
680	74.6	74.1	111.8	210.6	381.5	63.5	68.9	70.1	48.0	40.3	37.7	34.3
700	84.3	86.2	122.8	229.2	479.2	52.9	79.1	75.9	53.9	45.4	40.4	36.4
720	87.7	93.6	130.4	241.4	429.0	54.4	83.7	80.7	60.3	49.7	43.5	38.5
740	91.6	99.9	130.5	238.3	377.7	54.9	85.7	84.1	64.8	53.8	46.3	40.3
760	94.4	105.8	141.6	255.8	337.0	(a)	87.6	86.7	68.7	57.7	49.1	41.4
780	94.7	108.7	138.3	247.8	293.4	(a)	89.1	88.7	72.3	61.5	52.2	42.9
800	98.7	111.8	145.7	252.1	268.4	(a)	91.5	89.4	75.9	64.9	55.2	43.8
820	101.4	114.3	146.9	259.3	274.1	(a)	91.6	89.7	78.2	67.9	58.1	44.6
840	101.7	116.3	148.1	265.2	321.6	(a)	92.3	91.1	79.9	71.0	60.9	45.6
860	101.0	117.2	149.2	268.1	323.9	(a)	93.0	90.8	82.1	73.9	63.4	45.4
880	99.8	116.4	147.2	262.3	331.2	(a)	94.5	91.7	83.9	76.6	65.8	46.1
900	100.2	116.4	145.6	241.1	327.4	(a)	94.9	93.4	85.0	78.0	67.8	46.3
920	100.9	115.9	145.1	237.2	325.0	(a)	95.9	94.6	85.7	79.4	69.7	46.4
940	100.6	115.9	146.2	239.4	344.2	(a)	97.9	94.4	86.2	80.4	70.9	46.2
960	102.2	117.2	147.7	243.4	360.7	(a)	97.2	95.6	88.0	80.8	71.9	46.2
980	104.3	119.3	151.3	254.8	366.9	(a)	98.8	95.7	88.1	82.1	73.4	46.3
1000	107.2	121.5	155.4	260.6	377.7	(a)	100.5	97.3	88.6	82.9	74.7	46.1
1020	107.1	121.7	154.9	262.4	395.6	(a)	100.8	97.8	89.1	83.8	75.7	45.7
1040	108.3	122.2	155.6	266.2	406.0	(a)	101.8	98.4	89.6	84.5	76.5	45.4
1060	110.3	124.8	163.0	276.6	405.2	(a)	103.5	100.5	90.2	85.3	77.8	45.2
1080	113.2	127.9	168.1	283.1	408.4	(a)	105.1	101.0	91.1	86.0	78.7	44.9
1100	115.1	130.3	172.4	293.2	422.6	(a)	107.5	102.2	91.7	86.8	79.6	44.6
1120	115.9	130.2	169.9	302.2	444.3	(a)	108.8	104.4	92.9	87.3	80.1	44.1
1140	118.4	132.6	174.7	311.0	466.4	(a)	109.2	104.8	93.5	88.1	80.9	43.7
1160	119.3	133.9	178.6	316.5	479.4	(a)	110.4	106.3	94.5	88.9	81.7	43.3
1180	120.4	135.3	183.1	324.3	509.3	(a)	111.4	106.9	95.6	89.8	82.3	43.1
1200	120.7	134.5	179.5	326.9	508.9	(a)	113.1	108.9	96.7	90.6	83.1	42.8
1245	123.6	137.1	179.4	334.9	496.6	(a)	114.9	111.8	99.1	92.4	84.8	42.9
1260	124.2	137.9	177.8	332.3	488.7	(a)	115.6	113.1	99.5	93.1	85.5	42.9
1280	124.9	140.3	184.2	331.0	492.8	(a)	115.6	112.3	100.7	93.9	86.4	43.0
1300	124.7	140.2	181.3	323.9	479.6	(a)	116.4	113.3	101.5	94.7	87.5	45.2
1320	125.9	140.6	180.9	323.7	474.1	(a)	117.2	113.8	102.7	95.6	88.4	43.9
1340	126.9	142.1	182.2	322.2	463.2	(a)	117.3	114.8	103.4	96.7	89.4	43.3

(a) THERMOCOUPLE FAILED

TABLE B-1 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 1 THROUGH 12 --TEST AR6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 1	DAS 2	DAS 3	DAS 4	DAS 5	DAS 6	DAS 7	DAS 8	DAS 9	DAS 10	DAS 11	DAS 12
	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C
B-5	1360	129.1	143.2	183.9	323.6	455.6	(a)	118.6	115.6	104.2	97.6	43.1
	1380	130.2	143.6	183.3	321.3	445.6	(a)	120.0	117.2	105.1	98.7	43.1
	1440	131.8	146.6	186.1	316.8	435.9	(a)	121.5	118.7	107.7	101.4	43.8
	1500	128.0	141.3	170.9	285.9	382.9	(a)	120.9	120.2	109.3	103.2	43.2
	1560	132.9	144.3	178.7	291.6	398.8	(a)	122.8	120.6	110.2	105.1	43.4
	1620	137.2	149.5	188.1	331.2	425.2	(a)	126.5	123.2	112.1	107.1	43.7
	1700	139.7	154.4	196.7	345.0	480.6	(a)	128.1	125.5	115.0	110.1	44.6
	1760	141.4	155.3	196.7	340.1	508.3	(a)	129.2	127.6	116.2	111.7	45.9
	1820	142.8	156.8	199.1	339.2	545.1	(a)	130.8	129.1	117.9	113.6	46.9
	1880	145.2	158.2	197.7	330.6	469.6	(a)	132.7	131.5	119.7	115.5	48.4
	1940	146.3	157.6	192.6	324.4	481.4	(a)	133.7	135.6	121.9	117.3	49.9
	2000	148.7	160.7	195.5	323.8	462.9	(a)	134.7	135.1	123.2	119.7	51.6
	2060	150.7	162.1	195.3	320.9	450.4	(a)	136.7	137.4	125.6	120.8	52.2
	2120	150.6	161.3	190.7	267.7	844.8	(a)	137.1	136.8	125.9	122.5	53.3
	2180	152.7	164.9	188.9	239.7	692.8	(a)	138.1	137.3	126.7	123.6	54.3
	2260	156.9	168.1	187.3	211.2	603.4	(a)	142.7	138.1	127.1	125.2	55.7
	2320	158.5	168.7	187.2	198.8	607.3	(a)	150.2	139.0	128.1	127.0	56.8
	2380	159.8	170.4	188.9	197.1	638.2	(a)	152.0	139.6	129.2	128.7	58.3
	2440	163.9	175.5	195.3	197.3	553.4	(a)	154.7	140.2	130.2	130.8	59.0
	2500	164.7	177.8	201.4	198.8	449.2	(a)	156.3	141.4	132.2	132.8	59.8
	2560	165.3	177.4	202.9	201.6	467.9	(a)	155.7	143.7	134.8	135.3	60.2
	2620	166.3	178.8	202.5	206.1	415.4	(a)	157.2	142.4	135.4	137.3	60.7
	2680	168.3	181.3	208.4	212.4	(a)	(a)	158.3	158.1	137.3	139.4	61.5
	2740	169.0	182.8	207.1	221.8	(a)	(a)	159.5	163.8	141.4	140.9	62.2
	2800	171.3	185.8	209.9	227.3	(a)	(a)	161.3	164.3	144.1	141.8	62.9
	2880	173.3	187.7	213.9	237.3	(a)	(a)	163.9	164.3	146.0	144.4	63.2
	2940	173.8	188.1	213.2	237.7	(a)	(a)	164.0	166.8	147.3	145.8	63.3
	3000	175.9	189.8	214.1	235.6	(a)	(a)	165.8	165.8	148.7	146.3	63.7
	3060	177.7	192.3	214.2	231.1	(a)	(a)	166.6	166.7	149.6	145.7	64.2
	3120	178.6	193.7	216.8	234.4	(a)	(a)	168.3	169.9	150.8	146.9	64.1
	3180	180.8	195.7	218.2	236.1	(a)	(a)	168.6	173.1	151.2	147.2	63.7
	3240	181.4	197.3	218.7	235.9	(a)	(a)	168.5	173.3	152.3	147.7	64.1
	3340	184.2	199.3	220.9	242.6	(a)	(a)	169.6	174.8	153.4	152.1	64.3
	3400	185.0	201.0	222.4	242.5	(a)	(a)	172.7	174.8	154.3	155.1	65.0
	3460	184.5	200.8	221.8	244.8	(a)	(a)	172.9	173.2	155.4	156.9	65.2

(a) THERMOCOUPLE FAILED

TABLE B-1 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 1 THROUGH 12 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 1 DEG C	DAS 2 DEG C	DAS 3 DEG C	DAS 4 DEG C	DAS 5 DEG C	DAS 6 DEG C	DAS 7 DEG C	DAS 8 DEG C	DAS 9 DEG C	DAS 10 DEG C	DAS 11 DEG C	DAS 12 DEG C
3520	188.8	206.0	232.1	252.4	(a)	(a)	173.4	177.3	156.2	158.2	152.8	65.5
3580	191.4	207.9	231.6	259.4	(a)	(a)	174.3	179.6	157.0	159.4	152.5	65.1
3640	193.5	211.6	236.7	263.0	(a)	(a)	175.3	179.4	157.7	160.3	152.8	65.0
3700	195.8	213.7	244.5	263.9	(a)	(a)	175.6	178.1	158.7	161.1	152.9	65.1
3780	198.3	216.4	248.2	266.3	(a)	(a)	175.8	179.3	159.7	164.2	153.7	65.1
3840	197.8	216.4	246.4	266.9	(a)	(a)	176.4	180.1	161.2	166.7	154.2	65.7
3900	199.7	217.9	246.9	265.3	(a)	(a)	177.3	181.3	166.8	167.8	154.0	66.6
3960	200.8	219.6	477.1	263.1	(a)	(a)	178.9	180.0	168.8	170.6	155.1	66.5
4020	200.6	219.3	514.2	264.8	(a)	(a)	182.6	181.2	169.8	173.7	156.4	66.4
4080	202.1	220.8	384.9	263.9	(a)	(a)	183.9	180.3	169.8	175.4	157.3	66.8
4140	202.9	221.6	378.5	264.2	(a)	(a)	183.8	180.3	170.7	177.6	157.5	66.9
4200	202.7	220.9	328.8	262.0	(a)	(a)	184.2	180.4	171.3	177.2	157.4	66.8
4260	202.5	220.6	384.8	258.8	(a)	(a)	185.2	181.1	172.8	177.5	157.7	67.5
4320	201.9	220.1	392.7	254.8	(a)	(a)	185.2	181.7	173.1	177.4	157.8	67.9
4380	203.4	222.3	506.8	253.2	(a)	(a)	185.1	181.2	173.4	176.9	158.3	68.2
4440	204.9	224.3	392.6	258.0	(a)	(a)	185.1	182.1	172.6	177.1	158.1	68.3
4500	204.4	224.4	459.1	261.5	(a)	(a)	185.2	183.1	172.3	178.2	157.6	68.9
4560	205.6	226.3	324.1	261.7	(a)	(a)	185.9	182.0	171.8	178.2	157.6	69.1
4640	205.3	226.2	263.1	259.8	(a)	(a)	186.6	181.0	171.3	177.3	157.7	69.8
4700	204.9	226.2	251.8	256.5	(a)	(a)	186.4	193.1	171.1	178.7	158.2	70.7
4760	204.3	224.7	244.6	250.4	(a)	(a)	186.6	200.8	171.3	180.7	158.8	70.7
4820	205.3	226.8	242.6	245.9	(a)	(a)	187.1	199.0	172.2	182.0	160.0	71.0
4880	206.1	226.9	241.0	242.1	(a)	(a)	187.6	198.0	177.8	182.3	160.9	71.7
4960	207.9	230.7	245.6	240.6	(a)	(a)	189.8	199.2	180.1	182.2	160.7	72.1
5020	209.2	231.5	247.4	241.8	(a)	(a)	190.8	198.1	180.9	182.7	160.3	72.6
5080	209.4	232.3	251.8	244.2	(a)	(a)	191.4	198.4	181.5	184.0	160.3	73.3
5140	210.7	234.4	256.4	249.4	(a)	(a)	192.3	199.1	182.2	185.0	160.2	73.4
5200	211.0	236.4	256.7	253.7	(a)	(a)	193.4	200.2	182.6	184.6	160.4	73.8
5260	210.8	235.5	256.0	256.1	(a)	(a)	193.8	199.8	182.3	184.8	160.8	74.0
5340	212.5	238.2	257.1	261.8	(a)	(a)	194.7	197.6	182.8	184.6	162.0	75.1
5360	211.9	236.9	255.9	264.2	(a)	(a)	194.8	197.7	182.4	184.8	163.2	75.2
5380	212.1	237.3	258.2	265.1	(a)	(a)	195.2	196.8	183.0	185.2	163.7	75.2
5400	211.5	237.8	-13.4	266.7	(a)	(a)	195.1	196.7	183.1	186.1	164.4	75.6
5420	210.6	235.5	690.5	265.9	(a)	(a)	194.9	197.2	183.1	186.0	164.6	75.3
5440	206.7	228.4	293.1	261.0	(a)	(a)	193.3	195.1	182.5	184.6	163.4	74.6

(a) THERMOCOUPLE FAILED

TABLE B-1 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 1 THROUGH 12 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 1 DEG C	DAS 2 DEG C	DAS 3 DEG C	DAS 4 DEG C	DAS 5 DEG C	DAS 6 DEG C	DAS 7 DEG C	DAS 8 DEG C	DAS 9 DEG C	DAS 10 DEG C	DAS 11 DEG C	DAS 12 DEG C
5460	201.1	220.9	243.2	254.4	(a)	(a)	190.6	191.3	180.8	182.2	160.4	72.4
5480	196.1	214.1	225.7	248.4	(a)	(a)	187.0	186.6	178.2	179.6	156.6	70.2
5500	191.4	207.8	214.4	242.7	(a)	(a)	183.4	181.1	175.4	176.4	152.4	68.7
5520	186.7	201.8	205.8	237.7	(a)	(a)	179.5	175.4	172.3	173.1	148.2	67.2
5540	181.7	196.2	198.6	232.5	(a)	(a)	175.8	170.4	169.0	169.5	144.0	65.8
5560	177.3	191.0	192.1	227.6	(a)	(a)	172.4	165.8	165.8	165.8	139.8	64.8
5580	173.3	185.9	186.2	222.7	(a)	(a)	169.3	161.3	162.7	162.1	135.6	64.1
5600	169.6	181.4	181.3	217.8	(a)	(a)	166.1	157.4	159.6	158.7	131.8	63.1
5620	166.1	177.0	176.7	213.3	(a)	(a)	163.1	153.6	156.8	155.3	128.2	62.6
5640	162.8	172.9	172.2	208.9	(a)	(a)	160.4	150.3	153.8	152.1	124.9	62.3
5660	160.0	169.2	167.9	204.4	(a)	(a)	157.9	147.0	151.1	148.9	121.6	61.8
5680	157.2	165.7	164.2	200.0	(a)	(a)	155.4	144.1	148.4	145.9	118.7	61.6
5700	154.7	162.1	160.3	195.6	(a)	(a)	152.8	140.6	145.5	142.8	115.6	61.3
5747	149.4	155.4	152.9	186.6	(a)	(a)	148.1	135.2	140.4	137.2	110.7	60.7
5760	148.3	153.8	151.2	184.1	(a)	(a)	147.1	133.8	138.9	135.7	109.3	60.8
5780	146.4	151.3	148.4	180.5	(a)	(a)	145.4	131.8	136.9	133.3	107.4	60.5
5800	144.7	148.9	145.9	176.9	(a)	(a)	143.7	129.9	134.8	131.2	105.7	60.2
5820	143.2	146.6	143.4	173.6	(a)	(a)	142.3	128.2	133.0	129.1	104.1	60.1
5840	141.8	144.5	141.0	170.3	(a)	(a)	140.9	126.6	131.2	127.1	102.4	60.1
5860	140.3	142.4	138.8	167.2	(a)	(a)	139.7	125.2	129.5	125.3	101.0	60.1
5880	138.9	140.6	136.8	164.2	(a)	(a)	138.3	123.7	127.8	123.6	99.7	60.2
5900	137.8	138.8	134.8	161.4	(a)	(a)	137.3	122.3	126.4	122.1	98.4	60.0
5920	136.7	137.1	133.0	158.5	(a)	(a)	136.2	121.2	124.8	120.3	97.3	60.2
5940	135.6	135.3	131.2	155.9	(a)	(a)	135.2	120.1	123.4	118.9	96.2	60.3
5960	134.7	133.8	129.4	153.4	(a)	(a)	134.3	119.0	122.2	117.7	95.3	60.3
5980	133.8	132.3	127.8	151.1	(a)	(a)	133.4	118.0	120.9	116.3	94.4	60.3
6000	132.8	130.8	126.1	148.8	(a)	(a)	132.5	117.0	119.7	115.2	93.6	60.2
6060	130.6	127.1	122.1	142.3	(a)	(a)	130.1	114.6	116.3	111.8	91.3	60.4
6146	127.8	122.4	116.8	134.3	(a)	(a)	127.6	111.8	112.3	108.1	89.8	60.6
6200	126.4	120.0	114.1	129.7	(a)	(a)	126.4	110.3	110.4	106.2	87.6	60.6
6260	124.9	117.6	111.6	125.4	(a)	(a)	125.0	108.8	108.4	104.2	86.3	60.5
6320	123.9	115.6	109.5	121.4	(a)	(a)	123.9	107.6	106.7	102.5	85.1	60.4
6380	122.9	113.8	107.6	118.0	(a)	(a)	122.8	106.7	105.1	101.1	84.3	60.3
6440	122.1	112.2	105.9	114.8	(a)	(a)	121.9	105.7	103.7	99.8	83.4	60.2
6500	121.1	110.8	104.4	112.1	(a)	(a)	121.1	104.8	102.6	98.4	82.6	60.3

(a) THERMOCOUPLE FAILED

TABLE B-2

DIGITAL OUTPUT FOR CHANNELS 13 THROUGH 25 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 13 DEG C	DAS 14 DEG C	DAS 15 DEG C	DAS 16 DEG C	DAS 17 DEG C	DAS 18 DEG C	DAS 20 DEG C	DAS 21 DEG C	DAS 22 DEG C	DAS 23 DEG C	DAS 24 DEG C	DAS 25 DEG C
-100	33.1	32.0	31.4	30.5	29.4	28.6	32.2	31.3	30.6	29.3	28.4	32.4
-80	33.2	32.1	31.4	30.5	29.4	28.6	32.2	31.3	30.6	29.3	28.4	32.4
-60	33.1	32.1	31.3	30.5	29.4	28.6	32.3	31.4	30.5	29.4	28.5	32.4
-40	33.1	32.1	31.4	30.5	29.4	28.6	32.2	31.3	30.6	29.3	29.5	32.4
-20	33.2	32.1	31.3	30.6	29.7	28.4	32.3	31.3	30.6	29.3	28.4	32.4
0	33.1	32.1	31.5	30.6	29.5	28.5	32.4	31.4	30.6	29.4	28.6	32.4
20	33.2	32.2	31.4	30.5	29.6	28.5	32.3	31.3	30.6	29.3	28.4	32.4
40	33.2	32.2	31.4	30.6	29.7	28.6	32.3	31.4	30.7	29.3	28.4	32.5
60	33.2	32.3	31.6	30.6	29.7	28.5	32.1	31.6	30.7	29.4	28.4	32.5
80	33.1	32.2	31.7	30.8	29.5	28.6	32.1	31.9	30.8	29.4	29.6	32.4
100	33.2	32.3	31.8	30.8	29.5	28.7	32.1	32.1	30.7	29.6	28.6	32.4
120	33.2	32.3	31.8	31.0	29.6	28.6	32.3	32.1	31.0	29.5	28.7	32.5
140	33.2	32.3	31.9	31.2	29.6	28.7	32.4	32.2	31.1	29.7	28.7	32.4
160	33.2	32.3	31.9	31.3	29.6	28.6	32.4	32.2	31.2	29.5	28.7	32.4
180	33.2	32.4	32.1	31.3	29.6	28.6	32.5	32.4	31.3	29.6	28.7	32.4
200	33.2	32.4	32.2	31.4	29.7	28.6	32.6	32.4	31.4	29.5	29.7	32.6
220	33.4	32.5	32.2	31.5	29.7	28.7	32.7	32.6	31.4	29.6	28.7	32.5
240	33.3	32.5	32.4	31.6	29.7	28.7	32.8	32.9	31.6	29.7	28.8	32.4
260	33.4	32.5	32.4	31.6	29.7	28.8	32.9	32.8	31.7	29.6	28.8	32.6
280	33.4	32.6	32.4	31.6	29.7	28.7	33.0	32.8	31.8	29.3	28.8	32.6
300	33.5	32.8	32.6	31.6	29.7	28.9	32.9	33.0	31.7	29.8	28.8	32.4
320	33.5	32.8	32.6	31.9	29.8	28.8	33.1	33.1	31.9	29.7	29.6	32.6
340	33.4	32.8	32.8	32.0	29.8	28.8	33.2	33.1	32.0	29.7	28.9	32.6
360	33.6	32.8	32.7	31.9	29.8	28.9	33.2	33.0	32.0	29.7	28.9	32.5
380	33.6	32.9	32.8	32.0	29.8	28.9	33.3	32.9	32.1	29.7	28.9	32.6
400	33.4	33.1	32.9	32.0	29.8	29.0	33.2	33.1	32.0	29.7	28.7	32.3
446	33.6	33.1	33.1	32.2	29.8	29.0	33.2	33.2	32.1	29.8	29.0	32.4
493	33.7	33.1	33.1	32.2	29.9	29.1	33.5	33.3	32.2	29.8	29.0	32.6
503	33.6	33.2	33.1	32.2	29.9	29.1	33.6	33.2	32.3	29.8	28.9	32.6
520	33.7	33.3	33.2	32.3	29.9	29.1	33.4	33.2	32.3	29.8	28.9	32.6
540	33.7	33.3	33.2	32.3	29.9	29.1	33.4	33.3	32.2	29.9	28.9	32.6
560	33.7	33.4	33.3	32.4	29.9	29.1	33.4	33.4	32.2	29.9	29.4	32.6
580	33.7	33.4	33.3	32.4	29.9	29.2	33.5	33.4	32.3	29.9	28.9	32.5
600	33.6	33.3	33.2	32.4	30.0	29.1	33.5	33.6	32.3	29.8	28.9	32.6
620	33.7	33.2	33.2	32.4	29.9	29.1	33.6	33.6	32.3	29.8	28.9	32.4

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TABLE B-2 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 13 THROUGH 25 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 13 DEG C	DAS 14 DEG C	DAS 15 DEG C	DAS 16 DEG C	DAS 17 DEG C	DAS 18 DEG C	DAS 20 DEG C	DAS 21 DEG C	DAS 22 DEG C	DAS 23 DEG C	DAS 24 DEG C	DAS 25 DEG C
640	40.4	37.6	35.8	34.2	31.3	30.1	38.1	35.6	34.1	31.4	29.8	32.7
660	51.6	47.7	43.9	38.4	32.3	32.1	49.9	44.7	39.7	33.8	31.4	33.8
680	63.4	59.3	54.1	45.0	34.0	33.9	61.0	54.2	45.9	36.9	33.7	35.1
700	73.4	67.0	63.2	53.4	35.5	35.8	70.9	62.2	52.7	39.3	35.9	36.3
720	80.1	75.2	70.2	59.8	38.7	37.2	78.9	70.2	58.6	42.4	37.4	37.9
740	83.6	78.7	75.6	67.2	40.4	38.5	82.8	74.4	62.6	45.1	38.7	38.9
760	85.8	82.3	79.0	70.9	42.6	39.7	86.9	78.3	67.1	48.9	40.1	39.9
780	87.1	84.3	82.7	73.9	45.6	40.4	88.8	81.5	70.7	50.9	41.1	40.6
800	87.4	86.0	84.4	77.9	48.8	41.1	90.0	84.1	73.8	53.8	41.8	41.3
820	88.6	86.7	85.9	80.3	53.0	41.6	89.6	85.0	75.8	55.1	42.6	41.7
840	90.9	87.2	86.5	80.9	54.7	42.1	91.4	85.6	77.8	57.2	43.5	42.2
860	90.6	88.1	87.1	82.7	54.9	42.3	90.7	85.8	79.5	58.5	43.6	42.3
880	91.1	89.1	87.5	83.0	58.4	42.5	91.7	86.9	80.0	59.9	43.7	42.7
900	91.4	89.2	88.3	83.3	58.9	42.7	91.9	87.2	80.9	61.4	43.9	43.3
920	92.7	90.2	88.4	82.6	59.6	42.7	93.3	88.2	81.2	62.1	43.8	43.8
940	93.6	91.2	88.5	82.8	60.1	42.7	93.8	88.2	82.1	62.6	43.7	44.2
960	93.3	90.8	88.9	84.4	61.9	42.7	94.5	88.7	81.5	62.9	43.6	44.6
980	93.2	91.3	89.8	83.9	62.6	42.6	96.6	90.3	82.3	63.1	43.7	44.8
1000	95.2	93.0	91.1	84.2	63.5	42.8	97.3	89.7	82.9	64.1	43.2	45.1
1020	96.1	93.7	92.0	84.7	64.2	42.9	97.8	91.2	83.0	64.6	43.2	45.3
1040	97.5	94.4	92.8	84.8	65.3	42.8	98.4	92.0	83.3	65.1	43.0	45.8
1060	97.8	95.6	94.1	84.8	66.1	43.0	99.9	92.8	83.5	65.8	42.8	45.9
1080	99.6	95.8	94.8	84.7	66.7	42.8	100.7	92.9	84.1	66.6	42.7	46.2
1100	101.7	98.1	95.8	85.0	67.2	42.7	102.9	94.3	84.6	66.8	42.5	46.4
1120	102.9	100.8	96.2	86.2	67.9	42.3	104.0	94.6	85.3	67.1	42.3	47.0
1140	104.5	101.3	97.2	87.1	68.3	41.9	104.4	95.7	85.6	67.6	41.9	47.3
1160	105.7	102.4	99.2	87.5	69.0	41.8	105.4	97.0	86.7	67.7	41.9	47.7
1180	106.9	103.9	100.0	87.6	69.2	41.3	106.9	98.4	87.9	67.3	41.9	48.3
1200	107.3	105.0	101.5	89.1	69.8	41.2	108.6	99.6	88.7	67.8	41.8	48.8
1245	110.6	106.6	103.8	91.4	70.9	41.3	109.1	102.0	90.3	68.6	41.9	49.6
1260	110.8	106.9	104.7	92.3	71.2	41.2	109.7	102.7	90.4	68.8	41.6	49.8
1280	112.1	108.6	105.2	92.6	71.7	40.9	110.4	103.9	91.2	69.1	41.4	50.0
1300	112.3	109.4	105.5	93.4	72.1	40.8	111.3	104.8	91.7	69.4	41.2	50.3
1320	112.7	110.3	106.1	94.1	72.6	40.7	111.8	104.9	92.1	69.8	40.8	50.4
1340	113.6	111.4	106.6	95.0	73.1	40.7	112.2	105.7	92.9	70.3	40.9	50.4

TABLE B-2 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 13 THROUGH 25 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

	TIME SECONDS	DAS 13 DEG C	DAS 14 DEG C	DAS 15 DEG C	DAS 16 DEG C	DAS 17 DEG C	DAS 18 DEG C	DAS 20 DEG C	DAS 21 DEG C	DAS 22 DEG C	DAS 23 DEG C	DAS 24 DEG C	DAS 25 DEG C
B-10	1360	114.0	112.4	106.5	95.9	73.9	41.1	113.1	106.8	93.9	70.8	41.1	50.7
	1380	114.8	113.2	107.0	96.9	74.7	41.3	114.3	107.3	94.8	71.3	41.1	51.1
	1440	116.1	114.6	108.8	98.8	77.1	41.5	115.9	108.8	96.4	73.6	40.9	51.9
	1500	116.8	113.5	109.8	99.8	78.6	41.2	114.7	110.8	97.8	75.3	40.8	52.5
	1560	116.9	114.3	111.2	101.9	81.1	41.2	115.1	111.9	98.7	77.8	40.4	53.0
	1620	121.5	118.4	113.0	103.9	82.9	41.1	118.8	114.9	99.8	79.7	40.7	54.1
	1700	124.2	120.2	116.8	105.3	86.0	41.4	122.2	118.1	101.5	81.4	41.2	55.1
	1760	124.6	121.2	117.2	107.4	88.3	42.2	126.1	119.6	102.3	83.2	41.7	55.9
	1820	125.2	123.4	119.7	108.7	90.8	43.0	128.7	121.7	104.8	84.3	42.7	56.5
	1880	126.2	130.3	121.2	110.7	92.7	43.8	130.2	123.9	109.7	85.8	43.4	57.2
	1940	126.6	130.5	125.1	112.4	94.7	44.9	132.4	127.1	111.7	87.3	44.4	58.0
	2000	127.3	131.3	126.8	116.8	97.6	46.2	134.4	128.9	113.0	88.9	45.5	58.7
	2060	128.7	132.8	128.9	119.4	99.1	46.9	135.5	131.7	113.7	90.1	46.5	59.3
	2120	133.4	132.7	129.8	120.4	100.7	47.9	137.4	132.6	114.4	91.3	47.1	60.4
	2180	145.1	133.9	131.1	121.5	103.3	49.1	139.4	133.3	114.9	92.5	48.1	61.5
	2260	147.9	133.8	131.9	123.8	105.4	50.8	141.5	134.7	115.1	94.1	49.0	62.4
	2320	149.6	145.2	134.1	124.4	107.1	51.9	142.8	136.7	115.3	95.7	49.9	63.3
	2380	150.7	147.1	134.1	125.7	109.1	53.2	144.8	139.2	116.8	97.6	51.0	63.7
	2440	152.3	146.4	135.9	129.8	110.7	54.2	153.5	140.0	128.4	99.5	52.1	64.2
	2500	152.9	147.8	139.6	130.5	112.0	54.9	154.0	140.1	132.7	101.9	52.7	64.8
	2560	156.1	148.7	147.2	135.9	113.9	55.9	153.3	141.2	134.7	104.1	53.1	66.0
	2620	154.9	148.7	146.7	138.4	115.2	56.7	152.8	142.2	134.8	105.3	53.4	67.5
	2680	155.7	150.6	148.3	138.6	117.9	57.6	153.7	142.2	134.2	107.1	53.8	68.9
	2740	158.8	155.9	149.2	138.8	119.1	58.6	156.3	143.8	135.4	108.3	54.2	69.9
	2800	159.6	161.2	149.2	138.8	121.0	59.4	156.4	143.7	135.4	110.2	54.6	70.6
	2880	160.7	163.8	148.0	139.1	122.2	60.2	156.4	145.5	135.1	111.8	54.7	71.6
	2940	160.3	163.3	148.3	141.6	123.4	60.7	160.0	144.9	134.8	112.6	54.8	72.1
	3000	160.8	164.1	150.3	142.2	124.2	61.5	161.7	144.7	134.3	113.5	55.0	71.9
	3060	161.0	164.0	156.7	141.9	125.2	60.9	162.7	145.4	134.0	114.6	56.1	73.3
	3120	170.4	163.0	158.4	142.1	125.4	61.3	162.2	157.1	133.5	115.6	56.8	73.8
	3180	170.8	161.9	164.3	142.6	125.9	62.1	162.1	163.6	134.1	116.2	57.3	74.5
	3240	174.4	162.2	165.6	142.8	127.0	63.0	162.3	164.1	134.3	117.8	57.5	74.9
	3340	173.9	166.3	167.8	152.3	128.4	64.2	162.8	165.6	134.5	120.4	57.8	76.2
	3400	173.7	165.8	165.8	155.4	128.9	64.5	162.1	164.5	134.8	121.3	58.4	76.5
	3460	177.2	165.3	165.3	157.3	130.6	65.6	174.3	164.4	144.3	123.1	59.7	77.1

TABLE B-2 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 13 THROUGH 25 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 13 DEG C	DAS 14 DEG C	DAS 15 DEG C	DAS 16 DEG C	DAS 17 DEG C	DAS 18 DEG C	DAS 20 DEG C	DAS 21 DEG C	DAS 22 DEG C	DAS 23 DEG C	DAS 24 DEG C	DAS 25 DEG C
3520	178.4	165.7	164.8	157.5	131.2	66.3	174.6	165.8	160.4	125.2	59.4	77.6
3580	178.8	166.2	165.8	158.6	131.7	66.8	175.4	166.9	164.7	126.8	59.6	78.3
3640	179.9	166.9	165.8	159.7	132.6	67.2	175.9	170.3	166.6	128.8	59.7	79.2
3700	180.4	168.1	165.6	160.7	132.7	67.2	175.2	184.1	167.2	130.2	59.7	79.9
3780	180.3	168.6	167.7	160.4	133.8	67.9	175.9	185.4	168.1	131.9	59.9	80.7
3840	183.6	169.3	168.3	159.9	134.7	68.9	175.8	186.3	166.8	132.1	59.9	81.5
3900	188.1	170.2	167.6	160.3	135.3	69.6	176.1	186.6	166.4	133.3	60.1	82.1
3960	189.6	169.6	167.9	161.3	135.9	70.1	176.4	186.6	166.1	134.0	61.0	82.6
4020	188.8	169.8	168.5	160.6	136.6	70.6	176.7	188.2	165.8	135.4	61.0	83.3
4080	188.5	170.1	168.3	160.6	137.0	70.9	176.7	188.7	164.6	136.5	61.4	83.9
4140	190.3	170.2	168.4	160.8	137.6	71.4	176.8	188.8	164.6	136.2	61.8	84.4
4200	191.2	170.1	169.2	161.0	138.3	71.7	177.0	188.6	164.2	137.1	61.8	85.1
4260	192.6	192.6	170.3	161.6	138.6	72.0	177.3	188.4	164.1	138.4	62.1	85.8
4320	191.7	198.3	183.3	161.6	139.3	72.1	185.7	190.0	165.1	138.1	62.4	86.5
4380	191.8	198.8	184.8	161.4	140.4	72.6	191.6	189.1	164.2	138.8	62.7	87.0
4440	192.1	197.3	184.1	161.7	140.3	72.9	190.7	188.3	164.1	139.1	62.8	87.6
4500	191.9	196.9	184.1	180.8	140.6	73.1	193.1	187.7	163.7	139.3	63.3	88.1
4560	192.8	196.8	183.2	184.3	140.8	73.4	191.9	187.5	165.1	139.9	63.6	88.8
4640	190.7	197.6	183.9	183.3	141.2	73.9	191.1	186.9	164.9	141.2	63.9	89.4
4700	190.0	197.2	182.9	184.1	140.9	74.4	189.6	185.7	164.4	142.7	64.5	90.0
4760	190.6	195.8	182.3	182.8	141.4	75.1	188.5	186.1	163.9	142.3	64.9	90.6
4820	189.6	194.5	180.5	182.0	141.9	76.1	194.7	185.7	164.8	142.8	66.2	91.1
4880	191.5	195.5	181.2	181.4	142.6	76.9	194.2	184.6	167.0	143.5	66.6	91.7
4960	191.6	196.4	181.7	179.4	142.9	77.3	193.4	185.9	169.4	144.3	67.1	92.5
5020	193.4	196.3	190.7	179.7	143.4	77.6	194.7	186.6	170.7	144.3	67.6	93.3
5080	193.9	195.7	194.5	182.4	143.6	78.1	195.2	188.1	172.0	145.4	68.0	93.9
5140	193.9	195.9	195.4	183.6	143.7	78.3	195.7	187.8	172.9	146.4	68.4	94.6
5200	198.9	195.9	193.9	184.1	144.2	78.6	195.9	189.4	174.2	146.9	68.7	95.4
5260	202.4	195.7	195.1	183.4	144.8	79.1	196.2	188.9	174.4	147.7	69.1	96.1
5340	201.7	195.2	195.7	182.6	145.8	79.7	195.8	188.4	174.4	148.7	69.3	96.7
5360	201.4	194.9	196.1	182.1	146.3	79.9	195.9	188.6	174.4	148.5	69.4	96.9
5380	201.1	195.2	195.7	181.8	146.8	80.1	195.7	188.6	174.2	148.6	69.4	97.2
5400	201.2	195.1	197.6	181.3	146.8	80.4	195.5	188.1	173.9	148.9	69.5	97.3
5420	200.1	194.9	197.8	180.2	146.9	80.3	195.1	188.9	174.2	148.5	69.6	97.5
5440	196.8	193.8	197.6	178.9	145.6	79.8	193.3	188.5	173.7	146.9	69.1	97.6

TABLE B-2 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 13 THROUGH 25 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 13 DEG C	DAS 14 DEG C	DAS 15 DEG C	DAS 16 DEG C	DAS 17 DEG C	DAS 18 DEG C	DAS 20 DEG C	DAS 21 DEG C	DAS 22 DEG C	DAS 23 DEG C	DAS 24 DEG C	DAS 25 DEG C
5460	193.4	191.2	195.5	175.6	142.4	78.7	189.6	185.9	161.7	142.7	67.8	97.4
5480	189.6	187.5	190.1	171.4	139.3	77.5	185.1	182.0	168.3	137.5	66.7	97.3
5500	184.9	183.1	183.7	166.9	135.9	76.3	180.4	177.4	164.3	131.8	65.3	97.1
5520	180.4	178.6	177.8	162.9	132.7	75.1	175.6	172.3	160.4	125.8	64.3	96.7
5540	176.2	173.6	172.1	158.6	129.6	73.9	170.9	167.5	156.2	121.1	62.9	96.4
5560	171.8	169.2	166.8	154.5	126.9	72.9	166.4	162.8	152.0	116.6	61.9	96.2
5580	167.6	164.8	161.7	150.7	124.1	72.0	162.1	158.2	148.0	112.6	61.2	95.8
5600	163.7	160.5	157.2	146.9	121.2	71.1	158.3	154.3	144.2	109.2	60.7	95.6
5620	160.4	156.7	153.1	143.5	119.0	70.4	154.5	150.4	140.6	106.1	60.2	95.3
5640	157.1	153.1	149.4	140.2	116.6	69.7	150.9	146.8	137.3	103.5	59.8	95.1
5660	154.1	150.0	146.0	137.2	113.8	58.8	147.6	143.3	133.9	101.5	59.4	94.9
5680	151.3	146.9	142.8	134.4	111.8	68.7	144.8	140.4	131.3	99.7	59.2	94.8
5700	148.3	143.3	139.2	131.0	109.0	67.9	140.9	136.7	127.6	96.6	58.8	94.6
5747	143.6	138.2	133.7	126.2	105.3	67.2	136.6	132.0	123.3	93.7	58.4	94.4
5760	142.4	136.6	132.4	124.7	104.4	66.9	135.2	130.6	122.2	92.7	58.6	94.2
5780	140.4	134.8	130.2	123.0	102.6	66.7	133.1	128.4	120.2	91.8	58.4	94.2
5800	138.8	132.7	128.3	121.1	101.2	66.2	131.3	126.6	118.6	90.4	58.4	93.9
5820	137.2	131.0	126.6	119.4	99.9	65.9	129.7	124.8	117.0	89.7	58.5	93.9
5840	135.6	129.4	124.8	117.9	98.4	65.8	127.8	123.0	116.1	89.0	58.4	93.8
5860	133.9	127.8	123.1	116.3	97.4	65.5	126.3	121.3	114.8	88.1	58.1	93.7
5880	133.1	126.4	121.7	115.1	96.3	65.3	125.2	120.2	113.9	87.5	58.2	93.7
5900	131.9	125.3	120.1	113.9	95.2	65.3	123.8	118.7	112.7	86.9	58.3	93.7
5920	130.8	123.9	118.8	112.8	94.1	65.1	122.6	117.5	111.7	86.3	58.3	93.6
5940	129.7	122.8	117.6	111.7	93.1	64.9	121.4	116.3	110.7	86.2	58.4	93.6
5960	128.9	121.8	116.4	110.7	92.4	64.8	120.3	115.2	110.2	85.5	58.6	93.6
5980	128.1	120.7	115.3	109.7	91.6	64.8	119.2	114.1	109.3	85.0	58.5	93.5
6000	127.3	119.8	114.4	108.8	90.7	64.7	118.1	113.1	108.4	84.7	58.4	93.5
6060	125.2	117.0	111.8	106.2	88.7	64.3	115.2	110.6	106.4	83.5	58.4	93.4
6146	122.6	114.1	108.5	103.6	86.3	64.0	112.2	107.6	103.9	82.7	58.6	93.5
6200	121.6	112.7	106.9	102.1	85.2	63.9	110.5	106.0	102.4	82.0	58.7	93.4
6260	120.3	111.2	105.1	100.6	83.8	63.6	109.2	104.4	100.9	81.4	58.4	93.4
6320	119.4	109.9	103.9	99.4	82.7	63.6	107.9	103.1	99.7	80.8	58.6	93.4
6380	118.6	108.9	102.6	98.3	81.8	63.4	106.7	101.9	98.8	80.2	58.6	93.6
6440	117.9	107.8	101.5	97.1	80.9	63.2	105.8	100.9	97.6	79.7	58.4	93.6
6500	117.3	106.9	100.6	96.3	80.2	63.2	104.9	99.9	96.6	79.3	58.6	93.6

TABLE B-3

DIGITAL OUTPUT FOR CHANNELS 26 THROUGH 38 ---TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 26 DEG C	DAS 27 DEG C	DAS 29 DEG C	DAS 30 DEG C	DAS 31 DEG C	DAS 32 DEG C	DAS 33 DEG C	DAS 34 DEG C	DAS 35 DEG C	DAS 36 DEG C	DAS 37 DEG C	DAS 38 DEG C
-100	32.3	30.8	29.7	29.6	29.2	28.4	30.2	32.4	32.8	30.9	28.4	31.6
-80	32.3	30.8	29.7	29.6	29.2	28.3	30.2	32.4	32.8	30.9	28.4	31.6
-60	32.2	30.9	29.7	29.4	29.1	28.4	30.2	32.3	32.9	30.9	28.4	31.6
-40	32.3	30.9	29.7	29.6	29.2	28.3	30.2	32.3	32.8	30.9	28.5	31.6
-20	32.4	30.8	29.8	29.6	29.2	28.4	30.1	32.4	32.9	31.1	28.6	31.6
0	32.3	30.9	29.7	29.4	29.0	28.4	30.2	32.3	32.8	31.0	28.4	31.6
20	32.4	30.8	29.8	29.5	29.1	28.3	30.1	32.4	32.7	31.1	28.5	31.5
40	32.4	30.8	29.8	29.6	29.2	28.3	30.1	32.4	32.7	31.1	28.5	31.6
60	32.4	30.9	29.8	29.6	29.2	28.4	30.1	32.4	32.7	31.0	28.6	31.6
80	32.3	30.9	29.7	29.5	29.1	28.5	30.2	32.3	32.8	31.0	28.4	31.6
100	32.4	30.9	29.7	29.6	29.2	28.6	30.1	32.4	32.8	31.1	28.6	31.6
120	32.3	30.9	29.8	29.5	29.1	28.5	30.3	32.5	32.8	31.3	28.6	31.6
140	32.4	30.9	29.7	29.6	29.1	28.7	30.2	32.4	32.8	31.3	28.6	31.7
160	32.3	30.9	29.7	29.5	29.1	28.6	30.3	32.4	32.8	31.4	28.6	31.7
180	32.3	30.9	29.7	29.4	29.1	28.6	30.3	32.4	32.8	31.5	28.6	31.6
200	32.3	30.9	29.7	29.4	29.1	28.7	30.3	32.6	32.8	31.6	28.6	31.6
220	32.4	30.8	29.8	29.5	29.1	28.6	30.4	32.7	32.8	31.7	28.7	31.6
240	32.3	30.9	29.7	29.5	29.1	28.8	30.4	32.6	32.8	31.7	28.6	31.7
260	32.3	30.9	29.8	29.6	29.1	28.7	30.4	32.7	32.8	31.9	28.7	31.6
280	32.4	30.9	29.8	29.5	29.1	28.7	30.4	32.8	32.8	32.0	28.8	31.6
300	32.4	31.0	29.7	29.6	29.2	28.8	30.3	32.7	32.7	32.0	28.8	31.7
320	32.3	30.9	29.8	29.6	29.1	28.8	30.5	32.8	32.8	32.2	28.8	31.6
340	32.3	30.9	29.8	29.6	29.1	28.9	30.5	32.8	30.9	32.2	28.8	31.6
360	32.4	30.9	29.9	29.6	29.2	28.8	30.5	32.9	32.8	32.3	28.9	31.6
380	32.4	30.9	29.9	29.7	29.3	28.8	30.5	32.9	32.8	32.4	28.9	31.6
400	32.4	30.9	29.8	29.6	29.2	28.8	30.5	32.8	32.7	32.4	28.9	31.6
446	32.3	31.0	29.7	29.7	29.2	28.9	30.5	33.0	32.8	32.6	28.8	31.6
493	32.4	30.9	29.9	29.6	29.1	28.9	30.6	33.1	32.8	32.7	28.9	31.6
503	32.4	30.9	29.9	29.7	29.3	28.8	30.7	33.1	32.8	32.7	28.9	31.6
520	32.4	31.0	29.9	29.7	29.3	28.9	30.6	33.2	32.8	32.7	28.9	31.6
540	32.4	31.0	29.2	29.6	29.3	28.8	30.5	33.2	32.6	32.6	28.9	31.7
560	32.4	30.9	30.0	29.7	29.3	28.9	30.6	33.3	32.7	32.7	28.9	31.6
580	32.4	30.9	29.9	29.7	29.3	28.9	30.6	33.2	32.7	32.7	29.0	31.7
600	32.4	30.9	29.9	29.7	29.3	28.9	30.6	33.3	32.8	32.8	28.9	31.6
620	32.4	30.9	29.9	29.7	29.3	29.0	109.1	33.3	32.7	32.7	29.1	31.7

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TABLE B-3 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 26 THROUGH 38 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

	TIME SECONDS	DAS 26 DEG C	DAS 27 DEG C	DAS 29 DEG C	DAS 30 DEG C	DAS 31 DEG C	DAS 32 DEG C	DAS 33 DEG C	DAS 34 DEG C	DAS 35 DEG C	DAS 36 DEG C	DAS 37 DEG C	DAS 38 DEG C
B-14	640	32.3	30.9	29.9	29.7	29.6	29.8	96.5	36.2	32.9	33.6	31.9	33.4
	660	32.4	31.3	30.1	29.7	29.9	31.4	80.7	42.9	32.9	36.2	34.8	37.0
	680	32.6	31.8	30.1	29.9	30.3	33.7	78.9	52.8	32.9	42.8	37.5	39.2
	700	32.9	32.8	30.3	30.1	30.7	35.3	80.1	60.9	33.3	50.3	40.3	42.2
	720	33.6	33.6	30.7	30.3	31.1	37.0	78.3	67.6	33.6	56.3	42.1	43.7
	740	33.9	34.5	31.1	30.7	31.6	38.1	77.4	73.6	33.8	62.4	43.7	45.2
	760	34.7	35.6	31.6	31.2	32.0	39.1	103.2	77.4	34.3	66.9	44.7	46.0
	780	35.2	36.4	32.1	31.6	32.6	39.9	98.1	80.8	34.8	71.4	45.1	46.6
	800	35.8	37.4	32.4	32.1	33.1	40.4	93.8	83.3	35.4	74.9	45.2	47.3
	820	36.3	38.0	32.8	32.7	33.6	41.3	88.8	85.1	35.8	77.2	45.1	47.9
	840	36.8	38.6	33.5	33.4	34.5	41.6	86.4	86.6	36.2	79.4	45.2	48.6
	860	37.2	39.2	33.8	33.9	34.8	41.9	85.7	87.8	36.8	81.1	44.4	48.4
	880	37.7	39.8	34.1	34.3	35.3	42.2	85.2	88.3	37.4	82.2	43.7	49.2
	900	38.2	40.4	34.5	34.9	35.5	42.7	85.4	88.6	37.9	83.1	42.9	49.2
	920	38.6	40.8	34.8	35.4	35.7	42.9	85.9	89.3	38.5	83.8	42.0	50.0
	940	38.9	41.2	35.2	35.8	35.8	42.8	85.5	90.1	38.8	84.2	41.3	49.8
	960	39.5	41.8	35.6	36.4	36.2	42.3	85.7	90.8	39.3	84.7	40.6	49.6
	980	39.7	42.2	35.9	36.6	36.3	41.8	86.3	91.2	40.0	85.6	39.8	50.3
	1000	40.2	42.6	36.1	37.2	36.6	41.4	86.6	92.3	41.2	85.3	39.2	51.6
	1020	40.4	43.0	36.3	37.4	36.7	40.6	86.6	93.4	41.2	85.9	38.6	52.0
	1040	40.7	43.1	36.7	37.8	37.0	40.1	86.6	94.6	41.6	86.8	38.3	52.2
	1060	41.2	43.5	36.9	38.2	37.1	40.2	86.9	95.5	42.2	87.3	37.9	52.6
	1080	41.1	43.8	37.1	38.4	37.3	40.1	87.4	97.0	42.7	87.9	37.6	52.8
	1100	41.6	44.2	37.4	38.8	37.5	40.7	88.0	98.1	43.4	88.7	37.3	53.4
	1120	42.0	44.4	37.7	39.2	37.9	40.9	88.1	99.2	43.9	89.3	37.0	54.1
	1140	42.3	44.8	37.8	39.3	38.1	40.5	88.1	100.6	44.5	90.2	36.9	54.2
	1160	42.7	45.1	38.2	39.7	38.2	40.6	92.7	101.7	45.3	91.2	36.8	54.4
	1180	42.9	45.3	38.6	40.0	38.4	40.6	90.8	102.8	45.8	91.8	36.7	54.8
	1200	43.5	45.6	39.0	40.4	38.5	40.3	89.4	104.4	46.8	92.8	36.5	55.4
	1245	44.1	46.2	39.4	40.9	38.9	40.3	89.2	106.0	47.9	94.4	36.4	55.3
	1260	44.2	46.4	39.6	41.1	39.0	40.2	89.4	106.7	48.4	94.9	36.4	55.6
	1280	44.4	46.5	40.0	41.4	39.3	39.9	89.5	107.4	49.1	95.4	36.6	55.5
	1300	44.7	46.8	40.2	41.6	39.4	39.8	90.1	107.9	49.6	96.2	37.3	55.7
	1320	45.0	46.9	40.4	41.8	39.5	39.7	90.6	108.2	50.1	96.7	37.8	56.1
	1340	45.1	46.9	40.7	42.0	39.6	39.5	92.8	108.7	50.6	97.4	37.6	56.1

TABLE B-3 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 26 THROUGH 38 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 26 DEG C	DAS 27 DEG C	DAS 29 DEG C	DAS 30 DEG C	DAS 31 DEG C	DAS 32 DEG C	DAS 33 DEG C	DAS 34 DEG C	DAS 35 DEG C	DAS 36 DEG C	DAS 37 DEG C	DAS 38 DEG C
1360	45.4	47.0	40.9	42.3	39.7	39.5	95.1	109.2	51.2	97.8	37.6	56.6
1380	45.7	47.2	41.1	42.6	39.8	39.5	97.5	109.8	51.8	98.4	37.8	57.2
1440	46.3	47.5	41.7	43.2	40.2	39.1	100.7	111.3	53.2	100.3	38.4	58.3
1500	46.9	47.7	42.5	43.9	40.8	38.6	107.4	111.9	54.5	101.3	38.4	58.7
1560	47.7	48.2	43.0	44.5	41.2	38.2	115.4	112.4	55.9	102.1	38.3	60.2
1620	48.3	48.7	43.6	45.1	41.7	38.3	114.8	114.8	57.2	103.6	38.3	62.0
1700	49.4	49.3	44.6	45.8	42.5	38.0	149.8	117.4	58.9	105.7	38.9	63.3
1760	50.2	49.7	45.4	46.6	43.2	38.2	144.9	118.7	60.1	106.8	39.9	64.3
1820	50.9	50.3	46.1	47.3	43.8	38.5	196.8	119.9	61.3	107.8	39.6	65.8
1880	51.6	50.8	46.8	47.9	44.1	38.9	171.3	121.9	62.6	109.2	39.9	66.9
1940	52.3	51.3	47.7	48.9	44.7	39.4	170.8	123.2	63.7	110.2	43.6	67.9
2000	53.1	51.9	48.6	49.7	45.4	40.1	221.4	124.4	64.8	111.9	50.2	69.1
2060	53.8	52.8	49.4	50.3	46.2	40.6	226.8	126.9	65.8	113.2	53.0	69.9
2120	54.7	53.6	50.1	51.1	46.9	41.5	233.4	132.6	67.0	114.1	54.3	71.3
2180	55.3	54.2	50.9	51.9	47.6	42.1	221.1	136.2	67.9	115.6	61.7	72.3
2260	56.5	55.1	43.1	52.8	48.4	43.0	185.6	138.4	69.4	116.6	74.4	73.8
2320	57.3	55.9	52.6	53.7	49.2	43.7	165.6	139.2	70.5	117.3	73.6	74.8
2380	58.2	56.7	53.4	54.4	49.9	44.7	151.1	142.1	71.7	118.8	83.4	75.6
2440	59.1	57.5	54.2	55.3	50.9	45.6	157.8	144.1	73.4	120.2	78.9	76.7
2500	59.9	58.4	54.9	56.1	51.7	46.2	161.7	145.8	73.8	126.2	66.4	77.8
2560	60.7	59.1	55.7	57.1	52.7	46.7	160.2	146.3	74.8	134.7	69.3	78.2
2620	61.3	59.9	56.5	57.7	53.5	46.9	162.7	146.6	75.8	136.9	70.4	80.3
2680	62.1	60.7	57.2	58.5	54.3	47.2	184.8	147.6	76.9	138.1	73.3	81.2
2740	62.6	61.2	58.2	59.4	55.3	47.7	204.6	148.6	77.8	139.4	74.0	82.6
2800	63.3	62.2	58.9	60.1	55.6	48.1	202.6	149.9	78.9	139.6	66.7	83.8
2880	64.1	62.9	60.1	61.4	57.2	48.8	195.3	151.2	80.2	140.1	63.3	84.9
2940	64.9	63.8	60.7	62.2	57.9	49.0	198.7	151.6	81.3	140.2	62.8	85.3
3000	65.4	64.4	61.6	63.0	58.8	49.2	199.6	151.5	82.1	140.2	64.9	85.5
3060	66.4	65.4	62.4	63.9	59.5	49.7	212.3	158.1	83.3	139.9	64.7	85.7
3120	67.1	66.3	63.3	64.8	60.1	50.1	265.3	159.7	84.4	139.7	64.2	87.2
3180	67.7	67.1	64.1	65.6	60.7	50.6	240.9	160.3	85.4	140.2	64.9	87.9
3240	68.2	67.9	64.9	66.3	61.4	50.8	234.1	161.3	86.2	141.1	66.1	88.8
3340	69.3	69.1	66.3	67.8	62.9	51.5	240.1	161.3	87.8	142.3	63.7	89.8
3400	70.1	69.9	67.2	68.7	63.7	51.8	236.3	160.9	88.7	142.6	64.6	90.7
3460	70.8	70.7	68.1	69.6	64.6	52.4	238.2	160.4	89.8	143.1	66.8	91.2

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TABLE B-3 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 26 THROUGH 38 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 26 DEG C	DAS 27 DEG C	DAS 29 DEG C	DAS 30 DEG C	DAS 31 DEG C	DAS 32 DEG C	DAS 33 DEG C	DAS 34 DEG C	DAS 35 DEG C	DAS 36 DEG C	DAS 37 DEG C	DAS 38 DEG C
3520	71.4	71.4	69.0	70.4	65.4	52.8	232.9	160.3	90.7	143.2	66.4	92.3
3580	72.2	72.3	69.8	71.3	66.3	53.0	221.4	160.7	91.7	143.7	64.3	93.6
3640	73.0	73.1	70.7	72.1	67.0	53.6	211.1	161.4	92.5	144.6	63.1	94.7
3700	73.7	73.9	71.7	72.8	67.7	53.8	204.1	161.8	93.4	145.8	62.4	95.8
3780	74.6	75.1	72.6	74.0	68.8	54.3	194.9	162.9	94.5	147.2	62.2	96.7
3840	75.4	75.7	73.6	74.8	69.4	54.7	188.8	163.2	95.5	147.7	62.4	96.8
3900	76.2	76.5	74.4	75.7	70.3	54.8	184.1	163.4	96.5	148.6	62.1	97.2
3960	77.0	77.5	75.3	76.6	71.2	55.1	180.6	163.8	97.5	149.1	62.4	100.0
4020	77.6	78.3	76.0	77.2	71.8	55.5	177.7	164.4	98.7	149.8	62.7	100.3
4080	78.4	79.3	76.8	78.1	72.5	55.9	174.6	164.8	99.2	150.7	65.6	101.6
4140	79.4	79.9	77.8	78.8	73.2	55.9	172.2	173.4	100.3	151.2	66.2	102.6
4200	80.1	80.7	78.5	79.7	74.0	56.3	169.3	177.6	101.2	151.9	66.4	102.1
4260	80.9	81.2	79.4	80.3	74.7	56.8	167.3	179.0	102.1	152.6	65.2	103.3
4320	81.6	82.1	80.2	81.2	75.6	57.0	166.2	178.6	103.1	153.0	65.2	105.9
4380	82.3	82.8	81.1	82.1	76.3	57.4	167.2	178.3	104.1	153.2	65.5	106.4
4440	83.0	83.6	81.8	82.8	76.8	57.8	165.4	178.1	104.9	153.6	64.7	106.9
4500	83.7	84.6	82.6	83.7	77.6	57.9	163.2	177.8	105.9	154.0	65.4	108.6
4560	84.3	85.3	83.4	84.6	78.2	58.2	160.9	177.2	106.8	154.6	65.2	109.1
4640	85.1	86.3	84.4	85.6	79.2	58.6	158.7	176.7	108.0	154.8	65.4	110.5
4700	85.8	86.9	85.2	86.2	79.8	59.7	159.6	176.3	108.9	155.1	66.6	110.0
4760	86.5	87.7	85.9	86.9	80.4	60.6	164.1	175.9	109.8	155.3	66.9	110.0
4820	87.2	88.3	86.7	87.6	80.9	61.5	167.7	175.6	110.7	155.5	68.0	111.8
4880	87.7	88.9	87.4	88.3	81.6	62.4	170.6	175.3	111.7	155.7	69.4	111.7
4960	88.6	89.9	88.4	89.3	82.4	62.9	170.3	175.2	112.8	156.0	69.4	112.9
5020	89.3	90.6	89.1	90.1	83.1	63.3	173.4	175.7	113.8	156.4	71.8	115.3
5080	90.1	91.3	89.9	90.7	83.7	63.8	173.8	176.3	114.4	157.1	72.1	116.3
5140	90.6	92.1	90.6	91.6	84.5	64.1	173.0	176.9	115.4	157.8	73.1	116.7
5200	91.2	92.8	91.5	92.3	85.2	64.3	171.4	177.7	116.3	158.7	73.1	116.3
5260	92.0	93.4	91.6	92.9	85.6	64.5	171.1	178.2	117.1	159.5	74.5	116.5
5340	92.8	94.6	93.3	94.3	86.6	64.8	186.3	178.9	118.3	159.9	73.9	118.1
5360	93.1	94.8	93.6	94.5	86.8	65.1	189.6	179.3	118.6	160.2	73.3	118.4
5380	93.2	95.1	93.8	94.9	87.1	65.2	194.2	179.2	119.0	160.2	73.4	118.4
5400	93.4	95.2	94.0	95.1	87.3	65.4	197.6	179.5	119.1	160.6	73.1	118.7
5420	93.7	95.6	94.4	95.4	87.6	65.3	199.3	179.5	119.4	160.7	72.7	118.8
5440	93.8	95.7	94.7	95.8	87.7	64.8	198.7	179.2	119.8	160.8	71.7	118.2

TABLE B-3 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 26 THROUGH 38 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 26 DEG C	DAS 27 DEG C	DAS 29 DEG C	DAS 30 DEG C	DAS 31 DEG C	DAS 32 DEG C	DAS 33 DEG C	DAS 34 DEG C	DAS 35 DEG C	DAS 36 DEG C	DAS 37 DEG C	DAS 38 DEG C
5460	93.9	95.7	94.8	95.7	87.3	63.7	195.7	178.4	120.3	160.8	70.2	117.5
5480	94.2	95.9	94.9	95.9	87.3	62.8	193.7	177.4	120.3	160.8	68.7	116.7
5500	94.3	96.1	95.1	96.1	87.1	61.8	190.9	175.5	120.6	160.2	67.3	115.4
5520	94.3	96.2	95.2	96.1	86.8	60.8	187.4	173.4	120.8	159.1	66.7	114.8
5540	94.2	96.3	95.2	96.0	86.6	59.9	183.4	171.0	121.1	157.6	65.8	114.1
5560	94.2	96.3	95.2	96.1	86.4	59.1	179.6	168.5	121.6	155.8	65.2	113.6
5580	94.3	96.2	95.3	95.8	86.0	58.4	175.4	165.9	121.7	153.8	64.8	112.9
5600	94.1	96.1	95.2	95.7	85.8	57.8	171.3	163.2	122.2	151.6	64.2	112.5
5620	94.1	95.9	95.2	95.4	85.5	57.4	167.4	160.8	122.1	149.6	64.1	112.2
5640	94.1	95.8	94.9	95.2	85.3	57.1	163.6	158.2	122.3	147.5	63.3	111.8
5660	93.8	95.6	94.8	94.9	84.9	56.6	159.9	155.6	122.6	145.2	63.2	111.8
5680	93.8	95.4	94.8	94.9	84.9	56.3	156.8	153.2	122.8	142.9	63.1	111.3
5700	93.5	95.2	94.5	94.5	84.7	55.9	152.0	149.4	123.3	139.4	62.7	110.7
5747	93.4	95.0	94.3	94.3	84.5	55.4	147.3	145.4	123.6	135.7	62.7	110.4
5760	93.3	94.9	94.3	94.1	84.4	55.4	145.7	144.0	123.7	134.4	62.6	110.4
5780	93.3	94.6	94.1	93.9	84.2	55.4	142.9	142.1	123.8	132.6	62.5	110.0
5800	93.2	94.5	94.1	93.8	84.1	55.3	140.7	140.0	124.1	130.6	62.3	109.8
5820	93.1	94.4	93.9	93.7	84.1	55.3	138.6	138.1	124.3	128.7	62.4	109.7
5840	93.1	94.2	93.8	93.4	83.9	55.3	136.7	136.3	124.3	126.9	62.2	109.5
5860	92.8	94.0	93.7	93.1	83.7	55.2	134.7	134.6	124.4	125.2	62.2	109.2
5880	92.9	94.0	93.7	93.1	83.7	55.2	133.2	133.0	124.6	123.6	62.0	109.1
5900	92.8	93.8	93.6	92.9	83.7	55.3	131.6	131.4	124.7	122.0	61.9	108.8
5920	92.7	93.8	93.4	92.8	83.7	55.2	130.2	129.9	125.0	120.5	61.8	108.8
5940	92.7	93.6	93.4	92.7	83.6	55.3	128.7	128.5	125.0	119.1	61.8	108.6
5960	92.6	93.6	93.3	92.7	83.6	55.3	127.3	127.0	125.3	117.7	61.7	108.5
5980	92.7	93.4	93.2	92.6	83.6	55.3	125.9	125.8	125.4	116.5	61.6	108.4
6000	92.6	93.3	93.1	92.3	83.4	55.3	124.6	124.7	125.5	115.3	61.9	108.2
6060	92.4	92.9	92.8	92.0	83.2	55.3	121.0	121.2	125.8	111.9	62.6	107.9
6146	92.4	92.7	92.6	91.9	83.3	55.6	116.9	117.2	126.3	107.8	62.9	107.5
6200	92.3	92.6	92.4	91.6	83.1	55.6	114.7	115.1	126.7	105.8	62.9	107.1
6260	92.2	92.3	92.1	91.4	82.3	55.7	111.9	113.1	126.9	103.9	62.9	106.9
6320	92.4	92.3	92.2	91.3	82.9	55.7	109.7	111.4	127.4	102.2	62.8	106.6
6380	92.3	92.3	92.0	91.2	82.9	55.7	107.5	109.8	127.7	100.7	62.2	106.4
6440	92.4	92.2	91.8	91.1	82.8	55.7	105.3	108.6	127.8	99.4	62.2	106.1
6500	92.4	92.1	91.7	90.9	82.7	55.7	103.3	107.3	127.9	98.2	62.1	105.9

TABLE B-4

DIGITAL OUTPUT FOR CHANNELS 39 THROUGH 50 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

	TIME SECONDS	DAS 39 DEG C	DAS 40 DEG C	DAS 41 DEG C	DAS 42 DEG C	DAS 43 DEG C	DAS 44 DEG C	DAS 45 DEG C	DAS 46 DEG C	DAS 47 DEG C	DAS 48 DEG C	DAS 49 DEG C	DAS 50 DEG C
B-18	-100	36.0	36.4	37.1	36.8	28.6	28.3	28.2	27.1	29.3	33.5	34.3	31.3
	-80	36.0	36.4	37.1	36.8	28.6	28.4	28.2	27.1	29.3	33.6	34.4	31.2
	-60	36.1	36.6	37.2	36.6	28.7	28.4	28.2	27.1	29.2	33.6	34.3	30.4
	-40	36.2	36.6	37.2	36.7	28.7	28.4	28.1	27.2	29.2	33.5	34.4	31.2
	-20	36.1	36.6	37.2	36.8	28.6	28.3	28.2	27.2	29.2	33.6	34.3	31.1
	0	36.1	36.6	37.3	36.6	28.6	28.4	28.3	27.1	29.2	33.6	34.3	31.2
	20	36.0	36.7	37.4	36.8	28.6	28.4	28.3	27.2	29.2	33.6	34.3	31.1
	40	36.2	36.7	37.4	36.8	28.6	28.3	28.2	27.2	29.3	33.6	34.4	31.2
	60	36.0	36.4	37.2	36.8	28.7	28.3	28.1	27.3	29.3	33.7	34.4	31.2
	80	36.2	36.6	37.2	36.7	28.7	28.4	28.2	27.1	29.3	33.6	34.3	31.1
	100	35.9	36.3	37.0	36.7	28.7	28.4	28.1	27.1	29.3	33.5	34.3	31.3
	120	36.2	36.8	37.3	36.9	28.6	28.4	28.3	27.3	29.3	33.7	34.3	31.0
	140	36.2	36.7	37.3	36.6	28.7	28.4	27.9	27.0	29.3	33.3	34.1	31.0
	160	36.1	36.6	37.2	36.7	28.6	28.4	28.2	27.1	29.3	33.6	34.3	31.1
	180	36.1	36.6	37.3	36.7	28.6	28.4	28.2	27.1	29.3	33.6	34.3	31.1
	200	36.2	36.6	37.2	36.7	28.6	28.4	28.3	27.2	29.4	33.6	34.3	31.1
	220	36.2	36.8	37.4	36.8	28.6	28.4	28.2	27.2	29.4	33.6	34.3	31.1
	240	36.3	36.7	37.4	36.7	28.7	28.4	28.3	27.2	29.4	33.7	34.3	31.1
	260	36.3	36.7	37.4	36.8	28.6	28.4	28.3	27.2	29.4	33.6	34.3	31.1
	280	36.6	37.0	37.6	36.8	28.6	28.4	28.3	27.2	29.5	33.7	34.3	31.1
	300	36.1	36.7	37.3	36.9	28.8	28.3	28.2	27.3	29.7	33.6	34.3	31.3
	320	36.2	36.8	37.4	36.7	28.6	28.4	28.3	27.3	29.6	33.7	34.3	31.1
	340	36.4	37.0	37.5	36.8	28.6	28.4	28.2	27.4	29.6	33.8	34.3	31.0
	360	36.2	36.7	37.4	36.7	28.6	28.4	28.3	27.2	29.6	33.7	34.4	31.1
	380	36.1	36.6	37.2	36.7	28.6	28.4	28.3	27.3	29.6	33.6	34.3	31.1
	400	36.2	36.8	37.4	36.7	28.7	28.3	28.2	27.3	29.7	33.6	34.4	31.2
	446	36.2	36.8	37.4	36.9	28.7	28.3	28.3	27.4	29.7	33.7	34.4	31.1
	493	36.3	36.9	37.5	36.8	28.8	28.4	28.2	26.3	29.7	33.6	34.3	31.3
	503	36.4	37.0	37.6	36.8	28.7	28.4	28.2	27.2	29.7	33.7	34.5	31.2
	520	36.3	36.9	37.4	36.8	28.7	28.3	28.3	27.3	29.7	33.7	34.4	31.1
	540	35.9	36.5	37.1	36.8	28.8	28.3	28.1	27.2	29.8	33.4	34.3	31.3
	560	36.2	36.8	37.3	36.8	28.7	28.3	28.3	27.3	29.8	33.7	34.4	31.2
	580	36.1	36.6	37.1	36.8	28.7	28.3	28.2	27.3	29.8	33.6	34.4	31.3
	600	35.9	36.5	37.0	36.8	28.7	28.3	28.2	27.3	29.8	33.6	34.4	31.3
	620	36.1	36.6	37.2	36.9	28.8	28.3	28.2	27.3	29.9	33.6	34.4	31.2

TABLE B-4 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 39 THROUGH 50 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 39 DEG C	DAS 40 DEG C	DAS 41 DEG C	DAS 42 DEG C	DAS 43 DEG C	DAS 44 DEG C	DAS 45 DEG C	DAS 46 DEG C	DAS 47 DEG C	DAS 48 DEG C	DAS 49 DEG C	DAS 50 DEG C
640	43.2	50.3	50.7	46.2	28.7	28.4	28.3	27.3	31.9	34.1	34.3	31.2
660	52.4	63.4	64.2	57.7	28.9	28.3	28.4	27.7	34.7	35.1	34.5	31.3
680	60.4	70.6	72.2	64.9	29.2	28.4	28.6	28.0	36.5	35.8	34.7	31.4
700	67.6	84.1	85.3	75.9	29.3	28.4	28.9	28.4	38.6	37.3	34.9	31.5
720	69.4	83.7	86.0	77.9	29.6	28.6	29.3	28.6	40.4	37.9	35.1	31.7
740	75.2	89.7	91.8	84.8	29.8	28.7	29.7	28.7	43.2	39.0	35.3	31.7
760	78.5	89.6	92.2	87.7	30.2	28.8	29.9	28.9	45.8	39.7	35.8	32.1
780	78.2	91.6	94.1	90.5	30.4	28.9	30.2	28.9	48.3	40.5	36.1	32.4
800	78.8	94.6	97.5	92.7	30.7	29.1	30.4	28.8	50.4	41.2	36.4	32.6
820	81.5	94.9	98.1	95.5	30.9	29.2	30.7	28.9	52.4	41.7	36.7	32.8
840	81.7	97.2	99.7	96.7	31.1	29.2	31.0	28.9	54.2	42.6	37.0	32.9
860	81.9	94.1	98.1	97.0	31.4	29.4	31.1	28.7	55.1	42.6	37.4	33.2
880	81.5	96.3	99.3	97.9	31.8	29.4	31.2	28.8	57.0	43.2	37.8	33.5
900	81.1	92.9	96.8	97.4	32.1	29.4	31.3	28.8	57.6	43.4	38.1	33.7
920	81.2	96.7	99.8	98.4	32.3	29.5	31.4	28.7	57.8	44.3	38.4	33.9
940	80.7	91.8	95.9	97.7	32.5	29.4	31.5	28.8	58.4	44.3	38.7	34.0
960	83.4	91.0	96.3	98.7	32.8	29.3	31.6	28.9	58.5	44.6	39.2	34.4
980	83.1	95.3	99.9	100.2	33.0	29.4	31.7	28.9	59.5	45.1	39.4	34.6
1000	83.1	97.0	101.4	101.9	33.3	29.4	31.6	29.1	60.2	45.6	39.9	34.9
1020	84.0	97.2	102.1	102.4	33.6	29.6	31.6	29.3	61.6	45.8	40.3	35.2
1040	83.9	98.2	103.8	104.2	33.6	29.6	31.7	29.7	61.5	46.2	40.5	35.4
1060	84.6	99.7	105.8	105.7	33.9	29.6	31.6	29.7	61.8	46.8	40.9	35.7
1080	84.6	98.7	106.0	107.8	34.1	29.6	31.6	29.8	62.2	47.2	41.4	35.8
1100	85.8	100.2	108.1	109.3	34.3	29.5	31.6	29.9	62.2	47.7	41.7	36.1
1120	87.7	101.7	110.1	110.6	34.4	29.4	31.6	30.2	62.2	48.3	42.1	36.3
1140	88.7	102.1	111.1	111.8	34.4	29.6	31.6	30.4	62.1	48.8	42.4	36.6
1160	89.8	102.4	111.9	112.9	34.6	29.6	31.6	30.7	62.4	49.3	42.9	36.9
1180	91.9	103.9	113.7	114.2	34.5	29.6	31.7	30.6	62.2	49.8	43.3	37.2
1200	93.8	104.6	115.5	115.3	34.7	29.4	31.6	30.6	62.2	50.6	44.0	37.7
1245	93.9	104.1	116.2	116.9	34.7	29.5	31.8	30.7	62.0	50.7	44.7	38.0
1260	94.7	104.2	117.0	117.7	34.7	29.6	31.7	30.7	62.1	50.9	45.1	38.2
1280	93.4	103.3	116.2	118.4	34.7	29.6	31.8	30.7	62.4	50.9	45.5	38.5
1300	94.7	104.1	117.2	118.6	34.8	29.6	31.9	30.9	62.4	51.4	45.9	38.8
1320	95.9	104.9	118.4	119.4	34.7	29.5	32.0	30.9	62.3	51.7	46.3	39.1
1340	95.5	105.3	118.8	119.9	34.7	29.6	32.0	30.8	62.4	51.9	46.7	39.3

TABLE B-4 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 39 THROUGH 50 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 39 DEG C	DAS 40 DEG C	DAS 41 DEG C	DAS 42 DEG C	DAS 43 DEG C	DAS 44 DEG C	DAS 45 DEG C	DAS 46 DEG C	DAS 47 DEG C	DAS 48 DEG C	DAS 49 DEG C	DAS 50 DEG C
1360	95.6	105.5	119.7	121.6	34.8	29.6	32.1	30.7	62.6	52.2	47.2	39.7
1380	98.0	106.4	120.9	122.5	34.8	29.6	32.2	30.7	62.8	52.7	47.5	39.8
1440	99.9	108.9	123.3	123.8	34.9	29.7	32.3	30.4	63.9	53.8	48.8	40.7
1500	98.6	106.7	120.8	122.4	35.1	29.8	32.1	30.1	65.1	54.6	50.1	41.6
1560	103.5	109.6	123.6	124.1	35.4	29.7	32.0	29.8	66.4	55.9	51.3	42.5
1620	106.8	114.0	128.4	127.5	35.8	29.7	31.6	29.7	67.9	57.5	52.7	43.3
1700	107.9	113.6	130.1	129.7	36.2	29.8	31.8	29.5	69.0	59.1	54.4	44.3
1760	109.1	115.3	130.9	130.7	36.6	29.9	31.6	29.1	69.8	60.1	55.7	45.4
1820	110.0	118.1	135.3	131.8	37.1	29.9	31.7	28.8	70.7	61.4	57.1	46.1
1880	112.1	118.8	138.1	133.6	37.6	29.8	31.7	28.9	71.1	62.6	58.2	46.8
1940	112.7	120.6	137.9	135.7	38.1	29.9	31.6	29.3	71.1	63.2	59.5	47.7
2000	114.8	121.6	138.4	137.8	38.6	30.1	31.9	29.4	72.0	64.3	60.7	48.4
2060	116.3	124.6	139.6	138.9	39.2	30.1	31.9	29.3	72.1	65.3	61.8	49.2
2120	116.4	125.7	142.5	140.2	39.5	30.1	32.1	28.8	72.4	66.2	62.8	49.9
2180	117.8	128.4	145.9	141.6	39.9	30.1	32.2	28.9	73.0	67.2	64.1	50.8
2260	121.4	127.2	143.1	143.2	40.4	30.3	32.5	28.6	73.1	68.1	65.5	51.8
2320	120.1	128.8	146.1	148.2	40.9	30.4	32.8	28.9	73.4	68.9	66.4	52.4
2380	120.3	131.3	146.3	148.4	41.3	30.5	33.0	29.2	73.8	69.6	67.4	53.2
2440	124.7	132.2	147.7	150.1	41.8	30.6	33.2	29.5	74.1	70.4	68.4	53.9
2500	122.6	133.4	149.8	150.2	42.3	30.8	33.3	29.7	75.8	71.4	69.6	54.9
2560	120.3	134.9	150.3	149.8	42.7	30.9	33.6	30.1	80.4	72.3	70.6	55.7
2620	122.0	135.8	152.8	150.8	43.2	30.9	33.7	30.3	81.5	73.2	71.3	56.3
2680	123.0	135.7	151.2	151.1	43.6	31.1	33.8	30.5	82.0	73.8	72.5	57.2
2740	123.4	139.2	154.1	154.6	44.2	31.1	34.0	30.7	82.4	74.8	73.4	57.7
2800	124.1	140.7	156.8	155.1	44.6	31.3	33.9	30.8	83.1	75.2	74.4	58.6
2880	124.7	143.3	160.8	156.8	45.4	31.3	34.2	31.3	83.6	77.0	75.6	59.6
2940	123.8	144.4	159.9	157.4	45.8	31.6	34.3	31.3	83.6	77.8	76.6	60.4
3000	130.7	142.8	156.9	157.1	46.5	31.6	34.3	31.3	83.7	78.4	77.3	60.8
3060	125.7	139.6	155.4	158.5	46.9	31.7	34.4	31.5	83.8	79.2	78.4	61.8
3120	134.4	142.9	156.6	159.2	47.3	31.9	34.7	31.5	83.8	79.8	79.1	62.6
3180	131.9	142.7	157.5	161.1	47.9	32.0	34.6	31.4	83.6	80.5	80.1	63.3
3240	132.2	143.7	158.4	162.5	48.6	32.0	34.6	31.7	83.9	81.4	80.8	63.8
3340	130.1	143.3	158.8	162.8	49.5	32.2	34.5	31.9	84.3	82.7	82.3	65.2
3400	136.0	144.1	159.0	163.4	49.7	32.4	34.3	32.0	84.6	83.4	83.3	65.8
3460	134.2	144.7	158.6	163.3	50.2	32.5	34.5	31.7	85.0	84.1	84.1	66.6

TABLE B-4 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 39 THROUGH 50 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 39 DEG C	DAS 40 DEG C	DAS 41 DEG C	DAS 42 DEG C	DAS 43 DEG C	DAS 44 DEG C	DAS 45 DEG C	DAS 46 DEG C	DAS 47 DEG C	DAS 48 DEG C	DAS 49 DEG C	DAS 50 DEG C
3520	139.6	148.3	161.4	164.4	50.7	32.7	34.5	31.9	85.2	84.9	84.9	67.2
3580	137.8	147.9	162.6	165.7	51.1	32.8	34.7	31.9	85.7	85.8	85.9	67.9
3640	140.8	150.7	164.2	167.1	51.6	32.8	34.9	32.0	90.7	86.6	86.9	68.7
3700	139.6	151.6	165.4	169.0	52.1	32.9	35.0	32.2	96.2	87.6	87.8	69.5
3780	137.4	150.8	168.7	170.0	52.9	33.1	34.9	32.5	98.4	88.7	88.9	70.4
3840	141.4	151.3	171.1	170.3	53.4	33.2	35.2	32.6	98.9	89.2	90.1	71.1
3900	137.0	149.2	170.3	170.8	54.1	33.2	36.7	32.7	99.2	90.1	90.9	72.0
3960	147.3	155.2	175.3	171.9	54.6	33.3	38.0	32.9	99.3	91.0	91.7	72.8
4020	145.9	154.1	174.1	172.9	54.9	33.6	38.9	33.2	99.0	91.8	92.8	73.4
4080	146.6	156.1	174.6	173.3	55.4	33.6	39.5	33.2	99.0	92.8	93.6	74.2
4140	145.8	157.4	177.6	174.8	55.9	33.7	40.1	33.0	99.2	93.4	94.7	74.8
4200	143.6	153.4	174.4	174.3	56.4	33.7	40.6	33.0	99.5	94.1	95.6	75.6
4260	145.9	155.2	174.1	174.1	56.7	33.9	40.8	33.2	99.6	95.0	96.6	76.2
4320	144.2	155.5	176.4	174.4	57.3	33.9	41.1	33.0	99.9	95.4	97.6	77.1
4380	144.9	154.1	175.8	175.4	57.9	34.2	41.2	33.3	100.2	96.2	98.4	77.8
4440	147.7	154.6	176.4	175.9	58.5	34.3	41.4	33.4	100.0	96.7	99.4	78.4
4500	144.3	170.1	180.9	176.6	59.1	34.3	41.6	33.4	100.2	97.4	100.3	79.3
4560	148.1	165.8	180.1	177.1	59.5	34.3	41.6	33.6	100.1	98.2	101.2	80.1
4640	146.1	169.9	182.1	178.5	60.1	34.5	41.4	33.6	99.9	99.2	102.4	81.1
4700	143.5	165.9	178.6	178.3	60.3	34.7	41.2	33.5	100.1	99.7	103.5	81.7
4760	143.6	165.4	177.3	177.9	60.7	34.8	41.1	33.6	100.6	100.3	104.3	82.4
4820	146.2	164.8	177.9	178.2	61.1	34.9	40.8	33.8	100.9	100.8	105.2	83.1
4880	148.9	162.9	177.5	178.3	61.7	35.0	40.8	33.8	101.3	101.7	106.1	83.8
4960	150.4	163.6	179.5	179.2	62.3	35.1	40.7	33.9	101.6	102.4	107.1	84.7
5020	156.4	167.9	183.9	180.5	63.0	35.1	40.7	33.9	102.3	103.3	108.1	85.5
5080	158.3	169.3	185.3	181.5	63.6	35.3	40.4	34.2	102.8	103.9	108.8	86.2
5140	155.6	168.3	184.2	182.4	64.1	35.3	40.4	34.1	105.8	104.6	109.8	86.9
5200	151.9	167.3	182.6	182.7	64.5	35.4	40.2	34.3	108.3	105.1	110.6	87.6
5260	152.1	166.0	181.7	183.1	65.1	35.4	40.1	34.2	109.0	105.7	111.3	88.2
5340	156.4	168.5	183.8	184.5	65.6	35.7	40.0	34.4	109.1	106.8	112.6	89.2
5360	153.4	169.3	184.2	184.4	66.0	35.6	40.1	34.4	109.3	107.0	112.9	89.6
5380	153.8	168.3	183.3	184.6	66.1	35.8	40.0	34.5	109.7	107.1	113.3	89.7
5400	153.1	169.4	183.9	184.6	66.4	35.7	40.0	34.4	110.0	107.3	113.4	90.1
5420	154.3	168.6	182.8	184.4	66.4	35.8	39.9	34.5	110.0	107.5	113.7	90.2
5440	153.5	165.7	180.5	183.4	66.6	35.8	40.0	34.3	109.2	107.3	114.1	90.4

TABLE B-4 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 39 THROUGH 50 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 39 DEG C	DAS 40 DEG C	DAS 41 DEG C	DAS 42 DEG C	DAS 43 DEG C	DAS 44 DEG C	DAS 45 DEG C	DAS 46 DEG C	DAS 47 DEG C	DAS 48 DEG C	DAS 49 DEG C	DAS 50 DEG C
5460	150.7	161.4	176.8	181.8	66.6	35.8	39.8	34.2	106.6	107.1	114.2	90.6
5480	146.3	157.5	172.9	179.8	66.6	35.8	40.0	33.9	103.6	106.9	114.6	90.9
5500	142.9	153.9	168.9	177.7	66.4	35.8	39.9	33.8	100.6	106.8	114.7	91.1
5520	140.3	151.2	165.3	175.6	66.3	35.8	39.8	33.6	97.3	106.7	114.7	91.3
5540	139.0	149.0	162.1	173.4	66.0	35.8	40.1	33.4	94.6	106.5	114.9	91.4
5560	137.2	146.4	159.1	171.3	65.8	35.8	40.3	33.3	92.1	106.3	115.2	91.5
5580	135.1	145.1	156.6	169.3	65.6	35.9	40.3	33.3	89.6	106.2	115.2	91.6
5600	133.5	143.7	154.8	167.3	65.4	35.8	40.6	32.8	87.3	105.8	115.4	91.7
5620	132.3	141.7	152.4	165.2	65.3	35.8	40.6	32.8	86.1	105.8	115.4	91.9
5640	130.4	139.7	150.1	163.2	65.1	35.9	40.7	32.8	84.4	105.6	115.6	91.8
5660	129.3	138.1	148.2	161.3	64.9	35.8	40.8	32.7	83.1	105.3	115.6	92.0
5680	128.1	135.9	145.9	159.5	64.7	35.9	40.8	32.9	81.7	105.3	115.4	92.1
5700	126.8	133.2	142.3	156.2	64.6	35.8	41.0	33.1	79.9	105.0	115.9	92.3
5747	125.4	131.3	139.7	153.4	64.4	35.8	41.0	33.2	78.6	104.7	115.9	92.3
5760	125.2	130.7	138.7	152.3	64.3	35.7	41.1	33.2	78.3	104.6	115.9	92.4
5780	124.4	129.9	137.3	150.7	64.2	35.8	41.1	33.3	77.7	104.3	116.1	92.4
5800	124.6	129.7	136.2	149.1	64.1	35.7	41.1	33.4	77.2	104.3	116.0	92.6
5820	124.4	129.4	135.3	147.6	64.1	35.7	41.1	33.6	76.7	104.2	116.1	92.6
5840	124.0	128.9	134.5	146.1	63.9	35.7	41.1	33.6	76.2	104.0	116.0	92.7
5860	123.3	127.8	133.6	144.7	63.8	35.7	41.0	33.8	75.8	103.8	116.1	92.6
5880	122.8	127.3	132.7	143.4	63.7	35.6	41.0	33.8	75.5	103.8	116.1	92.7
5900	122.4	126.8	131.8	142.2	63.7	35.7	40.9	33.9	75.2	103.6	116.2	92.7
5920	122.3	126.1	130.9	141.0	63.7	35.6	40.9	33.9	74.8	103.6	116.1	92.8
5940	121.8	125.7	130.2	139.7	63.6	35.6	40.9	34.1	74.7	103.4	116.2	92.7
5960	121.6	125.2	129.4	138.8	63.5	35.7	40.8	34.3	74.4	103.4	116.1	92.9
5980	121.2	125.1	128.9	137.6	63.6	35.6	40.9	34.3	74.2	103.2	116.1	92.9
6000	120.8	124.6	128.3	136.6	63.5	35.6	40.8	34.3	74.0	103.2	116.1	93.0
6060	120.2	123.2	126.4	133.8	63.4	35.7	40.8	34.5	73.7	102.8	116.2	92.9
6146	119.2	121.6	124.2	130.4	63.2	35.8	40.6	34.9	73.2	102.6	116.2	93.1
6200	118.8	120.8	123.1	128.6	63.2	35.8	40.5	34.9	72.9	102.4	116.1	93.2
6260	118.2	120.2	122.1	126.6	63.2	35.6	40.5	34.8	72.8	102.2	115.9	93.3
6320	117.8	119.4	121.2	125.1	63.1	35.7	40.4	35.1	72.6	102.1	115.9	93.2
6380	117.3	118.8	120.3	123.7	63.1	35.8	40.3	35.1	72.4	101.8	115.9	93.3
6440	116.8	118.3	119.7	122.4	63.1	35.8	40.4	35.0	72.4	101.6	115.8	93.3
6500	116.5	117.6	118.9	121.4	62.9	35.8	40.2	35.0	72.2	101.4	115.7	93.3

TABLE B-5

DIGITAL OUTPUT FOR CHANNELS 51 THROUGH 65 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 51 DEG C	DAS 52 DEG C	DAS 53 DEG C	DAS 54 DEG C	DAS 55 DEG C	DAS 56 DEG C	DAS 57 DEG C	DAS 61 DEG C	DAS 62 DEG C	DAS 63 DEG C	DAS 64 DEG C	DAS 65 DEG C
-100	29.8	27.9	28.5	30.6	29.0	27.8	29.2	32.5	32.7	32.8	33.0	31.7
-80	29.9	27.9	28.5	30.7	29.0	27.9	29.4	32.6	32.8	32.8	33.0	31.8
-60	29.6	28.1	28.4	30.6	29.1	27.7	29.4	32.6	32.7	32.8	32.8	31.8
-40	29.9	28.0	28.4	30.7	29.1	27.6	29.4	32.6	32.7	32.8	33.0	31.7
-20	29.8	27.9	28.5	30.7	28.9	27.8	29.3	32.4	32.7	32.9	32.9	31.6
0	29.8	28.1	28.4	30.6	29.0	27.8	29.5	32.4	32.8	32.8	32.8	31.8
20	29.8	28.0	28.6	30.7	28.9	27.8	29.6	32.4	32.7	33.0	32.9	31.7
40	29.8	27.9	28.5	30.7	28.9	27.6	29.5	32.6	32.7	33.0	33.0	31.7
60	29.9	27.9	28.4	30.7	28.9	27.6	29.6	32.7	32.8	33.1	33.1	31.7
80	29.8	28.1	28.4	30.5	28.9	27.7	29.5	32.8	33.1	33.2	33.3	31.8
100	29.8	27.9	28.4	30.6	29.0	27.5	29.5	33.1	33.2	33.3	33.6	31.8
120	29.8	27.9	28.5	30.7	28.9	27.7	29.5	33.1	33.3	33.6	33.7	31.7
140	29.7	28.1	28.4	30.6	29.0	27.7	29.4	33.2	33.6	33.7	33.8	31.9
160	29.8	28.0	28.5	30.6	28.9	27.7	29.5	33.2	33.6	33.8	33.9	31.8
180	29.8	28.0	28.5	30.6	28.9	27.7	29.4	33.2	33.6	33.9	34.1	31.8
200	29.8	28.1	28.5	30.6	28.9	27.8	29.5	33.2	33.6	34.0	34.1	31.8
220	29.8	28.0	28.5	30.6	28.9	27.7	29.6	33.3	33.7	34.1	34.3	31.8
240	29.8	28.1	28.6	30.6	29.0	27.8	29.4	33.4	33.9	34.3	34.3	31.9
260	29.8	28.1	28.5	30.6	29.1	27.8	29.4	33.6	33.9	34.3	34.4	31.9
280	29.8	28.1	28.5	30.5	29.0	27.8	29.4	33.5	33.9	34.3	34.4	31.9
300	30.0	27.9	28.5	30.8	29.1	27.6	29.6	33.6	33.9	34.3	34.6	31.8
320	29.8	28.1	28.4	30.6	28.9	27.8	29.4	33.6	34.1	34.4	34.6	31.8
340	29.7	28.0	28.4	30.6	28.9	27.7	29.3	33.6	34.2	34.5	34.7	31.9
360	29.8	28.1	28.4	30.6	28.9	27.8	29.3	33.7	34.2	34.6	34.7	32.0
380	29.8	28.1	28.5	30.7	28.9	27.8	29.2	33.7	34.2	34.5	34.8	32.0
400	29.8	28.0	28.5	30.7	28.9	27.6	29.3	33.9	34.3	34.6	34.8	32.0
446	29.8	28.0	28.4	30.5	28.9	27.7	29.3	33.9	34.3	34.7	34.9	32.0
493	29.9	28.1	28.6	30.6	29.0	27.7	29.3	34.0	34.3	34.8	35.1	31.9
503	29.9	28.1	28.6	30.7	28.9	27.8	29.3	33.9	34.3	34.8	35.1	31.9
520	29.9	27.9	28.5	30.6	28.8	27.7	29.3	33.8	34.3	34.8	35.1	31.9
540	30.0	27.9	28.5	30.7	29.0	27.6	29.6	34.1	34.4	34.9	35.2	31.8
560	29.9	27.9	28.5	30.6	28.9	27.6	29.5	34.1	34.3	34.9	35.2	31.9
580	30.0	27.9	28.5	30.7	28.9	27.6	29.4	34.1	34.3	34.8	35.2	31.9
600	30.1	27.9	28.5	30.7	29.0	27.6	29.3	34.2	34.6	34.8	35.3	31.9
620	29.9	27.9	28.5	30.6	28.9	27.7	29.3	34.1	34.6	35.1	35.3	31.9

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TABLE B-5 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 51 THROUGH 65 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 51 DEG C	DAS 52 DEG C	DAS 53 DEG C	DAS 54 DEG C	DAS 55 DEG C	DAS 56 DEG C	DAS 57 DEG C	DAS 61 DEG C	DAS 62 DEG C	DAS 63 DEG C	DAS 64 DEG C	DAS 65 DEG C
640	29.9	28.1	28.4	30.4	29.0	27.6	29.3	37.6	38.5	38.9	39.7	32.2
660	30.0	27.9	28.6	30.6	28.9	27.7	29.3	46.7	48.1	49.3	50.3	32.4
680	30.1	28.0	28.4	30.7	29.1	27.6	29.3	54.7	56.4	57.6	57.7	33.3
700	30.2	27.9	28.6	30.7	28.9	27.6	29.4	61.5	63.5	65.4	65.6	34.1
720	30.3	27.9	28.7	30.7	29.0	27.7	29.3	65.6	67.8	70.4	72.7	34.8
740	30.4	28.2	28.7	30.6	28.9	27.7	29.3	70.3	72.2	74.8	77.9	35.5
760	30.8	27.9	28.7	30.7	29.0	27.6	29.3	73.2	75.3	77.7	80.8	36.1
780	30.9	28.0	28.7	30.7	29.0	27.6	29.3	74.6	76.7	79.1	82.9	36.7
800	31.1	28.1	28.6	30.6	29.1	27.6	29.3	75.6	77.5	79.9	84.6	37.2
820	31.3	28.1	28.7	30.6	29.1	27.6	29.7	78.0	80.1	82.3	85.6	37.4
840	31.4	28.1	28.8	30.6	29.1	27.7	29.4	78.5	80.5	82.8	86.8	37.8
860	31.8	28.2	28.8	30.6	29.1	27.7	29.4	79.5	81.5	83.7	87.4	38.2
880	32.0	28.1	28.8	30.5	29.0	27.7	29.7	78.9	81.2	84.0	88.0	38.5
900	32.3	28.1	28.8	30.5	29.1	27.6	29.4	79.2	81.5	83.8	87.8	38.9
920	32.4	28.2	28.8	30.5	29.1	27.7	29.4	79.2	81.3	84.1	88.7	39.2
940	32.5	28.1	28.9	30.5	28.9	27.7	29.3	80.1	82.2	84.7	88.4	39.3
960	32.9	28.0	29.0	30.6	28.9	27.6	29.4	81.2	82.9	85.7	89.5	39.6
980	33.1	28.1	29.0	30.6	28.9	27.8	29.4	82.6	84.6	86.6	90.6	39.8
1000	33.4	28.1	29.0	30.7	29.0	27.6	29.6	81.6	83.4	86.0	90.3	40.0
1020	33.6	28.1	28.9	30.7	29.1	27.6	29.4	82.3	84.4	86.9	91.8	40.4
1040	33.7	28.2	28.9	30.6	29.1	27.8	29.2	81.9	84.1	86.7	92.1	40.8
1060	34.0	28.1	29.1	30.8	29.1	27.6	29.4	82.3	84.4	87.7	93.3	40.9
1080	34.2	28.1	28.9	30.7	29.1	27.6	29.4	84.1	86.2	89.1	94.5	41.2
1100	34.2	28.1	29.1	30.6	29.1	27.5	29.4	84.1	86.2	89.7	96.0	41.5
1120	34.7	28.1	29.0	30.7	29.1	27.5	29.4	84.9	86.9	90.3	96.6	42.0
1140	34.8	28.1	29.1	30.7	29.0	27.5	29.5	86.2	88.1	91.9	97.8	42.3
1160	35.1	28.1	29.2	30.8	28.9	27.7	29.4	85.8	87.9	91.9	98.4	42.6
1180	35.4	28.3	29.1	30.7	29.1	27.8	29.3	86.1	88.3	92.3	99.2	43.0
1200	35.8	28.2	29.1	30.8	29.1	27.6	29.4	86.2	87.9	93.2	101.2	43.6
1245	36.2	28.2	29.3	30.8	29.1	27.9	30.5	86.8	87.8	93.8	102.1	44.1
1260	36.3	28.1	29.3	30.9	29.1	27.6	29.4	87.1	87.7	94.1	102.4	44.0
1280	36.6	28.2	29.2	30.8	29.1	27.6	29.6	87.4	87.9	94.7	103.1	44.2
1300	36.8	28.2	29.3	30.8	29.1	27.7	29.6	87.3	88.1	95.0	103.0	44.7
1320	37.1	28.2	29.3	30.9	29.2	27.6	29.6	87.3	87.9	95.2	103.2	44.9
1340	37.4	28.2	29.3	30.8	29.1	27.6	29.5	88.3	88.7	96.0	104.3	45.0

TABLE B-5 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 51 THROUGH 65 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 51 DEG C	DAS 52 DEG C	DAS 53 DEG C	DAS 54 DEG C	DAS 55 DEG C	DAS 56 DEG C	DAS 57 DEG C	DAS 61 DEG C	DAS 62 DEG C	DAS 63 DEG C	DAS 64 DEG C	DAS 65 DEG C
1360	37.5	28.2	29.4	30.7	29.0	27.7	29.3	88.6	89.2	96.6	104.7	45.3
1380	37.7	28.3	29.4	30.8	29.0	27.7	29.3	88.2	89.3	96.8	105.0	45.8
1440	38.5	28.4	29.4	30.8	29.1	27.7	29.3	89.4	91.5	98.7	107.2	46.8
1500	39.3	28.4	29.4	30.9	29.1	27.8	29.3	89.7	91.9	99.1	108.2	47.8
1560	40.0	28.4	29.6	30.9	29.1	27.8	29.2	90.3	93.3	99.9	108.6	48.6
1620	40.8	28.4	29.6	31.1	29.0	27.7	29.4	91.8	94.9	102.4	111.1	49.2
1700	41.7	28.6	29.6	30.9	29.0	27.8	29.2	94.0	98.2	104.9	112.3	50.2
1760	42.5	28.7	29.6	30.9	29.2	27.7	29.3	94.8	98.9	105.4	112.5	50.9
1820	43.4	28.8	29.6	31.1	29.2	27.6	29.5	96.1	100.6	107.3	113.7	51.7
1880	44.0	28.8	29.7	31.2	29.2	27.8	29.5	97.8	102.8	109.5	115.4	52.7
1940	44.9	28.8	29.7	31.6	29.1	27.7	29.5	98.9	103.7	111.0	117.1	53.2
2000	45.6	28.9	29.7	31.4	29.2	27.5	29.4	99.9	104.6	111.8	118.1	54.3
2060	46.3	28.9	29.7	31.6	29.2	27.7	29.5	101.1	106.3	114.1	119.4	54.9
2120	46.9	29.2	29.7	31.6	29.3	27.8	29.4	100.7	106.5	115.8	128.7	55.7
2180	47.8	29.2	29.7	31.7	29.2	27.6	29.7	100.3	106.5	118.2	134.2	56.3
2260	48.7	29.3	29.7	31.9	29.4	27.7	29.4	102.5	110.0	121.1	133.8	57.1
2320	49.3	29.4	29.8	31.9	29.3	27.8	29.5	102.8	111.3	126.2	133.4	58.1
2380	49.9	29.6	29.8	31.8	29.4	27.8	29.4	103.6	112.1	129.1	134.1	58.8
2440	50.7	29.7	29.9	32.0	29.4	27.9	29.7	104.1	112.8	131.8	137.3	59.6
2500	51.6	29.8	29.8	32.1	29.5	27.8	29.8	106.2	115.2	133.3	138.8	60.6
2560	52.3	29.8	29.9	32.2	29.4	27.8	29.9	108.0	116.9	135.6	138.9	61.2
2620	52.9	30.1	30.0	32.0	29.5	27.9	29.7	108.8	117.5	136.1	138.4	61.7
2680	53.8	30.2	29.9	32.3	29.6	27.8	29.7	110.2	119.0	137.4	138.5	62.2
2740	54.4	30.2	30.1	32.1	29.4	27.9	29.7	111.3	120.4	138.6	138.7	62.7
2800	55.2	30.4	29.9	32.3	29.4	27.8	29.9	112.8	121.8	140.2	138.9	63.7
2880	56.1	30.6	30.1	32.7	29.4	27.9	30.0	113.9	123.9	143.7	139.6	64.5
2940	56.9	30.8	30.0	32.5	29.6	27.9	30.4	115.6	126.5	145.3	139.7	65.3
3000	57.5	30.9	30.1	32.4	29.5	27.9	29.9	116.1	126.3	145.9	148.1	65.9
3060	58.4	31.1	30.1	32.7	29.6	27.9	30.1	118.1	129.1	148.8	164.1	66.7
3120	59.1	31.4	30.2	32.8	29.6	28.1	30.0	119.6	130.7	150.7	162.5	67.2
3180	59.9	31.4	30.1	32.7	29.7	27.9	30.3	120.2	131.3	150.2	162.4	67.9
3240	60.5	31.6	30.3	32.8	29.7	28.1	30.1	120.0	132.5	151.3	161.9	68.5
3340	61.8	31.9	30.2	32.5	29.6	28.0	30.1	120.9	134.8	150.2	160.8	69.8
3400	62.5	32.2	30.3	32.8	29.7	28.0	29.7	118.7	133.5	149.4	163.4	70.3
3460	63.3	32.4	30.4	32.7	29.7	27.9	30.0	119.4	135.2	155.7	162.2	70.9

TABLE B-5 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 51 THROUGH 65 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

	TIME	DAS 51	DAS 52	DAS 53	DAS 54	DAS 55	DAS 56	DAS 57	DAS 61	DAS 62	DAS 63	DAS 64	DAS 65
	SECONDS	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C	DEG C
B-26	3520	63.9	32.5	30.3	32.8	29.5	27.9	29.8	119.9	135.7	156.8	162.0	71.6
	3580	64.7	32.7	30.4	32.7	29.4	28.0	29.8	121.8	137.4	157.5	162.5	72.2
	3640	65.6	32.8	30.5	32.9	29.6	28.1	29.8	124.3	139.2	160.0	162.7	73.1
	3700	66.4	33.0	30.6	33.2	29.6	28.1	30.1	126.6	140.5	166.7	163.3	73.9
	3780	67.4	33.3	30.5	33.2	29.5	28.3	29.9	127.3	141.6	170.9	163.4	74.7
	3840	68.2	33.6	30.7	33.3	29.7	28.2	30.1	127.9	144.0	170.6	163.8	75.3
	3900	69.0	33.6	30.7	33.7	29.8	28.2	30.2	129.1	145.7	170.3	163.8	76.0
	3960	69.8	33.9	30.6	33.6	29.8	28.2	30.2	130.9	147.3	173.4	164.0	76.7
	4020	70.4	34.2	30.7	33.6	29.9	28.1	30.7	131.4	148.8	172.9	164.2	77.4
	4080	71.3	34.4	30.7	33.4	29.9	28.2	30.4	132.6	150.1	173.7	164.1	78.2
	4140	71.9	34.6	30.8	33.7	30.1	28.1	30.4	133.6	151.2	174.0	164.2	78.7
	4200	72.9	34.7	30.8	33.8	30.1	28.2	30.7	134.2	151.6	174.6	163.8	79.5
	4260	73.6	35.1	30.8	33.8	30.1	28.1	30.6	135.1	153.2	174.6	164.2	80.4
	4320	74.4	35.2	30.9	33.6	30.2	28.3	30.5	135.3	153.5	180.8	164.2	80.8
	4380	75.2	35.5	30.8	33.9	30.1	28.2	30.6	136.5	154.9	180.5	164.8	81.3
	4440	75.9	35.8	30.9	34.2	30.2	28.3	30.6	137.1	155.9	181.4	165.2	81.9
	4500	76.8	35.9	31.0	33.7	30.3	28.3	30.8	137.4	156.0	181.2	165.7	82.7
	4560	77.6	36.2	31.1	34.3	30.2	28.4	30.8	137.2	155.5	179.7	166.1	83.3
	4640	78.6	36.4	31.1	34.2	30.3	28.4	30.9	137.4	156.9	181.8	166.6	84.2
	4700	79.2	36.8	31.2	34.0	30.4	28.3	31.1	137.4	157.4	180.7	166.8	84.7
	4760	80.0	37.1	31.2	34.3	30.4	28.3	31.1	138.2	158.1	181.1	166.8	85.2
	4820	80.7	37.4	31.1	34.3	30.5	28.4	30.9	138.7	158.7	180.3	167.1	85.9
	4880	81.4	37.6	31.3	34.4	30.7	28.4	31.3	138.9	159.0	180.7	194.3	86.4
	4960	82.4	37.9	31.3	34.8	30.7	28.3	31.3	140.4	160.6	182.3	200.8	87.2
	5020	83.2	38.1	31.3	34.7	30.7	28.3	31.3	140.7	161.1	185.9	199.3	88.0
	5080	83.9	38.4	31.3	34.2	30.4	28.4	30.9	142.2	162.9	187.8	198.6	88.6
	5140	84.8	38.5	31.6	34.7	30.5	28.4	31.1	142.7	164.0	188.7	197.4	89.3
	5200	85.3	38.9	31.3	34.7	30.4	28.4	30.9	143.9	166.1	186.7	197.1	89.8
	5260	86.2	39.0	31.5	34.5	30.7	28.4	31.3	144.4	166.4	187.5	196.1	90.6
	5340	87.1	39.6	31.5	34.8	30.7	28.5	31.2	145.1	166.9	187.3	195.3	91.4
	5360	87.4	39.6	31.6	34.8	30.7	28.7	31.5	145.4	167.3	187.4	194.8	91.7
	5380	87.6	39.7	31.5	35.2	30.8	28.5	31.6	145.9	167.8	187.1	194.8	91.8
	5400	87.9	39.7	31.6	34.8	30.7	28.6	31.6	146.0	167.9	187.1	194.6	92.0
	5420	88.1	39.9	31.5	34.8	30.7	28.6	31.6	145.8	166.9	187.1	194.1	92.2
	5440	88.3	40.1	31.6	34.3	30.8	28.5	31.8	145.1	165.8	185.4	192.1	92.3

TABLE B-5 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 51 THROUGH 65 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 51 DEG C	DAS 52 DEG C	DAS 53 DEG C	DAS 54 DEG C	DAS 55 DEG C	DAS 56 DEG C	DAS 57 DEG C	DAS 61 DEG C	DAS 62 DEG C	DAS 63 DEG C	DAS 64 DEG C	DAS 65 DEG C
5460	88.4	40.1	31.6	34.8	30.7	28.6	31.6	143.3	162.6	181.4	187.9	92.2
5480	88.8	40.1	31.7	34.4	30.8	28.6	31.6	141.1	159.3	176.8	183.1	91.9
5500	89.1	40.1	31.7	35.1	30.8	28.7	31.8	138.8	155.8	171.9	177.7	91.7
5520	89.2	40.2	31.6	34.8	30.7	28.6	31.6	135.8	151.6	166.4	172.2	91.3
5540	89.3	40.3	31.7	34.4	30.9	28.6	31.8	133.5	148.1	161.7	167.1	91.0
5560	89.4	40.4	31.7	34.5	30.9	28.6	31.6	130.9	144.6	157.3	162.2	90.6
5580	89.4	40.6	31.6	35.1	30.8	28.6	31.6	128.5	141.2	152.8	157.7	90.4
5600	89.6	40.6	31.7	35.2	30.8	28.7	31.6	125.7	137.5	148.9	153.4	90.1
5620	89.8	40.7	31.7	35.1	30.7	28.7	31.4	123.8	135.0	145.4	149.5	89.8
5640	89.7	40.8	31.6	35.1	30.9	28.6	31.4	121.6	132.1	141.9	145.9	89.5
5660	89.8	40.8	31.8	34.8	30.9	28.7	31.6	119.4	129.6	139.1	142.4	89.4
5680	89.8	41.0	31.6	35.1	30.9	28.7	31.6	117.6	127.0	135.9	139.3	89.2
5700	90.0	41.1	31.8	35.2	30.9	28.6	31.8	113.9	122.5	130.7	133.6	88.9
5747	90.1	41.3	31.7	35.7	30.9	28.8	31.8	112.0	120.2	127.8	130.4	88.7
5760	90.2	41.2	31.8	35.5	31.1	28.7	31.7	110.9	118.9	126.6	128.9	88.7
5780	90.1	41.4	31.8	35.2	31.2	28.6	31.7	109.6	117.2	124.7	126.8	88.5
5800	90.3	41.4	31.9	35.2	31.1	28.7	31.9	108.5	115.9	122.9	124.9	88.5
5820	90.3	41.5	31.9	35.0	31.1	28.7	31.7	107.3	114.4	121.2	123.0	88.4
5840	90.3	41.6	31.9	35.1	31.1	28.8	31.9	106.3	113.0	119.7	121.3	88.3
5860	90.2	41.8	31.8	35.1	31.1	28.7	31.5	105.3	111.8	118.1	119.8	88.1
5880	90.3	41.7	31.9	35.3	31.1	28.7	31.6	104.2	110.6	116.7	118.4	88.1
5900	90.3	41.9	31.8	35.4	30.9	28.8	31.6	103.5	109.7	115.3	116.9	87.9
5920	90.4	41.9	31.9	35.3	31.1	28.8	31.5	102.7	108.6	114.2	115.5	87.8
5940	90.3	41.9	31.9	35.1	31.2	28.7	31.9	101.9	107.7	113.3	114.2	87.9
5960	90.4	41.9	31.9	35.2	31.2	28.8	31.8	101.2	106.7	112.2	113.1	87.7
5980	90.4	42.1	32.0	35.2	31.3	28.8	31.8	100.6	105.8	111.1	111.9	87.6
6000	90.4	42.1	32.0	35.5	31.2	28.8	31.6	99.9	105.0	110.1	111.1	87.4
6060	90.3	42.4	31.9	35.6	31.3	28.7	31.6	98.3	102.9	107.7	108.4	87.3
6146	90.6	42.7	32.0	35.2	31.1	28.9	31.9	96.6	100.6	104.6	105.4	86.9
6200	90.4	43.0	31.9	35.4	31.2	28.9	31.8	95.7	99.6	103.2	104.1	86.7
6260	90.4	43.1	32.1	35.6	31.3	28.8	31.4	94.8	98.4	101.9	102.7	86.6
6320	90.3	43.3	32.0	35.4	30.9	28.7	31.6	94.1	97.4	100.8	101.4	86.4
6380	90.3	43.5	32.0	35.8	31.1	28.8	31.9	93.4	96.6	99.7	100.3	86.2
6440	90.2	43.7	32.1	35.4	31.2	28.9	31.9	92.8	95.9	98.8	99.3	86.1
6500	90.2	43.9	32.1	35.3	31.3	28.7	31.9	92.2	95.1	97.9	98.3	85.9

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TABLE B-6

DIGITAL OUTPUT FOR CHANNELS 66 THROUGH 84 --TEST AR6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 66 DEG C	DAS 67 DEG C	DAS 68 DEG C	DAS 70 DEG C	DAS 71 DEG C	DAS 73 DEG C	DAS 77 DEG C	DAS 79 DEG C	DAS 80 DEG C	DAS 82 DEG C	DAS 83 DEG C	DAS 84 DEG C
-100	31.7	31.3	30.5	30.9	27.6	563.3	28.6	28.6	30.6	32.8	29.5	28.1
-80	31.7	31.4	30.4	30.9	27.4	563.3	28.6	28.6	30.6	32.8	29.6	27.9
-60	31.6	31.2	30.4	30.9	27.5	563.1	28.7	28.3	30.5	32.8	29.4	27.9
-40	31.6	31.4	30.5	31.1	27.5	563.1	28.7	28.6	30.7	32.8	29.4	28.1
-20	31.7	31.4	30.4	31.1	27.4	563.3	28.5	28.6	30.6	32.7	29.6	27.9
0	31.7	31.3	30.4	31.1	27.4	563.3	28.5	28.4	30.6	32.7	29.6	27.9
20	31.7	31.3	30.3	31.1	27.4	563.3	28.5	28.6	30.6	32.7	29.6	27.9
40	31.7	31.4	30.4	31.3	27.4	563.4	28.5	28.6	30.6	32.7	29.6	28.1
60	31.7	31.4	30.4	31.3	27.4	563.6	28.5	28.6	30.6	32.7	29.6	27.9
80	31.6	31.3	30.5	31.3	27.4	563.2	28.6	28.4	30.6	32.8	29.6	27.9
100	31.6	31.4	30.6	31.4	27.5	563.1	28.7	28.5	30.7	32.9	29.5	28.0
120	31.8	31.4	30.4	31.7	27.4	563.3	28.6	28.7	30.7	32.7	29.6	28.1
140	31.7	31.3	30.4	31.6	27.5	563.3	28.7	28.4	30.7	32.8	29.4	27.9
160	31.8	31.3	30.4	31.8	27.4	563.3	28.6	28.6	30.6	32.7	29.6	27.9
180	31.8	31.4	30.5	31.9	27.4	563.3	28.6	28.5	30.6	32.8	29.7	27.9
200	31.8	31.4	30.4	32.0	27.4	563.3	28.7	28.6	30.7	32.7	29.7	28.1
220	31.8	31.4	30.4	32.1	27.4	563.3	28.7	28.6	30.7	32.7	29.7	28.1
240	31.8	31.3	30.6	32.1	27.5	563.3	28.8	28.5	30.9	32.8	29.6	27.9
260	31.8	31.4	30.5	32.2	27.4	563.3	28.7	28.6	30.7	32.7	29.6	28.0
280	31.8	31.3	30.6	32.3	27.4	563.3	28.8	28.6	30.7	32.8	29.6	27.9
300	31.8	31.5	30.5	32.4	27.4	563.2	28.8	28.6	30.7	32.7	29.7	28.0
320	31.8	31.4	30.6	32.4	27.4	563.4	28.8	28.6	30.7	32.8	29.7	27.9
340	31.8	31.3	30.4	32.4	27.4	563.3	28.8	28.4	30.7	32.8	29.6	27.9
360	31.9	31.4	30.6	32.5	27.4	563.4	28.9	28.5	30.7	32.8	29.7	27.9
380	31.8	31.4	30.6	32.6	27.4	563.3	28.9	28.5	30.9	32.8	29.6	27.9
400	31.9	31.5	30.5	32.6	27.5	563.3	29.1	28.4	31.0	32.8	29.6	28.1
446	31.9	31.4	30.6	32.6	27.5	563.3	28.9	28.4	31.1	32.9	29.6	28.0
493	31.9	31.6	30.6	32.8	27.4	563.1	29.2	28.6	31.0	32.8	29.6	28.1
503	31.9	31.5	30.6	32.8	27.4	563.2	29.1	28.5	30.9	32.8	29.7	27.9
520	31.9	31.6	30.6	32.8	27.4	563.2	29.1	28.5	30.9	32.8	29.7	27.9
540	31.9	31.6	30.4	32.9	27.4	563.3	29.1	28.6	30.9	32.8	29.7	28.1
560	31.9	31.6	30.5	33.0	27.4	563.3	29.1	28.7	31.1	32.8	29.7	28.1
580	31.8	31.6	30.7	32.9	27.5	563.3	29.3	28.6	31.1	32.8	29.6	28.1
600	31.8	31.6	30.6	33.0	27.4	563.3	29.1	28.7	31.2	32.7	29.6	28.1
620	31.9	31.5	30.6	33.1	27.4	563.4	29.2	39.1	30.9	32.8	29.7	27.9

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TABLE B-6 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 66 THROUGH 84 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 66 DEG C	DAS 67 DEG C	DAS 68 DEG C	DAS 70 DEG C	DAS 71 DEG C	DAS 73 DEG C	DAS 77 DEG C	DAS 79 DEG C	DAS 80 DEG C	DAS 82 DEG C	DAS 83 DEG C	DAS 84 DEG C
640	31.9	31.6	31.2	35.8	27.6	563.1	30.4	32.4	31.1	32.8	29.6	27.9
660	32.2	31.7	31.3	45.7	27.5	563.3	31.6	31.4	31.4	32.8	29.7	28.1
680	32.3	31.9	31.7	55.6	27.5	563.3	32.8	31.9	31.6	32.9	29.8	27.9
700	32.8	32.5	32.3	63.1	27.5	563.3	34.0	32.5	32.1	33.1	29.8	27.9
720	33.4	33.2	32.9	70.8	27.4	563.4	35.2	32.6	33.0	33.1	29.9	28.1
740	33.8	33.8	33.4	73.9	27.4	563.3	36.3	33.1	33.8	33.2	30.1	28.2
760	34.2	34.6	34.5	77.8	27.4	563.2	37.4	33.2	34.6	33.5	30.1	28.1
780	34.7	35.3	35.4	80.9	27.5	563.3	38.5	33.8	35.5	33.7	30.3	28.2
800	35.1	35.7	36.1	82.2	27.5	563.3	39.6	33.8	36.3	33.9	30.6	28.1
820	35.4	36.2	37.0	82.8	27.5	563.2	40.3	33.9	37.5	34.1	30.7	28.3
840	35.8	36.6	37.8	83.6	27.4	563.4	40.9	33.8	38.3	34.3	30.9	28.3
860	36.1	37.0	38.2	84.1	27.6	563.6	41.9	33.8	39.3	34.5	31.2	28.2
880	36.3	37.4	38.7	84.8	27.6	563.3	42.9	34.2	40.6	34.7	31.2	28.4
900	36.7	37.7	39.2	84.4	27.6	563.2	43.8	34.3	41.6	34.9	31.3	28.4
920	37.0	37.9	39.5	85.1	27.6	563.4	44.6	34.3	42.4	35.1	31.6	28.4
940	37.3	38.0	39.3	85.8	27.4	563.4	45.0	34.3	43.2	35.2	31.9	28.4
960	37.6	38.4	39.7	85.9	27.4	563.5	45.6	34.6	44.5	35.4	32.1	28.5
980	37.9	38.6	39.9	86.0	27.4	563.4	46.2	34.6	45.4	35.6	32.3	28.7
1000	38.1	38.8	40.1	87.3	27.5	563.3	46.6	34.7	46.3	35.7	32.4	28.6
1020	38.2	38.9	40.4	88.2	27.6	563.3	46.9	34.6	47.1	36.1	32.5	28.6
1040	38.5	39.0	40.7	87.9	27.6	563.4	47.2	34.7	48.0	36.3	32.9	28.6
1060	38.9	39.3	40.7	88.9	27.5	563.4	47.3	34.8	49.1	36.3	33.0	28.7
1080	39.0	39.4	41.1	90.1	27.6	563.3	47.7	34.8	49.9	36.6	33.2	28.8
1100	39.4	39.7	41.2	90.8	27.6	563.3	47.7	34.8	50.8	36.8	33.4	28.8
1120	39.7	39.9	41.6	91.6	27.6	563.3	47.7	35.0	51.7	37.0	33.6	28.9
1140	40.0	39.9	41.4	92.4	27.5	563.5	47.6	35.1	52.4	37.2	33.9	28.9
1160	40.3	40.1	41.7	93.7	27.6	563.5	47.3	35.1	53.3	37.6	34.1	28.8
1180	40.4	40.3	41.8	94.7	27.7	563.3	47.3	35.1	54.1	37.8	34.3	28.9
1200	40.9	40.7	41.8	96.4	27.6	563.3	47.1	35.2	56.1	38.4	34.7	28.9
1245	41.6	40.7	41.8	97.0	27.7	563.3	46.9	35.3	56.8	38.7	34.9	29.1
1260	41.5	40.9	41.6	97.4	27.6	563.4	46.6	35.4	57.5	38.7	35.1	29.1
1280	41.7	40.8	41.4	98.2	27.7	563.4	46.5	35.6	58.2	39.1	35.3	29.0
1300	41.9	40.9	41.2	98.8	27.6	563.6	46.2	35.8	59.1	39.1	35.6	29.1
1320	42.2	41.1	41.0	98.9	27.7	563.5	45.8	36.3	59.9	39.4	35.7	29.2
1340	41.9	41.2	40.7	98.8	27.6	563.5	45.6	36.4	60.6	39.7	35.9	29.3

TABLE B-6 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 66 THROUGH 84 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 66 DEG C	DAS 67 DEG C	DAS 68 DEG C	DAS 70 DEG C	DAS 71 DEG C	DAS 73 DEG C	DAS 77 DEG C	DAS 79 DEG C	DAS 80 DEG C	DAS 82 DEG C	DAS 83 DEG C	DAS 84 DEG C
1360	42.3	41.1	40.8	99.2	27.6	563.3	45.3	36.6	61.3	39.8	36.2	29.2
1380	42.5	41.2	40.6	99.6	27.7	563.5	45.2	36.6	61.8	40.2	36.5	29.1
1440	43.1	41.4	40.6	100.9	27.8	563.4	44.6	36.9	64.1	41.1	37.1	29.2
1500	43.6	41.9	40.7	101.6	27.9	563.3	44.1	38.1	66.4	41.8	37.7	29.3
1560	44.2	42.2	40.9	101.7	27.9	563.6	44.1	37.2	68.3	42.6	38.5	29.4
1620	45.0	42.5	41.1	104.6	27.8	563.6	44.3	37.5	70.3	43.2	39.3	29.5
1700	46.0	43.2	41.8	106.9	27.9	563.5	45.1	37.9	72.9	44.3	40.2	29.7
1760	46.7	43.8	42.2	107.5	28.0	563.4	45.9	42.9	74.7	45.2	40.9 ^a	29.6
1820	47.3	44.2	42.5	108.5	28.1	563.4	46.8	47.3	76.4	45.8	41.5	29.8
1880	47.8	44.6	43.2	109.2	28.0	563.5	47.6	48.3	78.1	46.6	42.3	29.7
1940	48.5	45.2	43.4	121.1	28.0	563.6	48.4	52.5	79.7	47.1	42.9	29.8
2000	48.8	45.7	43.8	121.5	28.2	563.4	49.3	77.2	81.6	47.7	43.7	30.0
2060	50.3	46.2	44.4	122.3	28.1	563.6	50.2	89.7	83.2	48.5	44.4	30.2
2120	51.0	46.9	45.0	122.9	28.3	563.3	50.8	94.8	84.7	49.2	45.2	30.3
2180	51.9	47.3	45.8	124.3	28.2	563.3	51.7	100.3	86.3	49.7	45.8	30.4
2260	52.7	47.8	46.4	126.7	28.3	563.6	52.7	125.6	87.8	50.6	46.9	30.5
2320	53.3	48.2	47.2	128.3	28.4	563.3	53.6	123.1	89.4	51.2	47.5	30.7
2380	54.1	48.9	47.6	136.3	28.4	563.4	54.2	119.9	90.6	51.7	48.4	30.8
2440	54.8	49.6	48.2	139.1	28.4	563.4	54.8	118.5	91.9	52.4	49.1	30.9
2500	55.5	50.0	49.0	139.5	28.6	563.5	55.3	118.9	93.4	53.0	49.9	31.2
2560	56.1	50.5	49.7	140.2	28.6	563.6	55.6	130.0	94.9	53.8	50.5	31.2
2620	56.7	51.1	50.1	140.6	28.6	563.5	55.7	126.7	96.3	54.3	51.2	31.4
2680	57.2	51.7	50.7	141.4	28.7	563.5	56.1	123.7	97.7	54.8	51.9	31.6
2740	57.6	52.3	51.4	141.3	28.9	563.6	57.2	122.2	99.4	55.3	52.7	32.0
2800	57.9	52.8	52.0	142.2	28.9	563.4	58.5	121.4	100.7	55.9	53.5	32.2
2880	59.4	53.6	52.6	146.1	29.1	563.5	59.2	121.3	102.6	56.7	54.6	32.5
2940	59.9	54.1	53.3	146.5	29.1	563.4	59.6	121.6	103.8	57.2	55.3	32.7
3000	60.7	54.4	53.6	145.9	29.2	563.8	59.8	122.1	104.9	58.0	56.1	32.8
3060	61.4	55.1	54.1	146.2	29.3	563.5	60.0	122.4	106.1	58.4	56.9	33.2
3120	62.1	55.5	54.5	155.1	29.2	563.6	60.3	123.1	107.3	59.1	57.6	33.3
3180	62.5	56.1	54.9	156.3	29.3	563.6	60.7	123.5	108.6	59.7	58.4	33.7
3240	63.2	56.8	55.3	156.1	29.5	563.5	60.8	124.1	109.7	60.1	59.2	33.8
3340	64.2	57.6	55.8	155.3	29.6	563.5	61.1	124.9	111.8	61.3	60.4	34.3
3400	64.8	57.9	56.0	154.2	29.7	563.6	61.3	125.5	113.1	61.4	61.3	34.6
3460	65.6	58.4	56.7	153.1	29.8	563.7	61.7	126.3	114.3	62.1	62.1	34.8

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TABLE B-6 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 66 THROUGH 84 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 66 DEG C	DAS 67 DEG C	DAS 68 DEG C	DAS 70 DEG C	DAS 71 DEG C	DAS 73 DEG C	DAS 77 DEG C	DAS 79 DEG C	DAS 80 DEG C	DAS 82 DEG C	DAS 83 DEG C	DAS 84 DEG C
3520	66.2	59.1	57.2	152.9	29.9	563.7	62.0	127.7	115.5	62.6	62.9	35.1
3580	66.9	59.8	57.3	153.9	29.9	563.6	62.2	129.1	116.9	63.1	63.7	35.3
3640	67.5	60.6	57.7	154.1	29.9	563.5	62.4	130.7	118.3	63.7	64.5	35.7
3700	68.1	61.3	58.1	154.9	30.0	563.4	62.6	132.6	119.7	64.2	65.3	35.9
3780	69.0	61.9	58.7	155.2	30.1	563.6	62.8	134.4	121.6	65.2	66.2	36.3
3840	69.6	62.6	59.3	155.6	30.2	563.8	63.0	135.3	123.0	65.6	67.1	36.6
3900	70.2	63.3	59.6	156.1	30.3	563.5	63.2	135.9	124.3	66.3	67.9	36.9
3960	70.9	63.7	60.0	157.0	30.4	563.6	63.4	137.0	125.4	66.7	68.7	37.2
4020	71.6	64.3	60.5	157.1	30.5	563.6	63.7	141.8	126.6	67.1	69.5	37.4
4080	72.1	65.1	60.8	181.2	30.6	563.6	64.0	175.8	127.9	67.8	70.4	37.7
4140	72.9	65.6	61.1	187.3	30.8	563.6	64.2	258.2	129.1	68.4	71.2	38.1
4200	73.3	66.1	61.4	186.4	30.8	563.4	64.6	282.7	130.4	68.8	72.1	38.2
4260	73.9	66.3	62.1	185.2	30.9	563.4	64.9	285.7	131.3	69.5	72.9	38.5
4320	74.7	67.2	62.3	184.1	30.9	563.4	65.3	279.1	132.5	69.9	73.7	38.8
4380	75.3	67.7	62.9	182.3	31.0	563.6	65.9	267.2	133.5	70.4	74.6	39.1
4440	75.9	68.3	63.0	181.8	31.1	563.5	66.6	256.3	134.5	70.9	75.3	39.4
4500	76.4	68.9	63.1	181.1	31.2	563.6	67.4	244.4	135.6	71.3	76.1	39.7
4560	77.1	69.6	63.3	181.1	31.3	563.3	67.9	234.0	136.5	72.0	76.8	40.1
4640	77.8	70.3	63.9	179.4	31.4	563.5	68.6	221.7	137.8	72.7	78.0	40.3
4700	78.6	70.9	64.1	178.9	31.5	563.4	68.8	212.3	139.3	72.9	78.7	40.6
4760	79.2	71.5	64.5	179.1	31.6	563.1	69.2	205.3	139.3	73.4	79.5	40.8
4820	79.7	72.1	64.8	183.9	31.7	563.5	69.7	199.3	140.2	74.1	80.3	41.2
4880	80.2	72.7	65.3	183.2	31.8	563.2	70.3	194.1	140.8	74.5	80.9	41.4
4960	80.9	73.5	65.8	182.2	31.9	563.2	70.7	187.8	141.9	75.1	82.0	41.8
5020	81.5	74.0	66.1	181.9	31.9	563.3	70.8	184.4	142.6	75.6	82.8	42.1
5080	82.2	74.6	66.5	193.1	32.0	563.3	71.3	181.8	143.6	76.0	83.6	42.3
5140	82.6	75.2	66.8	195.1	32.0	563.3	71.8	179.2	144.3	76.4	84.3	42.6
5200	83.3	75.7	67.2	195.2	32.2	563.2	72.2	176.7	145.1	76.7	85.0	42.8
5260	83.5	76.4	67.4	194.9	32.2	563.3	72.8	174.4	145.8	77.4	85.7	43.1
5340	84.7	77.3	68.0	192.8	32.9	563.1	72.9	171.1	146.8	78.2	86.7	43.5
5360	84.9	77.4	68.3	192.7	32.4	563.2	73.3	170.4	147.2	78.3	86.9	43.6
5380	85.1	77.6	68.3	192.3	32.4	563.1	73.3	169.7	147.3	78.3	87.1	43.8
5400	85.3	77.8	68.7	192.2	32.4	563.1	73.6	168.9	147.7	78.3	87.5	43.7
5420	85.6	77.9	68.7	191.7	32.4	563.3	73.5	168.3	148.3	78.4	87.7	43.8
5440	85.7	78.1	68.4	189.5	32.6	563.1	73.2	167.6	148.2	78.5	88.0	44.1

TABLE B-6 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 66 THROUGH 84 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 66 DEG C	DAS 67 DEG C	DAS 68 DEG C	DAS 70 DEG C	DAS 71 DEG C	DAS 73 DEG C	DAS 77 DEG C	DAS 79 DEG C	DAS 80 DEG C	DAS 82 DEG C	DAS 83 DEG C	DAS 84 DEG C
5460	85.7	78.1	68.0	185.6	32.5	563.2	72.6	166.9	148.3	78.7	88.2	44.1
5480	85.7	78.2	67.4	180.7	32.6	563.0	71.9	166.4	148.3	79.1	88.3	44.2
5500	85.7	78.2	67.1	175.3	32.5	563.0	71.2	165.8	148.3	79.1	88.4	44.3
5520	85.6	77.8	66.6	169.6	32.5	563.2	70.4	165.2	148.2	79.2	88.7	44.4
5540	85.5	77.7	66.0	164.4	32.7	562.9	69.6	164.6	148.1	79.4	88.7	44.3
5560	85.6	77.3	65.6	159.4	32.7	563.1	68.6	163.8	147.8	79.6	89.1	44.4
5580	85.4	77.1	65.2	155.0	32.6	562.9	67.9	163.3	147.3	79.8	89.0	44.6
5600	85.3	76.7	64.9	150.7	32.8	563.1	67.1	162.6	147.1	79.8	89.2	44.4
5620	85.2	76.4	64.5	146.8	32.7	562.9	66.4	162.2	146.4	80.0	89.3	44.6
5640	85.2	76.0	64.3	143.1	32.7	563.0	65.9	161.7	145.9	80.0	89.2	44.6
5660	85.0	75.7	64.0	139.8	32.8	562.9	65.2	160.9	145.5	79.8	89.4	44.6
5680	85.0	75.5	63.8	136.9	32.7	562.9	64.8	160.5	144.9	80.1	89.4	44.7
5700	84.8	74.7	63.2	130.7	32.8	562.9	63.7	159.1	143.7	79.8	89.4	44.8
5747	84.8	74.7	63.1	128.2	32.7	563.0	63.3	158.7	143.1	80.2	89.7	44.7
5760	84.6	74.7	62.8	126.7	32.7	562.9	62.9	158.4	142.8	80.2	89.7	44.6
5780	84.7	74.4	62.9	124.4	32.8	562.9	62.6	157.8	142.4	80.1	89.6	44.7
5800	84.4	74.4	62.6	122.7	32.7	563.0	62.2	157.4	141.4	80.4	89.6	44.9
5820	84.4	74.2	62.5	120.8	32.8	562.9	62.0	156.9	140.9	80.4	89.7	44.8
5840	84.4	74.1	62.3	119.2	32.8	562.8	61.8	156.4	140.3	80.4	89.7	44.9
5860	84.4	73.8	62.3	117.4	32.9	562.9	61.4	155.9	139.7	80.3	89.8	44.8
5880	84.3	73.8	62.2	116.1	32.9	562.8	61.4	155.4	139.3	80.4	89.8	44.9
5900	84.3	73.6	62.2	114.5	33.1	562.9	61.1	154.9	138.8	80.5	89.8	44.7
5920	84.2	73.5	62.1	113.3	33.1	562.9	61.1	154.3	138.3	80.7	89.6	44.9
5940	84.1	73.6	61.8	112.2	32.9	562.9	61.1	154.1	137.5	80.9	89.7	44.9
5960	84.1	73.3	62.0	111.1	33.1	562.9	60.8	153.5	137.1	80.8	89.7	44.9
5980	84.1	73.3	61.9	110.1	33.1	562.9	60.7	153.1	136.4	80.7	89.8	44.8
6000	84.1	73.2	61.8	109.1	33.2	562.9	60.4	152.6	136.1	80.7	89.7	44.9
6060	83.7	73.2	61.6	106.6	33.1	562.9	60.2	151.3	134.2	80.8	89.6	45.1
6146	83.7	72.9	61.6	103.4	33.2	562.7	60.0	149.4	131.8	80.8	89.6	44.9
6200	83.6	72.9	61.4	101.9	33.3	562.6	59.8	148.3	130.4	80.7	89.6	45.0
6260	83.3	73.0	61.4	100.6	33.2	562.6	59.9	147.1	128.8	81.1	89.3	45.2
6320	83.2	72.9	61.2	99.4	33.3	562.4	59.7	145.9	127.2	80.8	89.3	45.1
6380	83.1	72.9	61.2	98.3	33.2	562.4	59.7	144.8	125.9	81.2	89.2	45.4
6440	83.1	72.9	61.2	97.3	33.3	562.3	59.7	143.8	124.3	81.2	89.2	45.3
6500	82.9	72.9	61.2	96.4	33.4	562.3	59.7	142.6	123.3	80.9	89.1	45.4

TABLE B-7

DIGITAL OUTPUT FOR CHANNELS 85 THROUGH 107 --TEST AR6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 85 DEG C	DAS 86 DEG C	DAS 87 PERCENT	DAS 88 PERCENT	DAS 89 PERCENT	DAS 90 PERCENT	DAS 91 PERCENT	DAS 92 PERCENT	DAS 93 PERCENT	DAS 105 KPa	DAS 106 Ks	DAS 107 s / SEC
-100	-7.6	13.2	23.4	24.3	-0.3	0.0	23.8	23.6	24.2	114.3	880.3	12.6
-80	-7.3	13.2	23.4	24.3	-0.2	0.0	23.8	23.6	24.2	114.3	880.3	15.7
-60	-7.4	13.2	23.4	24.3	0.6	0.5	23.8	23.6	24.2	114.2	880.3	10.1
-40	-7.0	13.2	23.4	24.3	-0.5	-0.4	23.8	23.6	24.2	114.2	880.3	17.6
-20	-7.2	13.2	23.4	24.3	-0.3	-0.1	23.8	23.6	24.2	114.3	880.3	11.3
0	-6.3	13.2	23.4	24.3	0.3	9.6	23.8	23.6	24.2	114.3	880.3	5.0
20	-6.8	13.2	23.4	24.3	0.2	0.4	23.8	23.6	24.2	114.3	880.3	13.2
40	-6.0	13.2	23.4	24.3	-0.2	0.0	23.8	23.6	24.2	114.3	880.7	8.2
60	-8.3	13.2	23.4	24.3	-0.1	0.1	23.8	23.6	24.2	114.4	880.7	14.5
80	-6.5	13.2	23.4	24.3	0.4	0.3	23.8	23.6	24.2	114.5	880.7	16.3
100	-6.7	13.2	23.4	24.3	-0.1	-0.1	23.8	23.6	24.2	114.5	880.7	13.2
120	-7.2	13.2	23.4	24.3	-0.1	0.0	23.8	23.6	24.2	114.5	880.7	17.6
140	-6.6	13.2	23.4	24.3	9.3	0.3	23.8	23.6	24.2	114.6	880.7	15.7
160	-5.4	13.2	23.4	24.3	-0.2	-0.1	23.8	23.6	24.2	114.7	880.7	17.0
180	-6.9	13.2	23.4	24.3	-0.2	-0.1	23.8	23.3	24.2	114.7	880.7	12.6
200	-7.4	13.2	23.4	24.3	-0.1	0.0	23.8	23.1	24.2	114.7	880.7	10.7
220	-7.1	13.2	23.4	24.3	0.0	9.6	23.8	23.0	24.2	114.9	880.7	22.6
240	-6.6	13.2	23.4	24.3	-0.2	-0.1	23.8	22.9	24.2	114.9	880.3	16.3
260	-5.7	13.2	23.4	24.3	-0.1	0.0	23.8	22.9	24.2	114.9	880.3	16.3
280	-7.2	13.2	23.4	24.3	0.0	0.2	23.8	23.0	24.2	114.9	880.3	11.3
300	-6.3	13.2	23.3	24.3	0.2	0.4	23.8	23.0	24.2	114.9	880.3	15.7
320	-7.3	13.2	23.3	24.3	-0.1	0.1	23.8	23.0	24.2	115.0	880.3	8.2
340	-6.7	13.3	23.3	24.3	0.4	0.5	23.8	22.9	24.2	115.1	880.3	11.9
360	-5.7	13.3	23.2	24.3	-0.4	8.9	23.8	22.9	24.2	115.1	880.3	18.9
380	-6.2	13.3	23.2	24.3	-0.3	-0.1	23.8	22.8	24.2	115.1	880.7	16.3
400	-7.7	13.3	23.2	24.3	9.6	0.4	23.8	22.8	24.2	115.3	880.7	10.1
446	-6.7	13.3	23.2	24.3	0.3	0.3	23.8	22.7	24.2	115.4	880.7	14.5
493	-7.4	13.3	23.2	24.3	-0.2	-0.1	23.8	22.7	24.2	115.4	880.7	11.3
503	-7.3	13.3	23.2	24.3	-0.2	9.6	23.8	22.8	24.1	115.4	880.7	19.5
520	-7.0	13.3	23.2	24.3	-0.2	0.0	23.8	22.8	24.2	115.4	880.7	11.9
540	-7.1	13.3	23.2	24.3	0.2	0.3	23.8	22.8	24.1	115.4	880.7	11.3
560	-6.7	13.3	23.2	24.3	-0.2	-0.1	23.8	22.7	24.2	115.4	880.7	15.1
580	-7.2	13.3	23.2	24.3	0.3	9.5	23.8	22.8	24.2	115.5	880.7	9.4
600	-6.0	13.4	23.2	24.3	0.0	0.4	23.8	22.8	24.1	115.5	878.9	91.1
620	-7.6	13.3	23.2	24.3	0.0	0.2	23.8	22.8	24.1	116.5	874.6	120.0

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TABLE B-7 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 85 THROUGH 107 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 85 DEG C	DAS 86 DEG C	DAS 87 PERCENT	DAS 88 PERCENT	DAS 89 PERCENT	DAS 90 PERCENT	DAS 91 PERCENT	DAS 92 PERCENT	DAS 93 PERCENT	DAS 105 KPa	DAS 106 Ks	DAS 107 s / SEC
640	-6.8	13.4	23.2	24.3	-0.2	0.0	23.8	22.8	24.1	119.8	873.7	45.9
660	-6.3	13.5	23.2	24.3	0.3	0.3	23.8	22.7	24.2	122.9	872.7	66.0
680	-6.0	13.5	23.2	24.3	0.1	0.1	23.8	22.7	24.2	125.3	872.3	65.4
700	-5.9	13.5	23.2	24.3	-0.2	0.0	23.8	22.7	24.2	126.9	871.8	42.7
720	-7.0	13.5	23.2	24.3	0.2	9.1	23.8	22.7	24.2	128.1	870.8	50.3
740	-6.3	13.5	23.2	24.3	0.4	0.6	23.8	23.1	24.2	128.9	870.4	44.0
760	-6.9	13.5	23.2	24.3	-0.3	0.0	23.8	23.1	24.2	129.6	869.4	66.6
780	-6.3	13.6	23.2	24.3	-0.2	0.0	23.8	23.0	24.2	130.2	869.0	53.4
800	-6.6	13.6	23.1	24.3	0.3	0.2	23.7	23.0	24.2	130.6	868.0	69.1
820	-6.2	13.6	23.1	24.3	0.1	0.1	23.7	23.0	24.2	130.9	867.1	41.5
840	-7.5	13.7	23.1	24.3	-0.2	0.0	23.7	23.1	24.2	131.2	866.6	60.3
860	-7.4	13.6	23.1	24.3	9.2	-0.2	23.7	23.0	24.2	131.5	865.7	42.1
880	-5.6	13.7	23.1	24.2	0.3	0.2	23.7	23.0	24.2	131.6	865.2	42.1
900	-7.3	13.7	23.1	24.2	-0.1	0.0	23.7	23.0	24.2	131.9	864.7	55.9
920	-7.1	13.7	23.2	24.2	-0.2	0.0	23.7	23.1	24.2	132.1	863.3	30.8
940	-6.3	13.6	23.2	24.2	0.1	9.4	23.7	23.0	24.2	132.2	862.8	51.5
960	-7.5	13.7	23.2	24.1	-0.3	0.0	23.7	23.0	24.2	132.4	862.3	60.3
980	-7.0	13.7	23.2	24.1	-0.1	0.0	23.7	23.0	24.2	132.8	861.4	49.0
1000	-6.6	13.7	23.2	24.1	-0.1	0.0	23.7	23.1	24.2	133.1	860.9	57.2
1020	-6.3	13.7	23.2	24.2	0.3	0.2	23.7	23.1	24.2	133.3	860.0	44.0
1040	-5.8	13.7	23.2	24.1	-0.1	0.1	23.7	23.1	24.2	133.6	859.5	31.4
1060	-6.1	13.7	23.2	24.2	-0.1	0.0	23.7	23.1	24.2	133.9	858.6	52.2
1080	-7.2	13.7	23.2	24.1	0.7	8.9	23.7	23.0	24.2	134.2	858.1	42.1
1100	-7.9	13.7	23.2	24.2	0.0	0.3	23.7	23.0	24.2	134.5	857.2	43.4
1120	-8.0	13.7	23.2	24.2	-0.1	0.1	23.7	23.0	24.2	134.8	856.7	55.9
1140	-6.4	13.7	23.2	24.2	0.3	0.3	23.7	23.1	24.2	135.1	855.3	65.4
1160	-7.0	13.6	23.3	24.2	0.0	0.4	23.8	23.0	24.2	135.3	854.3	39.6
1180	-7.3	13.5	23.3	24.2	-0.1	0.0	23.8	23.0	24.2	135.6	853.9	61.6
1200	-7.8	13.2	23.3	24.2	0.5	0.4	23.8	23.0	24.2	136.2	851.5	42.1
1245	-8.2	13.0	23.3	24.2	0.0	0.1	23.8	23.0	24.2	136.5	851.0	47.8
1260	-7.8	12.9	23.3	24.2	-0.1	0.0	23.8	22.9	24.2	136.6	850.6	55.9
1280	-7.8	12.6	23.3	24.2	0.1	0.1	23.8	22.9	24.2	136.9	850.1	55.9
1300	-7.8	12.3	23.3	24.2	0.3	9.3	23.8	22.8	24.2	137.1	849.1	49.7
1320	-8.0	12.1	23.3	24.2	0.0	0.1	23.8	22.8	24.2	137.3	848.2	60.3
1340	-8.0	11.8	23.3	24.2	0.2	0.2	23.8	22.7	24.2	137.8	847.7	52.8

TABLE B-7 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 85 THROUGH 107 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 85 DEG C	DAS 86 DEG C	DAS 87 PERCENT	DAS 88 PERCENT	DAS 89 PERCENT	DAS 90 PERCENT	DAS 91 PERCENT	DAS 92 PERCENT	DAS 93 PERCENT	DAS 105 KPa	DAS 106 Kg	DAS 107 g / SEC
1360	-7.0	11.5	23.3	24.2	-0.2	0.0	23.8	22.7	24.2	138.2	846.8	47.8
1380	-7.5	11.1	23.3	24.2	0.0	0.0	23.9	22.7	24.2	138.6	845.8	61.6
1440	-8.9	10.4	23.3	24.2	0.0	9.2	23.9	22.6	24.1	139.1	844.0	27.0
1500	-9.2	9.4	23.4	24.3	-0.2	0.0	23.9	22.7	24.0	139.1	841.1	56.6
1560	-8.7	8.7	23.4	24.3	-0.3	-0.1	23.9	22.8	23.9	140.4	838.8	50.9
1620	-9.7	8.1	23.4	24.3	-0.4	0.0	24.0	22.8	24.0	141.5	836.4	44.6
1700	-9.7	8.2	23.4	24.1	-0.2	-0.1	24.0	22.3	24.0	142.4	832.6	47.8
1760	-9.6	8.0	23.4	23.9	-0.2	0.0	24.0	22.5	24.1	143.0	830.3	40.2
1820	-8.6	8.0	23.4	23.9	-0.3	0.0	24.0	22.3	24.0	144.0	827.9	50.3
1880	-8.7	7.7	23.4	23.9	0.4	0.2	24.0	22.3	24.1	144.7	825.1	64.7
1940	-10.5	7.6	23.4	24.0	9.1	0.0	24.0	22.2	24.0	145.6	822.7	49.0
2000	-10.5	7.3	23.3	24.0	0.7	0.4	24.0	22.3	24.1	146.5	820.4	51.5
2060	-10.1	7.1	23.3	24.0	-0.2	0.0	23.9	22.2	24.1	147.3	817.5	49.7
2120	-11.2	7.1	23.3	24.0	-0.1	0.0	23.9	22.3	24.1	148.2	815.2	25.8
2180	-12.2	6.9	23.3	24.0	0.0	0.3	24.0	22.6	24.1	149.1	812.3	50.3
2260	-12.2	6.6	23.3	24.0	-0.2	-0.1	23.9	22.9	24.1	150.4	808.6	49.0
2320	-15.1	6.4	23.3	24.0	0.0	0.1	23.9	23.0	24.1	151.3	806.7	40.2
2380	-13.8	6.3	23.3	24.0	-0.2	5.9	23.9	23.0	24.1	152.2	804.3	32.7
2440	-14.4	6.1	23.3	24.0	-0.2	-0.1	23.9	22.9	24.0	153.3	801.0	55.3
2500	-14.5	5.9	23.2	24.0	-0.2	0.0	23.9	22.6	24.0	154.1	798.7	71.6
2560	-12.8	5.7	23.2	24.0	-0.2	0.0	23.9	22.7	24.0	154.7	795.8	57.8
2620	-14.9	5.5	23.2	24.0	-0.4	0.0	23.9	22.5	24.0	155.3	793.9	58.5
2680	-14.6	5.4	23.2	24.4	0.1	0.2	23.9	22.3	24.0	156.0	791.6	40.9
2740	-15.0	5.2	23.5	23.9	0.5	11.6	23.9	22.2	24.0	156.9	788.8	59.1
2800	-15.9	5.1	23.2	23.9	0.2	0.2	23.9	22.0	24.0	157.7	785.9	45.9
2880	-4.5	4.7	23.2	23.9	0.3	4.0	23.9	21.7	24.0	158.6	782.6	40.9
2940	-11.9	4.4	23.1	23.9	0.0	0.1	23.9	21.5	23.9	159.0	780.3	58.5
3000	-10.1	4.1	23.1	23.8	0.3	0.3	23.9	21.6	23.9	159.3	778.4	40.2
3060	-16.3	3.6	23.1	23.8	0.1	0.2	23.9	21.5	23.9	159.9	775.5	45.9
3120	-12.6	3.7	23.1	23.8	0.0	0.2	23.9	22.0	23.9	160.6	772.7	47.1
3180	-16.6	3.2	23.0	23.8	0.3	0.5	23.9	21.7	23.9	161.1	770.4	67.2
3240	-16.4	3.1	23.0	23.8	11.3	0.1	23.9	21.4	23.8	161.6	767.5	57.8
3340	-17.0	2.8	23.0	23.7	0.2	0.2	23.9	21.4	23.8	162.4	763.8	45.3
3400	-15.5	2.5	23.0	23.8	0.7	0.3	23.9	21.2	23.8	162.7	761.4	51.5
3460	-16.5	2.5	23.0	23.8	11.3	0.2	23.8	21.2	23.7	163.1	758.6	44.0

TABLE B-7 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 85 THROUGH 107 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

	TIME SECONDS	DAS 85 DEG C	DAS 86 DEG C	DAS 87 PERCENT	DAS 88 PERCENT	DAS 89 PERCENT	DAS 90 PERCENT	DAS 91 PERCENT	DAS 92 PERCENT	DAS 93 PERCENT	DAS 105 KPa	DAS 106 Ks	DAS 107 s / SEC
B-36	3520	-17.0	1.6	23.0	23.7	-0.1	0.1	23.8	21.3	23.7	164.2	755.7	41.5
	3580	-17.2	1.6	23.0	23.7	-0.1	0.0	23.8	21.2	23.7	164.9	752.9	45.9
	3640	-17.0	1.0	22.9	23.7	-0.1	0.1	23.8	21.3	23.7	165.5	750.5	43.4
	3700	-15.7	0.9	22.9	23.7	-0.1	0.3	23.9	21.2	23.7	166.2	748.2	49.7
	3780	-8.3	0.1	22.9	23.7	-0.1	0.0	23.9	21.4	23.7	166.4	744.9	39.6
	3840	-13.5	0.2	22.8	23.6	0.0	0.1	23.9	21.4	23.7	166.8	742.1	45.3
	3900	-15.4	-0.7	22.8	23.5	0.0	0.3	23.9	21.1	23.7	167.1	739.2	42.7
	3960	-15.9	-0.3	22.8	23.4	11.3	0.1	23.9	21.3	23.7	167.4	736.9	37.1
	4020	-13.7	-1.2	22.8	23.4	-0.3	0.0	23.8	21.2	23.7	167.5	734.5	45.3
	4080	-16.9	-1.5	22.8	23.3	-0.5	0.0	23.8	21.1	23.7	167.7	730.7	46.5
	4140	-17.1	1.4	22.7	23.3	0.0	0.1	23.8	21.0	23.7	168.0	729.8	51.5
	4200	-17.4	-1.3	22.8	23.3	0.6	0.4	23.8	21.1	23.7	168.1	727.0	54.7
	4260	-15.3	-2.3	22.7	23.3	1.3	0.9	23.8	20.9	23.7	168.2	724.1	28.9
	4320	-17.1	-2.2	22.6	23.3	11.3	0.1	23.8	20.9	23.7	168.1	721.8	57.8
	4380	-17.1	-1.8	22.6	23.2	-0.1	0.0	23.8	20.9	23.6	168.3	719.9	52.8
	4440	-17.0	-1.4	22.5	23.2	-0.2	0.0	23.8	20.9	23.6	168.4	717.1	59.1
	4500	-17.1	-1.5	22.4	23.2	-0.3	-0.1	23.8	20.6	23.5	168.5	714.7	39.6
	4560	-17.1	-1.2	22.3	23.2	0.2	0.2	23.8	20.3	23.5	168.5	711.9	50.3
	4640	-17.2	-1.2	22.2	23.2	-0.1	0.1	23.8	20.0	23.4	168.4	708.1	66.0
	4700	-16.3	-1.6	22.1	23.2	0.0	0.2	23.8	20.0	23.3	168.4	706.2	45.9
	4760	-17.3	13.5	22.0	23.4	0.4	11.3	23.8	19.9	23.3	168.3	703.4	59.7
	4820	-17.3	16.6	21.9	23.1	-0.1	0.1	23.7	20.0	23.2	168.3	701.0	52.2
	4880	-17.0	18.6	21.8	23.1	-0.3	0.0	23.7	20.0	23.1	168.4	698.7	52.2
	4960	-17.3	19.3	21.7	23.1	-0.2	0.0	23.7	19.7	22.9	168.7	694.9	49.7
	5020	-17.5	19.7	21.6	23.0	-0.2	0.0	23.7	19.6	22.8	168.9	692.5	50.9
	5080	-17.2	19.9	21.4	23.0	-0.3	0.0	23.7	19.4	22.8	169.2	690.2	42.1
	5140	-17.4	19.9	21.6	22.9	0.1	0.3	23.6	19.4	22.6	169.4	687.3	43.4
	5200	-15.8	20.0	23.1	23.0	0.4	0.5	23.6	19.3	22.5	169.5	685.0	39.6
	5260	-15.8	19.3	23.6	23.0	11.3	0.1	23.6	19.1	22.5	169.5	681.7	49.7
	5340	-17.0	4.0	23.5	21.7	0.6	0.5	23.6	19.0	22.3	169.4	678.8	46.5
	5360	-16.9	3.0	23.4	21.7	-0.2	-0.1	23.5	18.9	22.2	169.5	677.9	55.3
	5380	-17.3	2.7	23.3	21.8	0.0	0.0	23.5	18.9	22.2	169.4	677.4	54.7
	5400	-17.3	2.5	23.3	21.7	11.3	0.4	23.5	18.9	22.1	169.5	676.5	3.8
	5420	-16.6	1.9	23.1	21.7	0.0	0.1	23.5	18.9	22.1	168.2	676.5	5.7
	5440	-16.5	1.3	23.1	21.8	-0.1	0.0	23.5	18.8	22.0	165.9	676.0	-6.9

TABLE B-7 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 85 THROUGH 107 --TEST AR6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

	TIME SECONDS	DAS 85 DEG C	DAS 86 DEG C	DAS 87 PERCENT	DAS 88 PERCENT	DAS 89 PERCENT	DAS 90 PERCENT	DAS 91 PERCENT	DAS 92 PERCENT	DAS 93 PERCENT	DAS 105 KPa	DAS 106 Ks	DAS 107 g / SEC
B-37	5460	-17.0	1.1	23.0	21.9	0.2	0.2	23.5	18.9	22.0	163.4	676.0	-12.6
	5480	-17.4	0.8	23.0	21.8	0.2	11.3	23.4	18.9	21.9	161.2	676.0	-10.7
	5500	-15.8	0.7	22.9	21.7	-0.2	0.1	23.5	18.8	21.9	159.3	675.5	-8.2
	5520	-17.5	0.9	22.9	21.6	-0.1	0.0	23.5	18.7	21.8	157.5	675.5	-13.8
	5540	-17.4	0.8	22.8	21.6	-0.1	0.0	23.5	18.9	21.8	155.9	676.0	-8.2
	5560	-17.3	0.3	22.8	21.8	0.5	0.6	23.5	19.5	21.8	154.6	676.0	3.1
	5580	-17.5	0.0	22.8	21.7	0.0	0.1	23.5	20.1	21.8	153.3	676.5	4.4
	5600	-17.2	-0.1	22.8	21.6	0.0	0.1	23.5	20.1	21.7	152.2	676.0	-6.3
	5620	-17.1	-0.4	22.8	21.6	11.3	-0.1	23.5	20.2	21.7	151.2	676.5	16.3
	5640	-17.2	-0.4	22.8	21.5	0.4	0.4	23.5	20.3	21.6	150.2	676.5	-5.0
	5660	-17.4	-0.6	22.8	21.6	0.3	0.2	23.5	20.3	21.6	149.3	677.0	-10.1
	5680	-17.3	-0.5	22.8	21.5	-0.2	0.1	23.5	20.4	21.6	148.6	677.4	-17.0
	5700	-16.8	-0.8	22.8	21.5	0.0	0.1	23.5	20.6	21.5	146.8	677.0	-0.6
	5747	-16.0	-0.8	22.8	21.6	-0.2	0.0	23.5	20.7	21.5	146.3	677.4	-18.2
	5760	-17.4	-1.1	22.8	21.6	11.3	-0.1	23.5	20.7	21.4	146.0	677.4	-6.3
	5780	-16.3	-0.8	22.8	21.5	0.3	0.4	23.5	20.7	21.4	145.5	677.0	-10.1
	5800	-16.1	-0.9	22.8	21.5	0.3	0.3	23.5	20.7	21.4	144.9	677.4	-18.9
	5820	-15.6	-0.5	22.8	21.5	-0.1	0.1	23.4	20.7	21.4	144.5	677.4	-10.7
	5840	-17.2	-0.6	22.8	21.5	0.8	11.3	23.5	20.7	21.5	144.0	677.0	-12.6
	5860	-17.4	-0.9	22.8	21.5	0.5	0.6	23.4	20.8	21.5	143.6	677.4	-12.6
	5880	-15.6	-0.7	22.8	21.5	-0.3	0.0	23.4	20.8	21.4	143.3	677.9	-10.7
	5900	-17.4	-1.1	22.7	21.5	-0.2	0.0	23.4	20.8	21.3	142.9	677.9	-15.1
	5920	-16.9	-0.7	22.8	21.5	0.1	0.2	23.4	20.8	21.3	142.6	677.9	-16.3
	5940	-16.8	-1.0	22.8	21.5	0.1	0.2	23.4	20.9	21.3	142.3	677.9	-17.0
	5960	-17.0	-0.7	22.8	21.5	-0.4	-0.2	23.4	20.9	21.3	142.0	677.4	-17.0
	5980	-17.1	-0.7	22.8	21.5	11.3	0.2	23.4	20.9	21.2	141.7	677.4	-17.6
	6000	-16.7	-0.5	22.8	21.5	0.2	0.2	23.4	20.9	21.2	141.4	677.0	-18.2
	6060	-17.6	-0.8	22.7	21.5	0.4	0.5	23.4	20.9	21.1	140.8	676.5	-19.5
	6146	-17.6	0.7	22.8	21.3	0.0	0.4	23.3	20.9	21.1	140.0	676.5	-20.7
	6200	-17.5	1.6	22.8	21.3	0.4	11.3	23.4	20.9	21.1	139.7	676.5	-22.0
	6260	-17.5	2.0	22.8	21.3	0.1	0.1	23.4	20.9	21.1	139.2	676.5	-22.0
	6320	-17.5	1.7	22.8	21.7	0.4	0.1	23.3	20.9	21.1	138.9	677.0	-22.6
	6380	-17.4	0.9	22.8	22.1	-0.1	0.0	23.3	20.9	21.1	138.6	677.0	-23.3
	6440	-17.5	0.3	22.8	22.2	0.0	0.1	23.3	20.8	21.1	138.2	677.4	-23.9
	6500	-17.5	-0.2	22.8	22.2	-0.2	0.0	23.3	20.8	21.1	138.1	677.4	-24.5

TABLE B-8

DIGITAL OUTPUT FOR CHANNELS 108 THROUGH 136 --TEST AR6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 108 g / SEC	DAS 113 W/Sq. M	DAS 114 W/Sq. M	DAS 115 W/Sq. M	DAS 116 KPa	DAS 117 PERCENT	DAS 118 PERCENT	DAS 119 PERCENT	DAS 130 DEG C	DAS 131 DEG C	DAS 135 DEG C	DAS 136 DEG C
-100	-0.1	9.8	8.0	1.5	-8.7	0.9	0.9	0.9	29.9	29.4	877.9	193.9
-80	-0.1	10.0	7.3	1.3	-9.2	0.9	0.9	0.9	30.0	29.5	878.4	193.2
-60	-0.1	10.0	7.3	1.3	-9.2	0.9	0.9	0.9	29.9	29.4	877.9	193.7
-40	-0.1	10.0	7.5	1.3	-9.2	0.9	0.9	0.9	30.1	29.4	878.2	192.7
-20	-0.1	9.8	8.2	1.5	-9.2	0.9	0.9	0.9	29.9	29.5	878.0	192.7
0	-0.1	10.5	7.5	1.3	-9.2	0.9	0.9	0.9	29.9	29.5	879.1	177.8
20	-0.1	10.0	8.0	1.3	-9.2	0.9	0.9	0.9	29.9	29.6	878.0	191.2
40	-0.1	10.2	7.1	1.5	-8.7	0.9	0.9	0.9	29.9	29.6	877.9	191.8
60	-0.1	10.5	7.8	1.3	-9.2	0.9	0.9	0.9	29.9	29.6	877.9	194.3
80	-0.1	10.9	6.9	1.3	-9.2	0.9	0.9	0.9	29.9	29.4	877.7	195.1
100	-0.1	12.3	8.4	1.3	-9.2	0.9	0.9	0.9	30.1	29.3	877.9	196.7
120	-0.1	11.9	7.5	1.5	-9.2	0.9	0.9	0.9	30.0	29.5	877.8	197.3
140	-0.1	12.8	7.8	1.5	-9.2	0.9	0.9	0.9	29.9	29.4	877.8	200.6
160	-0.1	13.0	6.9	1.5	-9.2	0.9	0.9	0.8	29.9	29.4	877.7	200.2
180	-0.1	14.2	8.2	1.5	-9.2	0.9	0.9	0.7	29.9	29.6	877.7	200.6
200	-0.1	13.3	8.0	1.5	-9.2	0.9	0.9	0.7	29.9	29.6	877.8	199.9
220	-0.1	13.5	8.0	1.5	-9.2	0.9	0.9	0.7	29.9	29.6	877.9	201.6
240	-0.1	14.0	7.3	1.5	-9.2	0.9	0.9	0.7	30.1	29.4	877.9	204.5
260	-0.1	15.4	8.4	1.5	-8.7	0.9	0.9	0.7	29.9	29.6	877.8	203.4
280	-0.1	15.6	8.0	1.5	-9.2	0.9	0.9	0.7	30.0	29.4	877.1	203.3
300	-0.1	15.8	8.2	1.5	-9.2	0.9	0.9	0.7	29.9	29.6	877.8	204.9
320	-0.1	16.5	8.4	1.5	-9.2	0.9	0.9	0.7	29.9	29.5	877.8	201.2
340	-0.1	17.5	8.6	1.5	-9.2	0.9	0.9	0.7	29.9	29.4	877.8	200.2
360	-0.1	15.6	8.0	1.5	-9.2	0.9	0.9	0.7	29.9	29.5	876.9	198.3
380	-0.1	16.1	8.4	1.5	-9.2	0.9	0.9	0.7	30.1	29.4	877.9	200.2
400	-0.1	15.8	7.5	1.5	-9.2	0.9	0.9	0.6	30.0	29.4	877.8	202.2
446	-0.1	16.8	7.8	1.7	-9.2	0.9	0.9	0.7	30.1	29.6	877.8	202.4
493	-0.1	17.7	7.5	1.7	-9.2	0.9	0.9	0.7	30.1	29.6	878.1	202.1
503	-0.1	20.3	7.8	1.7	-9.2	0.9	0.9	0.6	30.1	29.4	878.0	200.7
520	-0.1	17.5	7.1	1.7	-9.2	0.9	0.9	0.6	30.0	29.4	877.9	200.1
540	-0.1	18.2	7.5	1.7	-9.2	0.9	0.9	0.6	30.1	29.6	877.9	198.3
560	-0.1	16.8	7.8	1.7	-8.7	0.9	0.9	0.7	30.1	29.6	879.1	199.1
580	-0.1	17.0	7.3	1.7	-9.2	0.9	0.9	0.7	30.1	29.4	877.9	199.9
600	-0.1	17.9	8.6	1.7	56.5	0.9	0.9	0.7	30.1	29.6	878.0	198.8
620	-0.1	55.9	8.6	1.9	238.6	0.9	0.9	0.7	30.1	29.5	877.9	198.7

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TABLE B-8 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 108 THROUGH 136 --TEST AR6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 108 g / SEC	DAS 113 W/Sq. M	DAS 114 W/Sq. M	DAS 115 W/Sq. M	DAS 116 KPa	DAS 117 PERCENT	DAS 118 PERCENT	DAS 119 PERCENT	DAS 130 DEG C	DAS 131 DEG C	DAS 135 DEG C	DAS 136 DEG C
640	-0.1	88.3	9.5	3.2	250.1	0.9	0.9	0.6	30.2	29.5	877.9	198.4
660	9.3	175.4	11.7	5.2	248.2	0.9	0.9	0.6	30.2	29.6	878.1	201.1
680	16.3	274.1	13.7	8.2	245.9	0.8	0.8	0.6	30.2	29.7	876.8	204.2
700	15.3	355.4	16.4	11.3	242.2	0.8	0.8	0.6	30.3	29.7	877.9	202.2
720	21.2	442.0	19.1	13.2	247.3	0.8	0.8	0.7	30.5	29.9	877.9	202.6
740	21.2	441.1	20.8	15.2	247.8	0.8	0.8	0.8	30.7	30.1	878.0	207.5
760	21.3	516.3	23.0	16.7	245.9	0.8	0.8	0.8	30.8	30.1	877.7	209.4
780	21.6	548.2	27.0	18.0	244.5	0.8	0.8	0.8	31.0	30.3	877.7	212.2
800	21.7	585.5	28.1	18.8	244.1	0.8	0.8	0.7	31.1	30.5	877.4	214.3
820	21.5	613.5	30.4	19.1	245.0	0.8	0.8	0.8	31.4	30.7	877.5	213.4
840	21.1	586.4	30.8	19.3	233.0	0.8	0.8	0.8	31.5	30.9	877.4	214.6
860	20.6	544.5	33.5	21.4	222.9	0.8	0.8	0.8	31.7	31.1	877.6	214.6
880	20.9	569.4	37.0	22.1	225.2	0.8	0.8	0.7	32.0	31.3	877.7	213.8
900	20.9	610.4	37.7	21.9	225.7	0.8	0.8	0.8	32.2	31.6	879.6	214.6
920	20.5	575.0	40.5	22.7	219.7	0.8	0.8	0.7	32.3	31.6	877.7	211.5
940	20.2	588.1	41.7	23.6	218.3	0.8	0.8	0.8	32.4	31.9	877.7	210.3
960	18.6	554.8	42.8	24.0	233.5	0.8	0.7	0.8	32.7	32.1	877.8	210.0
980	18.8	570.6	46.3	24.5	220.6	0.8	0.7	0.8	33.0	32.3	877.9	210.1
1000	18.0	633.3	46.1	24.7	227.1	0.8	0.7	0.8	33.2	32.4	877.9	211.1
1020	18.0	662.8	49.0	24.7	218.3	0.8	0.7	0.8	33.4	32.7	877.9	211.5
1040	18.2	597.2	49.6	25.1	229.8	0.8	0.7	0.7	33.6	32.9	877.8	212.0
1060	19.1	610.2	51.4	26.2	225.7	0.8	0.6	0.7	33.9	33.1	878.2	212.9
1080	19.9	613.0	50.5	26.2	230.3	0.8	0.6	0.7	34.1	33.4	878.1	212.4
1100	27.4	610.2	53.0	26.8	222.5	0.8	0.6	0.7	34.3	33.5	878.2	213.2
1120	18.4	651.2	58.1	26.8	233.0	0.8	0.6	0.7	34.5	33.7	878.1	213.5
1140	15.2	629.8	60.9	28.1	224.3	0.8	0.6	0.7	34.7	33.9	878.2	211.8
1160	16.5	638.8	59.6	28.6	224.3	0.8	0.6	0.7	34.8	34.3	878.0	211.9
1180	17.0	655.6	65.1	29.0	232.6	0.8	0.6	0.7	35.2	34.3	878.0	213.5
1200	18.7	714.5	65.6	30.3	232.6	0.8	0.6	0.7	35.7	35.1	877.7	214.7
1245	20.3	686.8	69.6	30.3	233.0	0.8	0.5	0.7	35.9	35.1	877.8	217.1
1260	19.9	713.8	69.8	31.2	229.8	0.8	0.5	0.7	36.2	35.2	877.8	217.2
1280	19.1	690.1	76.4	31.0	225.7	0.8	0.5	0.7	36.2	35.5	877.7	214.1
1300	20.4	710.1	80.7	31.6	228.9	0.8	0.5	0.7	36.5	35.8	877.7	215.1
1320	19.9	676.8	80.7	32.0	222.5	0.8	0.5	0.7	36.9	35.9	877.9	215.2
1340	22.6	713.8	81.5	32.0	235.3	0.8	0.5	0.7	37.1	36.1	877.8	218.6

TABLE B-8 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 108 THROUGH 136 --TEST AR6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 108 s / SEC	DAS 113 W/Sq. M	DAS 114 W/Sq. M	DAS 115 W/Sq. M	DAS 116 KPa	DAS 117 PERCENT	DAS 118 PERCENT	DAS 119 PERCENT	DAS 130 DEG C	DAS 131 DEG C	DAS 135 DEG C	DAS 136 DEG C
1360	23.1	746.9	84.2	32.7	235.8	0.8	0.5	0.7	37.3	36.5	877.8	217.7
1380	22.4	748.1	92.0	33.1	236.3	0.8	0.5	0.7	37.4	36.7	878.9	216.5
1440	22.2	756.2	90.4	34.6	214.2	0.7	0.4	0.7	38.2	37.4	877.6	213.4
1500	22.5	803.5	99.9	35.3	207.3	0.7	0.4	0.7	39.2	37.9	877.9	210.2
1560	20.9	732.9	100.4	35.3	234.4	0.7	0.4	0.7	39.7	38.7	877.8	211.0
1620	15.7	778.6	111.4	37.9	233.5	0.7	0.4	0.7	40.4	39.4	877.8	210.9
1700	17.5	774.2	113.2	39.8	233.0	0.7	0.3	0.7	41.6	40.3	877.8	211.3
1760	16.6	742.3	118.3	40.3	232.6	0.7	0.3	0.6	42.3	40.9	877.9	208.8
1820	21.9	777.9	127.6	41.1	231.7	0.7	0.3	0.6	43.3	41.6	877.9	219.3
1880	19.4	787.4	130.3	42.4	233.5	0.7	0.3	0.6	43.8	42.2	877.7	217.1
1940	19.5	792.8	132.7	42.9	232.1	0.6	0.3	0.6	44.8	42.8	877.9	218.5
2000	20.7	804.4	151.6	42.9	226.2	0.7	0.3	0.6	45.6	43.6	877.8	217.8
2060	21.4	800.5	148.9	45.0	232.1	0.7	0.3	0.6	46.4	44.2	877.9	216.9
2120	20.6	752.7	157.3	45.2	232.6	0.7	0.2	0.6	47.1	45.0	878.0	213.3
2180	21.0	764.1	162.4	45.9	232.6	0.6	0.2	0.6	47.9	45.6	877.9	212.2
2260	20.5	713.6	171.5	47.6	232.6	0.6	0.2	0.6	49.0	46.3	877.9	211.1
2320	20.4	711.0	177.3	48.7	232.6	0.6	0.2	0.6	49.7	47.0	877.9	204.4
2380	20.6	736.4	175.7	49.4	233.5	0.6	0.2	0.6	50.4	47.8	877.7	203.7
2440	20.2	749.5	181.9	49.8	234.4	0.6	0.2	0.6	51.4	48.3	877.7	204.0
2500	20.5	768.8	199.6	51.5	228.9	0.6	0.2	0.6	52.1	49.0	877.6	203.3
2560	20.5	745.1	200.5	52.0	236.3	0.6	0.2	0.6	53.0	49.6	877.7	204.1
2620	20.0	726.9	196.5	53.0	237.2	0.6	0.2	0.6	53.8	50.3	877.7	204.8
2680	20.2	731.3	210.7	53.3	238.1	0.6	0.2	0.6	54.6	50.9	877.8	207.7
2740	20.1	759.3	205.4	54.8	238.1	0.6	0.2	0.6	55.4	51.7	878.0	205.9
2800	20.0	771.4	214.3	56.1	237.2	0.6	0.2	0.5	56.3	52.3	877.8	205.7
2880	19.9	734.8	217.4	57.6	236.7	0.6	0.1	0.5	57.3	53.3	877.9	208.9
2940	19.9	760.9	229.5	57.8	236.3	0.5	0.2	0.5	58.1	53.8	879.9	211.8
3000	19.9	729.9	232.2	58.2	236.7	0.5	0.1	0.5	58.9	54.5	878.3	204.4
3060	20.2	717.3	236.0	59.5	235.8	0.5	0.2	0.5	59.7	55.1	877.5	151.8
3120	20.3	720.4	249.7	59.7	235.3	0.5	0.1	0.5	60.7	55.7	878.2	125.1
3180	20.5	712.4	256.4	61.5	234.9	0.5	0.1	0.5	61.4	56.4	878.5	121.2
3240	20.5	736.7	253.7	63.4	234.4	0.5	0.1	0.5	62.2	56.9	877.7	116.3
3340	20.5	754.4	265.2	63.9	227.1	0.5	0.1	0.5	63.6	58.0	875.8	111.5
3400	20.5	744.8	278.3	65.2	236.7	0.5	0.1	0.5	64.6	58.7	874.4	109.1
3460	20.3	744.4	284.1	66.2	239.0	0.5	0.1	0.4	65.2	59.2	872.7	107.0

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TABLE B-8 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 108 THROUGH 136 --TEST AB6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 108 s / SEC	DAS 113 W/Sq. M	DAS 114 W/Sq. M	DAS 115 W/Sq. M	DAS 116 KPa	DAS 117 PERCENT	DAS 118 PERCENT	DAS 119 PERCENT	DAS 130 DEG C	DAS 131 DEG C	DAS 135 DEG C	DAS 136 DEG C
3520	20.1	753.4	290.5	67.5	240.4	0.5	0.1	0.5	66.2	59.9	871.4	104.9
3580	20.1	750.9	293.6	69.1	241.8	0.5	0.1	0.5	67.1	60.5	869.8	103.2
3640	20.0	778.8	297.1	70.1	243.2	0.5	0.1	0.5	67.8	61.1	868.1	101.5
3700	15.9	777.0	296.2	71.0	237.6	0.5	0.1	0.5	68.8	61.6	866.6	100.2
3780	15.8	761.8	308.4	73.2	245.9	0.5	0.1	0.5	69.8	62.6	864.3	97.6
3840	15.7	762.8	306.0	73.2	246.8	0.5	0.1	0.5	70.8	63.1	862.7	96.5
3900	15.6	742.3	326.4	75.3	247.8	0.5	0.1	0.4	71.6	63.7	860.9	94.8
3960	15.2	786.3	336.6	76.9	246.8	0.5	0.1	0.5	72.5	64.3	858.7	93.4
4020	14.6	768.1	339.9	77.3	245.9	0.5	0.1	0.4	73.4	65.0	856.6	91.8
4080	13.9	795.6	338.6	78.6	245.0	0.5	0.1	0.5	74.3	65.7	854.6	90.6
4140	13.1	793.7	351.0	79.4	244.1	0.5	0.1	0.4	75.2	66.1	852.7	89.4
4200	12.3	811.9	351.2	78.8	243.2	0.5	0.1	0.5	76.1	66.8	850.6	87.9
4260	11.2	776.3	357.8	80.7	242.2	0.5	0.0	0.4	77.1	67.5	848.5	87.2
4320	10.2	812.1	353.8	82.0	241.8	0.5	0.1	0.4	77.8	68.1	846.4	85.8
4380	7.5	824.7	388.9	83.6	240.4	0.4	0.0	0.4	78.8	68.7	843.7	84.5
4440	13.7	802.6	374.9	84.4	239.9	0.5	0.0	0.4	79.6	69.3	840.4	83.7
4500	4.6	839.6	380.0	85.9	239.0	0.5	0.0	0.4	80.4	69.9	837.0	82.6
4560	0.9	834.3	409.5	84.9	238.6	0.5	0.0	0.4	81.4	70.3	833.4	81.4
4640	0.7	831.9	397.5	88.1	238.6	0.4	0.0	0.4	82.6	71.3	828.6	80.1
4700	-0.1	821.2	409.0	86.4	238.1	0.4	0.0	0.4	83.4	71.7	825.2	79.4
4760	-0.1	800.0	414.8	89.2	238.1	0.4	0.0	0.4	84.3	72.2	821.5	78.5
4820	-0.1	830.3	409.2	89.8	237.6	0.4	0.0	0.4	85.2	72.9	817.7	77.5
4880	-0.1	826.3	413.4	91.1	237.2	0.4	0.0	0.4	85.9	73.4	814.0	76.7
4960	-0.1	847.8	423.9	91.8	236.3	0.4	0.0	0.4	87.1	74.3	809.1	75.7
5020	-0.1	845.4	435.2	93.5	235.8	0.4	0.0	0.4	88.0	74.7	805.4	74.9
5080	-0.1	831.7	442.9	94.2	234.9	0.4	0.0	0.3	88.7	75.4	801.7	73.9
5140	-0.1	851.0	450.7	95.0	228.0	0.4	0.0	0.4	89.6	76.0	797.8	73.3
5200	-0.1	865.0	440.7	96.5	235.3	0.4	0.0	0.3	90.6	76.4	794.1	72.5
5260	-0.1	886.2	454.7	96.5	235.8	0.4	0.0	0.3	91.2	77.1	790.3	72.0
5340	-0.1	854.5	477.5	98.1	235.8	0.4	0.0	0.3	92.4	77.7	785.4	71.0
5360	-0.1	856.8	462.4	98.7	236.3	0.4	0.0	0.3	92.6	78.1	784.1	70.8
5380	-0.1	866.4	481.0	99.6	236.3	0.3	0.0	0.3	92.9	78.1	783.1	70.6
5400	-0.1	867.8	469.9	99.6	133.8	0.4	0.0	0.3	93.2	78.4	781.6	70.2
5420	-0.1	846.4	464.2	97.8	29.0	0.3	0.0	0.3	93.6	78.6	780.4	70.1
5440	-0.1	812.4	479.9	98.5	1.8	0.3	0.0	0.3	93.8	78.8	779.2	69.9

TABLE B-8 (CONT.)

DIGITAL OUTPUT FOR CHANNELS 108 THROUGH 136 --TEST AR6
(REFER TO TABLE A-1 FOR CHANNEL DESCRIPTIONS)

TIME SECONDS	DAS 108 g / SEC	DAS 113 W/Sq. M	DAS 114 W/Sq. M	DAS 115 W/Sq. M	DAS 116 KPa	DAS 117 PERCENT	DAS 118 PERCENT	DAS 119 PERCENT	DAS 130 DEG C	DAS 131 DEG C	DAS 135 DEG C	DAS 136 DEG C
5460	-0.1	757.2	478.6	95.9	-0.5	0.4	0.0	0.3	94.1	78.9	777.9	69.7
5480	-0.1	681.7	472.6	93.7	-0.5	0.4	0.0	0.3	94.3	79.0	776.7	69.7
5500	-0.1	640.2	479.0	92.0	-0.5	0.4	0.0	0.3	94.4	79.1	775.6	69.4
5520	-0.1	597.4	458.0	90.3	-0.5	0.4	0.0	0.3	94.5	79.3	774.2	69.1
5540	-0.1	549.4	461.8	89.0	-0.9	0.4	0.0	0.4	94.7	79.4	772.9	68.8
5560	-0.1	528.2	490.1	87.2	-0.9	0.4	0.0	0.4	94.9	79.4	771.7	68.7
5580	-0.1	481.6	485.0	85.5	-0.9	0.4	0.0	0.4	95.1	79.4	770.7	68.5
5600	-0.1	460.9	482.1	84.2	-0.9	0.4	0.0	0.4	95.1	79.6	769.2	68.2
5620	-0.1	436.7	461.3	82.9	-1.4	0.4	0.0	0.5	95.2	79.6	768.1	68.1
5640	-0.1	412.2	474.2	80.1	-1.4	0.4	0.0	0.5	95.4	79.5	766.8	68.1
5660	-0.1	389.2	485.9	80.3	-1.4	0.4	0.0	0.5	95.3	79.6	765.1	67.6
5680	-0.1	373.6	474.4	79.0	-0.9	0.4	0.0	0.5	95.6	79.5	763.7	67.6
5700	-0.1	334.9	461.3	77.1	-0.9	0.4	0.0	0.5	95.7	79.5	759.1	67.3
5747	-0.1	319.8	463.3	76.4	-1.4	0.4	0.0	0.5	95.7	79.6	757.7	66.9
5760	-0.1	310.9	475.9	76.2	-1.4	0.4	0.0	0.5	95.7	79.6	756.8	66.8
5780	-0.1	300.7	468.8	73.8	-1.4	0.4	0.0	0.5	95.7	79.6	755.2	66.6
5800	-0.1	290.9	472.6	74.7	-1.4	0.4	0.0	0.5	95.8	79.4	753.6	66.6
5820	-0.1	281.1	476.6	73.8	-1.4	0.4	0.0	0.5	95.8	79.4	751.7	66.3
5840	-0.1	266.4	470.8	73.2	-1.4	0.4	0.0	0.5	95.9	79.4	749.9	66.1
5860	-0.1	260.4	460.2	72.7	-1.4	0.4	0.0	0.5	95.9	79.4	748.2	66.1
5880	-0.1	251.8	461.8	72.1	-1.4	0.4	0.0	0.5	95.8	79.4	746.6	65.8
5900	-0.1	245.5	468.8	71.7	-1.4	0.4	0.0	0.5	95.8	79.3	744.8	65.6
5920	-0.1	241.1	462.4	71.2	-1.4	0.4	0.0	0.5	95.7	79.2	743.6	65.6
5940	-0.1	235.2	453.8	70.8	-1.4	0.4	0.0	0.5	95.9	79.2	741.4	65.4
5960	-0.1	223.8	452.9	70.4	-1.4	0.4	0.0	0.5	95.7	79.2	740.2	65.3
5980	-0.1	221.0	457.1	69.9	-1.4	0.4	0.0	0.5	95.8	79.1	738.2	65.1
6000	-0.1	216.6	459.8	68.2	-1.4	0.4	0.0	0.5	95.7	79.1	736.6	64.8
6060	-0.1	200.5	475.5	68.2	-1.4	0.4	0.0	0.5	95.7	78.6	731.9	64.4
6146	-0.1	191.7	458.2	66.9	-1.8	0.4	0.0	0.5	95.7	78.4	724.6	63.8
6200	-0.1	178.6	438.7	66.0	-1.8	0.4	0.0	0.5	95.6	78.4	719.4	63.3
6260	-0.1	175.1	440.5	65.4	-1.8	0.4	0.0	0.5	95.6	78.0	715.6	62.9
6320	-0.1	166.5	453.1	64.7	-1.8	0.4	0.0	0.5	95.4	77.8	710.4	62.7
6380	-0.1	161.6	454.4	64.3	-2.3	0.4	0.0	0.5	95.3	77.6	705.6	62.2
6440	-0.1	157.0	438.5	63.9	-1.8	0.4	0.0	0.5	95.2	77.4	701.3	61.8
6500	-0.1	153.9	451.8	63.4	-2.3	0.4	0.0	0.5	95.1	77.1	697.1	61.7

A P P E N D I X C

TEMPERATURE AND PRESSURE DATA

APPENDIX C

TEMPERATURE AND PRESSURE DATA

Table C-1 presents the mean containment temperature, mean containment vessel steel temperature, containment pressure, factor for converting standard volume to volume at containment conditions, and the temperature gradients at the vertical wall and ceiling, all as a function of time from -1.67 minutes to 6940 minutes.

The method for calculating the mean temperatures is discussed in Section 4.4.1 of the main report, the method of measuring the temperature gradients near the wall and ceiling is discussed in Section 4.4.3, and the method for calculating the volume conversion factor is described in Section 4.4.5.

TABLE C-1

TEMPERATURE AND PRESSURE DATA FOR TEST AR6

TIME SECONDS	CV ATMOS AVG TEMP DEG C	CV PRESS KPa	FACTOR STD. TO ACTUAL CU. M	AVG CV STEEL TEMP DEG C	GRADIENT DEG C / CM	
					WALL	CEILING
-100	31.0	114.3	1.013	30.3	0.8	2.9
-80	31.0	114.3	1.013	30.3	0.8	2.9
-60	31.0	114.2	1.012	30.2	0.8	3.0
-40	31.0	114.2	1.012	30.3	0.9	3.0
-20	31.0	114.3	1.012	30.3	0.8	3.0
0	31.0	114.3	1.012	30.3	0.7	3.0
20	31.0	114.3	1.013	30.3	0.7	3.0
40	31.0	114.3	1.013	30.3	0.9	3.1
60	31.1	114.4	1.013	30.4	1.0	2.9
80	31.2	114.5	1.014	30.3	1.0	3.0
100	31.2	114.5	1.014	30.3	1.3	2.9
120	31.3	114.5	1.014	30.3	1.3	3.1
140	31.3	114.6	1.014	30.3	1.3	3.0
160	31.3	114.7	1.015	30.3	1.4	3.0
180	31.4	114.7	1.015	30.3	1.4	3.0
200	31.5	114.7	1.015	30.3	1.4	3.0
220	31.5	114.9	1.016	30.3	1.6	3.1
240	31.6	114.9	1.016	30.4	1.6	3.1
260	31.6	114.9	1.016	30.4	1.7	3.1
280	31.6	114.9	1.017	30.4	1.6	3.3
300	31.7	114.9	1.016	30.4	1.8	3.0
320	31.7	115.0	1.017	30.4	1.8	3.1
340	31.7	115.1	1.017	30.4	1.7	3.2
360	31.7	115.1	1.018	30.4	1.7	3.1
380	31.8	115.1	1.018	30.4	1.7	3.0
400	31.8	115.3	1.019	30.4	1.9	3.0
446	31.9	115.4	1.019	30.4	1.9	3.1
493	31.9	115.4	1.019	30.4	2.1	3.1
503	31.9	115.4	1.020	30.5	2.0	3.2
520	32.0	115.4	1.020	30.5	1.9	3.1
540	32.0	115.4	1.019	30.4	2.3	2.8
560	32.0	115.4	1.019	30.5	2.2	3.1
580	32.0	115.5	1.020	30.5	2.1	3.0
600	32.0	115.5	1.020	30.5	2.3	2.9
620	32.0	116.5	1.028	30.5	2.2	3.0

TABLE C-1
TEMPERATURE AND PRESSURE DATA FOR TEST AR6

TIME SECONDS	CV ATMOS AVG TEMP DEG C	CV PRESS KPa	FACTOR STD. TO ACTUAL CU. M	AVG CV STEEL TEMP DEG C	GRADIENT DEG C / CM	
					WALL	CEILING
640	35.5	119.8	1.046	30.7	5.4	6.5
660	42.1	122.9	1.051	31.3	14.3	10.3
680	49.6	125.3	1.046	31.8	21.3	14.1
700	55.7	126.9	1.040	32.5	27.4	16.9
720	60.7	128.1	1.034	33.1	30.8	17.1
740	64.0	128.9	1.031	33.6	34.8	20.0
760	66.9	129.6	1.027	34.1	37.1	21.7
780	69.2	130.2	1.025	34.6	37.8	21.1
800	71.3	130.6	1.022	35.0	38.4	21.0
820	72.6	130.9	1.020	35.4	40.6	22.4
840	73.9	131.2	1.019	35.8	40.7	22.1
860	74.7	131.5	1.019	36.0	41.3	22.3
880	75.8	131.6	1.017	36.4	40.4	21.5
900	76.5	131.9	1.017	36.7	40.3	21.3
920	77.1	132.1	1.017	37.0	40.1	20.8
940	77.7	132.2	1.015	37.1	40.8	20.6
960	78.0	132.4	1.016	37.3	41.6	22.6
980	78.7	132.8	1.017	37.5	42.7	21.9
1000	79.5	133.1	1.018	37.8	41.6	21.0
1020	80.0	133.3	1.017	37.9	41.9	21.3
1040	80.6	133.6	1.018	38.1	41.1	21.2
1060	81.4	133.9	1.018	38.4	41.4	21.3
1080	82.0	134.2	1.019	38.5	42.9	21.1
1100	83.0	134.5	1.018	38.8	42.6	21.6
1120	83.8	134.8	1.018	39.1	42.9	22.4
1140	84.3	135.1	1.018	39.3	43.9	23.0
1160	85.2	135.3	1.018	39.5	43.3	23.6
1180	85.9	135.6	1.018	39.7	43.1	24.7
1200	86.8	136.2	1.020	40.0	42.6	25.6
1245	88.4	136.5	1.017	40.3	42.7	25.7
1260	88.8	136.6	1.017	40.4	43.1	26.1
1280	89.3	136.9	1.018	40.4	43.2	25.3
1300	90.0	137.1	1.018	40.6	42.6	26.0
1320	90.5	137.3	1.018	40.7	42.4	26.6
1340	91.0	137.8	1.020	40.8	43.3	26.3

TABLE C-1

TEMPERATURE AND PRESSURE DATA FOR TEST AB6

TIME SECONDS	CV ATMOS AVG TEMP DEG C	CV PRESS KPa	FACTOR STD. TO ACTUAL CU. M	AVG CV STEEL TEMP DEG C	GRADIENT DEG C / CM	
					WALL	CEILING
1360	91.8	138.2	1.021	41.0	43.3	26.0
1380	92.6	138.6	1.021	41.1	42.4	27.2
1440	94.3	139.1	1.021	41.6	42.6	27.7
1500	95.1	139.1	1.018	42.0	41.8	26.6
1560	96.3	140.4	1.024	42.5	41.7	28.9
1620	98.6	141.5	1.026	43.1	42.6	29.9
1700	100.7	142.4	1.026	43.8	43.8	29.8
1760	102.3	143.0	1.027	44.3	43.9	29.9
1820	104.0	144.0	1.029	44.9	44.4	29.4
1880	106.1	144.7	1.029	45.5	45.1	30.1
1940	108.1	145.6	1.029	46.1	45.7	29.9
2000	110.0	146.5	1.031	46.7	45.6	30.5
2060	111.6	147.3	1.032	47.3	46.2	30.9
2120	112.5	148.2	1.036	47.9	45.0	30.0
2180	114.6	149.1	1.036	48.6	44.0	30.3
2260	116.9	150.4	1.039	49.3	45.4	31.7
2320	119.3	151.3	1.039	49.9	44.7	30.2
2380	121.3	152.2	1.040	50.5	44.8	29.9
2440	123.5	153.3	1.042	51.2	44.4	32.0
2500	124.3	154.1	1.045	51.8	45.7	29.9
2560	126.3	154.7	1.044	52.4	46.8	28.0
2620	127.0	155.3	1.046	53.1	47.2	27.8
2680	129.1	156.0	1.046	53.7	48.1	27.9
2740	131.0	156.9	1.047	54.3	48.6	27.2
2800	131.8	157.7	1.050	54.9	49.1	26.9
2880	132.6	158.6	1.054	55.8	49.4	26.5
2940	133.3	159.0	1.055	56.3	50.3	25.7
3000	134.2	159.3	1.055	56.7	50.2	30.1
3060	135.0	159.9	1.056	57.3	51.4	26.7
3120	136.8	160.6	1.056	57.9	52.3	31.5
3180	137.9	161.1	1.056	58.4	52.2	29.4
3240	138.7	161.6	1.058	59.0	51.5	28.9
3340	140.4	162.4	1.058	59.9	51.1	26.9
3400	141.1	162.7	1.059	60.4	48.4	30.2
3460	143.1	163.1	1.056	60.9	48.4	28.6

TABLE C-1
TEMPERATURE AND PRESSURE DATA FOR TEST AB6

TIME SECONDS	CV ATMOS AVG TEMP DEG C	CV PRESS KPa	FACTOR STD. TO ACTUAL CU. M	AVG CV STEEL TEMP DEG C	GRADIENT DEG C / CM	
					WALL	CEILING
3520	144.8	164.2	1.059	61.5	48.3	31.5
3580	145.7	164.9	1.061	62.1	49.6	29.4
3640	146.5	165.5	1.063	62.7	51.2	30.7
3700	147.5	166.2	1.065	63.3	52.6	29.2
3780	148.4	166.4	1.064	64.1	52.7	27.1
3840	149.1	166.8	1.065	64.6	52.6	29.8
3900	150.0	167.1	1.064	65.2	53.1	26.5
3960	150.7	167.4	1.065	65.9	54.2	31.5
4020	151.7	167.5	1.063	66.4	54.1	30.4
4080	152.2	167.7	1.063	67.0	54.3	30.0
4140	152.6	168.0	1.064	67.5	54.9	28.8
4200	152.9	168.1	1.064	67.9	54.7	27.7
4260	154.6	168.2	1.060	68.5	54.7	28.4
4320	156.3	168.1	1.055	69.2	54.5	25.5
4380	156.8	168.3	1.055	69.7	55.2	25.6
4440	156.6	168.4	1.057	70.2	55.2	27.2
4500	157.9	168.5	1.054	70.8	54.7	23.8
4560	158.1	168.5	1.053	71.3	53.9	26.0
4640	158.0	168.4	1.053	72.0	53.3	23.7
4700	158.7	168.4	1.051	72.5	52.7	22.3
4760	159.2	168.3	1.049	73.0	53.1	22.4
4820	159.7	168.3	1.048	73.6	52.8	23.0
4880	160.5	168.4	1.047	74.1	52.6	24.9
4960	161.2	168.7	1.047	74.8	53.2	25.0
5020	162.2	168.9	1.045	75.4	52.7	27.4
5080	163.1	169.2	1.045	76.0	53.6	28.0
5140	163.7	169.4	1.045	76.5	53.3	25.9
5200	164.3	169.5	1.044	76.9	54.1	23.7
5260	164.8	169.5	1.043	77.4	53.8	23.7
5340	164.9	169.4	1.043	78.2	53.7	25.6
5360	164.9	169.5	1.043	78.4	53.7	23.3
5380	165.0	169.4	1.042	78.5	54.1	23.6
5400	165.1	169.5	1.042	78.7	54.0	23.0
5420	165.0	168.2	1.035	78.9	53.6	23.7
5440	163.8	165.9	1.023	78.9	52.8	23.6

TABLE C-1
TEMPERATURE AND PRESSURE DATA FOR TEST AR6

TIME SECONDS	CV ATMOS AVG TEMP DEG C	CV PRESS KPa	FACTOR STD. TO ACTUAL CU. M	AVG CV STEEL TEMP DEG C	GRADIENT DEG C / CM	
					WALL	CEILING
5460	160.6	163.4	1.016	78.7	51.1	22.1
5480	157.7	161.2	1.009	78.6	49.2	19.7
5500	153.9	159.3	1.005	78.4	47.1	18.4
5520	150.0	157.5	1.003	78.2	44.6	17.0
5540	146.3	155.9	1.002	78.0	42.5	16.6
5560	142.7	154.6	1.002	77.8	40.4	15.7
5580	139.4	153.3	1.002	77.6	38.1	14.7
5600	136.2	152.2	1.003	77.4	35.6	14.0
5620	133.3	151.2	1.003	77.3	33.9	13.4
5640	130.5	150.2	1.003	77.1	32.1	12.4
5660	127.4	149.3	1.005	77.0	30.0	11.7
5680	125.7	148.6	1.004	76.9	28.4	11.2
5700	122.9	146.8	0.999	76.7	25.0	10.7
5747	118.9	146.3	1.006	76.6	23.3	10.0
5760	117.8	146.0	1.006	76.5	22.2	9.9
5780	116.2	145.5	1.007	76.4	21.1	9.6
5800	114.7	144.9	1.007	76.4	20.0	9.3
5820	113.4	144.5	1.008	76.3	18.9	9.8
5840	112.1	144.0	1.007	76.2	18.0	9.7
5860	110.8	143.6	1.008	76.1	17.2	9.4
5880	109.8	143.3	1.009	76.1	16.1	9.1
5900	108.8	142.9	1.009	76.1	15.6	9.1
5920	107.8	142.6	1.009	76.0	14.9	9.0
5940	106.9	142.3	1.009	76.0	14.1	8.9
5960	106.1	142.0	1.009	76.0	13.4	8.7
5980	105.2	141.7	1.009	76.0	12.9	8.6
6000	104.5	141.4	1.009	75.9	12.4	8.4
6060	102.5	140.8	1.010	75.8	11.0	8.2
6146	100.2	140.0	1.011	75.8	9.7	7.8
6200	99.0	139.7	1.012	75.7	9.1	7.8
6260	97.8	139.2	1.012	75.6	8.2	7.5
6320	96.8	138.9	1.012	75.6	7.7	7.5
6380	95.8	138.6	1.012	75.6	7.2	7.3
6440	95.0	138.2	1.012	75.5	6.7	7.1
6500	94.2	138.1	1.013	75.5	6.3	7.1

TABLE C-1
TEMPERATURE AND PRESSURE DATA FOR TEST AB6

TIME SECONDS	CV ATMOS AVG TEMP DEG C	CV PRESS KPa	FACTOR STD. TO ACTUAL CU. M	AVG CV STEEL TEMP DEG C	GRADIENT DEG C / CM	
					WALL	CEILING
6720	92.0	137.1	1.012	75.3	5.5	7.0
7080	89.7	136.4	1.013	75.2	4.4	6.8
7440	88.1	135.8	1.014	74.9	3.8	6.9
7800	86.9	135.3	1.013	74.7	3.7	6.9
8160	85.9	134.9	1.013	74.5	3.6	6.8
8520	85.1	134.5	1.012	74.3	3.2	6.9
8880	84.4	134.4	1.013	74.1	3.1	6.9
9240	83.7	134.1	1.013	73.8	3.2	6.9
9600	83.1	133.9	1.013	73.5	3.0	6.9
9960	82.6	133.7	1.013	73.3	3.0	6.7
10320	82.1	133.5	1.013	73.1	2.8	6.8
10680	81.6	133.4	1.014	72.8	2.7	6.7
11040	81.1	133.1	1.013	72.6	2.8	6.8
11400	80.7	133.1	1.014	72.3	2.6	6.8
11760	80.2	132.8	1.013	72.1	2.7	6.6
12120	79.8	132.7	1.013	71.8	2.6	6.5
12480	79.4	132.5	1.013	71.6	2.5	6.6
12840	79.0	132.4	1.013	71.3	2.6	6.4
13200	78.6	132.2	1.013	71.1	2.5	6.4
13560	78.3	132.1	1.013	70.8	2.4	6.4
13920	77.9	131.9	1.013	70.6	2.6	6.3
14280	77.5	131.8	1.013	70.4	2.4	6.2
14700	77.8	131.6	1.010	70.1	2.6	6.2
15600	76.3	131.1	1.012	69.5	2.6	6.3
16500	75.5	130.8	1.011	69.0	2.6	6.1
18067	74.2	130.3	1.011	68.0	2.5	5.8
19867	72.7	129.6	1.010	66.9	2.4	5.6
21667	71.3	128.9	1.008	65.9	2.2	5.3
23467	69.9	128.2	1.007	64.9	2.2	5.1
25267	68.6	127.6	1.007	63.9	2.2	5.1
27067	67.5	127.1	1.006	62.9	2.1	5.1
28867	66.7	126.7	1.005	62.1	2.2	5.3
30667	65.6	126.0	1.003	61.3	2.2	5.0
32467	64.7	125.6	1.002	60.5	2.2	4.4
34267	63.7	125.1	1.001	59.7	2.1	4.6

TABLE C-1
TEMPERATURE AND PRESSURE DATA FOR TEST AB6

TIME SECONDS	CV ATMOS AVG TEMP DEG C	CV PRESS KPa	FACTOR STD. TO ACTUAL CU. M	AVG CV STEEL TEMP DEG C	GRADIENT DEG C / CM	
					WALL	CEILING
36067	62.8	124.7	1.001	58.9	1.9	4.3
39667	61.0	124.2	1.001	57.5	1.9	4.3
43267	59.4	123.6	1.002	56.1	1.8	3.9
46867	57.8	122.6	0.998	54.7	1.7	4.6
50467	56.4	121.9	0.997	53.4	1.9	4.6
54067	55.0	120.9	0.993	52.3	1.7	4.6
57667	53.8	120.2	0.991	51.2	1.6	4.8
61867	52.4	119.1	0.987	50.0	1.6	4.7
65467	51.2	118.3	0.983	49.1	1.4	4.8
69067	50.2	117.7	0.981	48.2	1.5	4.9
74220	48.8	116.0	0.971	46.9	1.4	5.1
93600	44.6	112.9	0.958	43.3	1.1	3.9
100800	43.5	112.0	0.954	42.3	1.1	3.5
108000	42.4	110.9	0.947	41.4	0.9	3.0
115200	41.6	110.3	0.945	40.7	0.8	2.7
122400	40.9	110.0	0.944	40.0	0.8	2.7
129600	40.3	110.1	0.947	39.3	0.7	3.4
136800	39.6	109.7	0.945	38.7	0.7	3.6
144000	39.0	109.6	0.946	38.0	0.8	3.6
151200	38.4	109.3	0.945	37.5	0.8	3.6
158400	37.8	109.0	0.945	37.0	0.7	3.7
168959	37.0	108.3	0.941	36.3	0.6	3.4
177059	36.5	106.8	0.929	35.8	0.7	3.6
184259	36.2	105.7	0.921	35.5	0.6	3.4
264359	34.0	100.9	0.886	33.4	0.6	3.2
278759	33.3	113.4	0.998	33.1	0.2	2.7
294059	32.3	109.6	0.967	32.3	0.1	2.3
311159	31.4	106.5	0.942	31.4	0.1	3.1
322859	30.9	104.0	0.922	31.0	0.0	3.2
339059	30.2	100.9	0.897	30.4	0.1	3.3
357959	29.9	99.8	0.887	30.1	0.1	2.2
372359	29.8	99.8	0.888	29.9	0.1	2.1
385859	29.6	99.8	0.889	29.8	0.0	3.1
399359	29.4	99.6	0.887	29.4	0.2	3.6
416459	29.1	99.2	0.885	29.1	0.0	3.6

TABLE A-1 (Cont'd)

<u>DAS No.</u>	<u>Recorder & Point</u>	<u>Measurement</u>	<u>Output</u>	<u>Description and Location</u>
105	8-red	CV pressure	psia	Absolute pressure, 600 mV = 60 psia
106	8-blue	Na tank wt.	lb	Load cell on TK-3, 600 mV = 6000 lb
107	4-red	Na flowrate	mV	Spray line, 1 mV = 63 g/s
108	4-blue	O ₂ flowrate	mV	Oxygen line to CV
109	9-red	Pressure drop	psi	Tk-3 to CV atmos, 10 V = 200 psi
110	9-green			Spare
111	10-red			Spare
112	10-green			Spare
113	20-1	Heat flux	mV	HM-1, inside CV steel, +0.46 m elev, 254°
114	--	Heat flux	mV	HM-2, outside CV steel, +0.46 m elev, 254°
115	20-3	Heat flux	mV	HM-3, outside of insulation, +0.46 m elev, 266°
116	--	Na nozzle ΔP	mV	ΔP across Na spray nozzle
117	20-5	H ₂ conc	%	G-5
118	--	H ₂ conc	%	G-3
119	--	H ₂ conc	%	G-4
120	--		v	Dial-A-Volt, set at 1.0
130	--	CV wall temp	°F	At HM-3
131	--	CV wall temp	°F	At HM-2 (no insulation)
135	--	NaI liquid	°F	NaI vaporizer
136	--	NaI gas temp	°F	Nucleator gas outlet

A P P E N D I X D

CASCADE IMPACTOR DATA

APPENDIX D

CASCADE IMPACTOR DATA

Data for individual cascade impactor measurements and the calculational procedures used to extract size data from the stage deposits are presented in this appendix. The collection characteristics of each impactor stage were assumed to be controlled by the dimensionless impaction parameter:

$$\Psi = \frac{\rho u d^2 C}{18 \mu D} \quad (D-1)$$

where:

- Ψ = Impaction parameter (dimensionless)
- u = Gas velocity (cm/s)
- ρ = Particle density (g/cm³)
- d = Particle diameter (cm)
- μ = Gas viscosity (g/cm*s)
- D = Impactor jet diameter (cm)
- C = Cunningham slip factor (dimensionless)

At the point of the impaction curve where 50% of the particles are collected, the impaction parameter Ψ takes the value Ψ_{50} . The 50% size is:

$$d_{50} = \left(\frac{18 \mu D \Psi_{50}}{u C} \right)^{0.5} \quad (D-2)$$

where:

- d_{50} = Particle diameter at the 50% point on efficiency vs size curve
- Ψ_{50} = Impaction parameter for the jet at the 50% efficiency point

Equation D-2 was used to determine d_{50} values at flow conditions different from those to calibrate the impactor; it can also be used to relate the d_{50} to the value under calibration conditions. If C is assumed to be constant, then d_{50} can be expressed as:

$$d_{50} = (d_{50})_{\text{ref}} \left(\frac{\mu}{\mu_{\text{ref}}} \times \frac{Q_{\text{ref}}}{Q} \right)^{0.5} \quad (\text{D-3})$$

where:

d_{50} = Aerodynamic diameter at sampling conditions

μ = Viscosity of gas at sampling conditions

Q = Gas flow rate at sampling conditions

ref = Subscript indicating value of parameter under calibration or reference conditions

Cascade impactors of two designs (Andersen Mark III circular jet impactor* and Sierra rectangular jet impactor**) were used for particle size analysis. Stage cut-size diameters used to interpret data obtained from the circular jet impactor are recommended by the manufacturer^(D-1) and listed in Table D-1. These values are in good agreement with calibrations reported by Cushing et al.^(D-2)

Stage cut-off diameters for the rectangular jet impactor are listed in Table D-2, and the data were obtained from the work of Cushing et al.^(D-2) Cut diameters listed in Tables D-1 and D-2 were adjusted for sampling conditions using Equation D-3.

Particle size distributions were constructed from cascade impactor data using the cut-off diameter approach described by Mercer.^(D-3) Table D-3 presents an example of the calculation method.

*Manufactured by Andersen 2000, Inc., Atlanta, Ga.

**Model 226, Stack Sampler, Manufactured by Sierra Instrument Co., Inc., Carmel Valley, CA.

TABLE D-1

STAGE CUT DIAMETERS FOR CIRCULAR JET
IMPACTOR USED IN AIR CLEANING TESTS

<u>Stage No.</u>	<u>d₅₀* (μm)</u>
0	13.2
1	8.3
2	5.64
3	3.8
4	2.45
5	1.25
6	0.77
7	0.52

*Size of unit density spheres removed with 50% efficiency at 21°C, 1 atm pressure, and 0.50-ACFM flow rate.

TABLE D-2

STAGE CUT DIAMETERS FOR RECTANGULAR JET
IMPACTOR USED IN AIR CLEANING TESTS

<u>Stage No.</u>	<u>d₅₀* (μm)</u>
1	18.0
2	11.0
3	4.4
4	2.65
5	1.70
6	0.95

*Size of unit density spheres removed with 50% efficiency at 28°C, 29.5 Hg pressure, and 0.25-ACFM flow rate.

The stage accumulations of sodium were obtained by washing each stage collection paper with water and analyzing the water by flame emission spectrometry. Losses to the interstage impactor walls were ignored. The inlet walls were washed and analyzed for sodium, and the recovered sodium was assumed to be associated with aerosol particles larger than the first-stage cut-off diameter.

The particle size distribution was obtained by plotting the two right-hand columns in Table D-3 on log-probability paper as shown in Figure 20. The aerodynamic mass median diameter and geometric standard deviation can be obtained from the line drawn through the data points. The geometric standard deviation was obtained from:

$$\sigma_g = \frac{\text{Particle Diameter at 84.13\%}}{\text{Particle Diameter at 50\%}} \quad (\text{D-4})$$

Mass distributions of sodium found on the cascade impactor stages are presented in Tables D-4 through D-31 for Test AB6. The data of Tables D-4 through D-31 are plotted on log-probability paper in Figures D-1 through D-25.

REFERENCES FOR APPENDIX D

- D-1 Operating Manual for Andersen 2000, Inc., Mark II and Mark III Particle Size Samplers, TR 76-900023, Andersen 2000 Inc., Atlanta, GA, January 1976.
- D-2 K. M. Cushing et al., Particle Sizing Techniques for Control Device Evaluation: Cascade Impactor Calibrations, EPA-600/2-76-280, Southern Research Institute, Birmingham, AL, October 1976.
- D-3 T. T. Mercer, "The Interpretation of Cascade Impactor Data," Industrial Hygiene Journal 26, pp. 236-241, 1965.

TABLE D-3
EXAMPLE TREATMENT OF CASCADE IMPACTOR DATA

Stage Number (a)	Na Mass (mg) (b)	Mass Fraction	Cumulative Fraction	Fraction Less Than Cut Size	d ₅₀ (μ m)
-----	-----	-----	-----	-----	-----
1	1.09	0.105	0.105	0.895	13.39
2	1.19	0.115	0.220	0.780	8.42
3	1.39	0.134	0.354	0.646	5.72
4	0.79	0.076	0.430	0.570	3.85
5	1.59	0.153	0.584	0.416	2.48
6	2.49	0.240	0.824	0.176	1.27
7	1.59	0.153	0.977	0.023	0.78
8	0.22	0.021	0.998	0.002	0.53
9 (filter)	0.02	0.002			
TOTAL	<u>10.36</u>	<u>1.000</u>			

(a) Sample No. AB6-T1-I3, taken at time 75900 s, Andersen Mark III, flowrate 14.0 std l/s.

(b) Net mass after correction for background on stage collection papers.

TABLE D-4 NaOx

TEST: AB-6 T1-I2 TIME = 790 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 34 DEG F 140.80 ROTOMETER RDG., SCFM 0.25
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 17.75
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 80.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	1.50	1.35	0.053	0.947	16.448
2	2.30	2.15	0.084	0.863	10.051
3	3.20	3.05	0.120	0.743	4.021
4	4.00	3.85	0.151	0.593	2.421
5	5.90	5.75	0.225	0.367	1.553
6	4.20	4.05	0.159	0.208	0.868
BU	5.80	5.31	0.208		
TOTAL		25.50	1.00		

TABLE D-5 NaOx

TEST: AB-6 T1-I3 TIME = 1265 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 34 DEG F 121.30 ROTOMETER RDG., SCFM 0.50
 FIRST BACKGROUND 0.01 CV PRESSURE, PSIA 16.79
 SECOND BACKGROUND 0.01 SAMPLE DURATION, MIN. 100.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	1.10	1.09	0.105	0.895	13.387
2	1.20	1.19	0.115	0.780	8.418
3	1.40	1.39	0.134	0.646	5.720
4	0.80	0.79	0.076	0.570	3.854
5	1.60	1.59	0.153	0.416	2.485
6	2.50	2.49	0.240	0.176	1.268
7	1.60	1.59	0.153	0.023	0.781
8	0.23	0.22	0.021	0.002	0.527
BU	0.03	0.02	0.002		
TOTAL		10.36	1.00		

TABLE D-6 NaOx

TEST: AB-6 T3-I4 TIME = 14.25 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 183.30 ROTOMETER RDG., SCFM 0.20
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 19.07
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 0.50

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.39	0.24	0.010	0.990	19.576
2	0.57	0.42	0.017	0.973	11.963
3	1.18	1.03	0.043	0.930	4.785
4	15.70	15.55	0.647	0.284	2.882
5	4.30	4.15	0.172	0.111	1.849
6	1.86	1.71	0.071	0.040	1.033
BU	1.45	0.96	0.040		
TOTAL		24.05	1.00		

TABLE D-7 NaOx

TEST: AB-6 T3-I5 TIME = 19.17 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 198.30 ROTOMETER RDG., SCFM 0.20
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 19.59
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 0.33

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.93	0.78	0.035	0.965	19.806
2	2.96	2.81	0.127	0.838	12.104
3	8.60	8.45	0.383	0.455	4.841
4	4.50	4.35	0.197	0.257	2.916
5	3.36	3.21	0.145	0.112	1.871
6	1.51	1.36	0.062	0.051	1.045
BU	1.60	1.11	0.051		
TOTAL		22.06	1.00		

TABLE D-8 NaOx

TEST: AB-6 T3-I6 TIME = 29.13 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 225.10 ROTOMETER RDG., SCFM 0.20
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 20.72
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 0.25

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	1.47	1.32	0.072	0.928	20.306
2	3.08	2.93	0.159	0.769	12.409
3	4.80	4.65	0.253	0.516	4.964
4	4.30	4.15	0.226	0.291	2.990
5	3.88	3.73	0.203	0.088	1.918
6	1.21	1.06	0.057	0.031	1.072
BU	1.05	0.56	0.031		
TOTAL		18.39	1.00		

TABLE D-9 NaOx

TEST: AB-6 T3-I7 TIME = 54.67 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 312.40 ROTOMETER RDG., SCFM 0.20
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 23.50
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 0.33

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	1.47	1.32	0.080	0.920	21.417
2	2.03	1.88	0.114	0.805	13.088
3	4.22	4.07	0.248	0.557	5.235
4	4.77	4.62	0.281	0.276	3.153
5	3.39	3.24	0.197	0.079	2.023
6	1.13	0.98	0.060	0.019	1.130
BU	0.80	0.31	0.019		
TOTAL		16.41	1.00		

TABLE D-10 NaOx

TEST: AB-6 T3-18 TIME = 72.25 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 361.50 ROTOMETER RDG., SCFM 0.10
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 24.38
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 0.50

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	1.04	0.89	0.050	0.950	30.692
2	1.26	1.11	0.062	0.888	18.756
3	3.21	3.06	0.172	0.716	7.502
4	6.20	6.05	0.340	0.376	4.519
5	3.91	3.76	0.211	0.165	2.899
6	1.82	1.67	0.094	0.071	1.620
BU	1.75	1.26	0.071		
TOTAL		17.79	1.00		

TABLE D-11 NaOx

TEST: AB-6 T3-19 TIME = 88.08 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 70 DEG F 382.50 ROTOMETER RDG., SCFM 0.25
 FIRST BACKGROUND 0.01 CV PRESSURE, PSIA 24.59
 SECOND BACKGROUND 0.01 SAMPLE DURATION, MIN. 0.17

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	1.82	1.81	0.099	0.901	20.657
2	1.87	1.86	0.101	0.800	12.989
3	3.16	3.15	0.172	0.629	8.826
4	2.15	2.14	0.117	0.512	5.947
5	5.10	5.09	0.277	0.235	3.834
6	3.22	3.21	0.175	0.060	1.956
7	0.67	0.66	0.036	0.024	1.205
8	0.36	0.35	0.019	0.005	0.814
BU	0.11	0.10	0.005		
TOTAL		18.36	1.00		

TABLE D-12 NaOx

TEST: AB-6 T3-I10 TIME = 92.08 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 70 DEG F 337.20 ROTOMETER RDG., SCFM 0.25
 FIRST BACKGROUND 0.01 CV PRESSURE, PSIA 22.84
 SECOND BACKGROUND 0.01 SAMPLE DURATION, MIN. 0.17

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	1.27	1.26	0.099	0.901	20.002
2	0.78	0.77	0.061	0.840	12.577
3	1.53	1.52	0.120	0.720	8.546
4	2.20	2.19	0.173	0.548	5.758
5	3.47	3.46	0.273	0.275	3.713
6	2.55	2.54	0.200	0.074	1.894
7	0.60	0.59	0.046	0.028	1.167
8	0.27	0.26	0.020	0.008	0.788
BU	0.11	0.10	0.008		
TOTAL		12.68	1.00		

TABLE D-13 NaOx

TEST: AB-6 T3-I11 TIME = 96.33 MINUTES 9S SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 256.00 ROTOMETER RDG., SCFM 0.15
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 21.10
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 0.66

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.80	0.65	0.059	0.941	23.579
2	1.09	0.94	0.085	0.857	14.409
3	2.93	2.78	0.251	0.605	5.764
4	3.39	3.24	0.293	0.312	3.471
5	1.65	1.50	0.135	0.177	2.227
6	1.29	1.14	0.103	0.074	1.244
7	0.51	0.36	0.032	0.042	0.694
8	0.36	0.21	0.019	0.023	0.393
BU	0.74	0.25	0.023		
TOTAL		11.05	1.00		

TABLE D-14 NaOx

TEST: AB-6 T3-I12 TIME = 109.5 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 203.70 ROTOMETER RDG., SCFM 0.20
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 19.98
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 1.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	1.31	1.16	0.103	0.897	19.989
2	1.89	1.74	0.154	0.744	12.216
3	3.49	3.34	0.296	0.448	4.886
4	2.99	2.84	0.251	0.197	2.943
5	1.57	1.42	0.126	0.071	1.888
6	0.70	0.55	0.048	0.023	1.055
BU	0.74	0.25	0.023		
TOTAL		11.29	1.00		

TABLE D-15 NaOx

TEST: AB-6 T3-I13 TIME = 209 MINUTES 9S SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 175.60 ROTOMETER RDG., SCFM 0.25
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 19.22
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 6.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.76	0.61	0.046	0.954	17.895
2	1.83	1.68	0.127	0.828	10.936
3	3.50	3.35	0.253	0.575	4.374
4	4.01	3.86	0.291	0.284	2.635
5	2.43	2.28	0.172	0.112	1.690
6	0.97	0.82	0.062	0.050	0.944
7	0.44	0.29	0.022	0.029	0.527
8	0.34	0.19	0.014	0.015	0.298
BU	0.68	0.19	0.015		
TOTAL		13.25	1.00		

TABLE D-16 NaOx

TEST: AB-6 T3-I14 TIME = 267 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 168.70 ROTOMETER RDG., SCFM 0.25
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 19.02
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 12.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	1.20	1.05	0.052	0.948	17.816
2	1.83	1.68	0.084	0.864	10.888
3	2.66	2.51	0.125	0.739	4.355
4	3.13	2.98	0.148	0.591	2.623
5	4.75	4.60	0.229	0.362	1.683
6	5.30	5.15	0.257	0.105	0.940
BU	2.60	2.11	0.105		
TOTAL		20.07	1.00		

TABLE D-17 NaOx

TEST: AB-6 T3-I15 TIME = 344 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 70 DEG F 160.80 ROTOMETER RDG., SCFM 0.50
 FIRST BACKGROUND 0.01 CV PRESSURE, PSIA 18.73
 SECOND BACKGROUND 0.01 SAMPLE DURATION, MIN. 10.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	1.49	1.48	0.079	0.921	14.071
2	2.69	2.68	0.144	0.777	8.848
3	2.79	2.78	0.149	0.627	6.012
4	2.91	2.90	0.156	0.472	4.051
5	3.21	3.20	0.172	0.300	2.612
6	3.64	3.63	0.195	0.105	1.333
7	1.77	1.76	0.095	0.010	0.821
8	0.20	0.19	0.010	0.000	0.554
BU	0.01	0.00	0.000		
TOTAL		18.61	1.00		

TABLE D-18 NaOx

TEST: AB-6 T3-I16 TIME = 450 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 70 DEG F 151.80 ROTOMETER RDG., SCFM 0.50
 FIRST BACKGROUND 0.01 CV PRESSURE, PSIA 18.44
 SECOND BACKGROUND 0.01 SAMPLE DURATION, MIN. 20.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	2.14	2.13	0.085	0.915	13.977
2	3.65	3.64	0.145	0.770	8.789
3	3.81	3.80	0.152	0.618	5.972
4	3.41	3.40	0.136	0.483	4.024
5	4.14	4.13	0.165	0.318	2.594
6	5.00	4.99	0.199	0.119	1.324
7	2.74	2.73	0.109	0.010	0.815
8	0.26	0.25	0.010	0.000	0.551
BU	0.01	0.00	0.000		
TOTAL		25.06	1.00		

TABLE D-19 NaOx

TEST: AB-6 T3-I17 TIME = 1045 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 70 DEG F 124.00 ROTOMETER RDG., SCFM 0.50
 FIRST BACKGROUND 0.01 CV PRESSURE, PSIA 17.25
 SECOND BACKGROUND 0.01 SAMPLE DURATION, MIN. 100.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.36	0.35	0.032	0.968	13.565
2	0.51	0.50	0.045	0.923	8.530
3	1.71	1.70	0.154	0.768	5.796
4	2.25	2.24	0.204	0.565	3.905
5	2.97	2.96	0.269	0.296	2.518
6	2.75	2.74	0.249	0.047	1.285
7	0.17	0.16	0.014	0.032	0.791
8	0.04	0.03	0.003	0.030	0.534
BU	0.34	0.33	0.030		
TOTAL		11.00	1.00		

TABLE D-20 NaOx

TEST: AB-6 T3-I18 TIME = 1525 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 70 DEG F 111.20 ROTOMETER RDG., SCFM 0.50
 FIRST BACKGROUND 0.01 CV PRESSURE, PSIA 16.45
 SECOND BACKGROUND 0.01 SAMPLE DURATION, MIN. 150.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.09	0.08	0.009	0.991	13.268
2	0.09	0.08	0.009	0.982	8.343
3	0.31	0.30	0.035	0.947	5.669
4	0.72	0.71	0.083	0.864	3.820
5	2.07	2.06	0.240	0.624	2.463
6	1.73	1.72	0.201	0.423	1.256
7	3.44	3.43	0.400	0.023	0.774
8	0.10	0.09	0.010	0.012	0.523
BU	0.12	0.11	0.012		
TOTAL		8.57	1.00		

TABLE D-21 NaOx

TEST: AB-6 T3-I19 TIME = 1687.5 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 70 DEG F 108.90 ROTOMETER RDG., SCFM 0.50
 FIRST BACKGROUND 0.01 CV PRESSURE, PSIA 16.25
 SECOND BACKGROUND 0.01 SAMPLE DURATION, MIN. 165.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.02	0.01	0.002	0.998	13.191
2	0.02	0.01	0.002	0.996	8.294
3	0.11	0.10	0.022	0.974	5.636
4	0.23	0.22	0.049	0.925	3.797
5	1.05	1.04	0.232	0.693	2.448
6	1.92	1.91	0.426	0.267	1.249
7	1.09	1.08	0.241	0.026	0.769
8	0.10	0.09	0.020	0.006	0.520
BU	0.04	0.03	0.006		
TOTAL		4.48	1.00		

TABLE D-22 NaOx

TEST: AB-6 T3-I20 TIME = 2983 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 70 DEG F 96.70 ROTOMETER RDG., SCFM 0.50
 FIRST BACKGROUND 0.01 CV PRESSURE, PSIA 15.44
 SECOND BACKGROUND 0.01 SAMPLE DURATION, MIN. 460.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.02	0.01	0.005	0.995	12.878
2	0.02	0.01	0.005	0.990	8.097
3	0.02	0.01	0.005	0.984	5.502
4	0.03	0.02	0.011	0.973	3.707
5	0.12	0.11	0.063	0.910	2.390
6	0.67	0.66	0.381	0.529	1.219
7	0.39	0.38	0.219	0.310	0.751
8	0.31	0.30	0.173	0.137	0.507
BU	0.25	0.24	0.137		
TOTAL		1.73	1.00		

TABLE D-23 NaOx

TEST: AB-6 T4-I1 TIME = 580 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 77 DEG F 125.20 ROTOMETER RDG., SCFM 0.25
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 18.12
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 40.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.50	0.35	0.033	0.967	17.482
2	0.88	0.73	0.068	0.899	10.684
3	2.83	2.68	0.251	0.648	4.273
4	3.32	3.17	0.297	0.351	2.574
5	2.73	2.58	0.242	0.109	1.651
6	0.79	0.64	0.060	0.049	0.923
BU	1.01	0.52	0.049		
TOTAL		10.66	1.00		

TABLE D-24 NaOx

TEST: AB-6 T4-12 TIME = 790 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 77 DEG F 120.50 ROTOMETER RDG., SCFM 0.25
 FIRST BACKGROUND 0.15 CV PRESSURE, PSIA 17.75
 SECOND BACKGROUND 0.49 SAMPLE DURATION, MIN. 80.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.54	0.39	0.031	0.969	17.166
2	0.66	0.51	0.041	0.928	10.490
3	2.85	2.70	0.216	0.712	4.196
4	3.57	3.42	0.274	0.438	2.527
5	3.26	3.11	0.249	0.189	1.621
6	0.90	0.75	0.060	0.129	0.906
BU	2.10	1.61	0.129		
TOTAL		12.48	1.00		

TABLE D-25 NaOx

TEST: AB-6 T4-13 TIME = 1265 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 77 DEG F 110.40 ROTOMETER RDG., SCFM 0.50
 FIRST BACKGROUND 0.01 CV PRESSURE, PSIA 16.79
 SECOND BACKGROUND 0.01 SAMPLE DURATION, MIN. 100.00

STAGE NUMBER	LAB MG NaOx	NET MG NaOx	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.06	0.05	0.006	0.994	13.406
2	0.11	0.10	0.012	0.983	8.429
3	0.47	0.46	0.054	0.929	5.728
4	1.62	1.61	0.189	0.739	3.859
5	2.98	2.97	0.349	0.390	2.488
6	2.49	2.48	0.292	0.098	1.269
7	0.45	0.44	0.052	0.046	0.782
8	0.20	0.19	0.022	0.024	0.528
BU	0.22	0.21	0.024		
TOTAL		8.50	1.00		

TABLE D-26 NaI

TEST: AB-6 T3-I1 TIME = 2.25 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 70 DEG F 89.00 ROTOMETER RDG., SCFM 0.50
 FIRST BACKGROUND 0.00 CV PRESSURE, PSIA 16.61
 SECOND BACKGROUND 0.00 SAMPLE DURATION, MIN. 0.50

STAGE NUMBER	LAB MG NaI	NET MG NaI	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.00	0.00	0.001	0.999	13.370
2	0.00	0.00	0.001	0.998	8.407
3	0.00	0.00	0.001	0.998	5.713
4	0.00	0.00	0.001	0.997	3.849
5	0.02	0.02	0.019	0.978	2.482
6	0.27	0.27	0.292	0.686	1.266
7	0.49	0.49	0.532	0.154	0.780
8	0.11	0.11	0.120	0.034	0.527
BU	0.03	0.03	0.034		
TOTAL		0.92	1.00		

TABLE D-27 NaI

TEST: AB-6 T3-I2 TIME = 5.75 MINUTES ANDERSON IMPACTOR

TEMP. AT DAS # 70 DEG F 90.30 ROTOMETER RDG., SCFM 0.50
 FIRST BACKGROUND 0.00 CV PRESSURE, PSIA 16.69
 SECOND BACKGROUND 0.00 SAMPLE DURATION, MIN. 0.50

STAGE NUMBER	LAB MG NaI	NET MG NaI	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.00	0.00	0.001	0.999	13.400
2	0.00	0.00	0.001	0.998	8.426
3	0.00	0.00	0.002	0.996	5.725
4	0.01	0.01	0.004	0.991	3.858
5	0.04	0.04	0.035	0.956	2.487
6	0.35	0.35	0.287	0.669	1.269
7	0.58	0.58	0.469	0.201	0.782
8	0.20	0.20	0.163	0.038	0.528
BU	0.05	0.05	0.038		
TOTAL		1.23	1.00		

TABLE D-28 NaI

TEST: AB-6 T3-I3 TIME = 9.5 MINUTES 9S SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 91.30 ROTOMETER RDG., SCFM 0.20
 FIRST BACKGROUND 0.00 CV PRESSURE, PSIA 16.75
 SECOND BACKGROUND 0.00 SAMPLE DURATION, MIN. 1.00

STAGE NUMBER	LAB MG NaI	NET MG NaI	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.00	0.00	0.002	0.998	18.556
2	0.01	0.01	0.003	0.994	11.340
3	0.01	0.01	0.008	0.986	4.536
4	0.03	0.03	0.017	0.969	2.732
5	0.15	0.15	0.090	0.879	1.752
6	0.61	0.61	0.365	0.513	0.979
7	0.00	0.00	0.001	0.512	0.546
8	0.48	0.48	0.283	0.229	0.309
BU	0.38	0.38	0.229		
TOTAL		1.68	1.00		

TABLE D-29 NaI

TEST: AB-6 T3-I4 TIME = 14.25 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 183.30 ROTOMETER RDG., SCFM 0.20
 FIRST BACKGROUND 0.00 CV PRESSURE, PSIA 19.07
 SECOND BACKGROUND 0.00 SAMPLE DURATION, MIN. 0.50

STAGE NUMBER	LAB MG NaI	NET MG NaI	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.00	0.00	0.003	0.997	19.576
2	0.01	0.01	0.008	0.989	11.963
3	0.04	0.03	0.047	0.943	4.785
4	0.52	0.52	0.689	0.253	2.882
5	0.13	0.13	0.178	0.076	1.849
6	0.04	0.04	0.052	0.024	1.033
BU	0.02	0.02	0.024		
TOTAL		0.75	1.00		

TABLE D-30 NaI

TEST: AB-6 T3-15 TIME = 19.17 MINUTES SIERRA IMPACTOR

TEMP. AT DAS # 70 DEG F 198.30 ROTOMETER RDG., SCFM 0.20
 FIRST BACKGROUND 0.00 CV PRESSURE, PSIA 19.59
 SECOND BACKGROUND 0.00 SAMPLE DURATION, MIN. 0.33

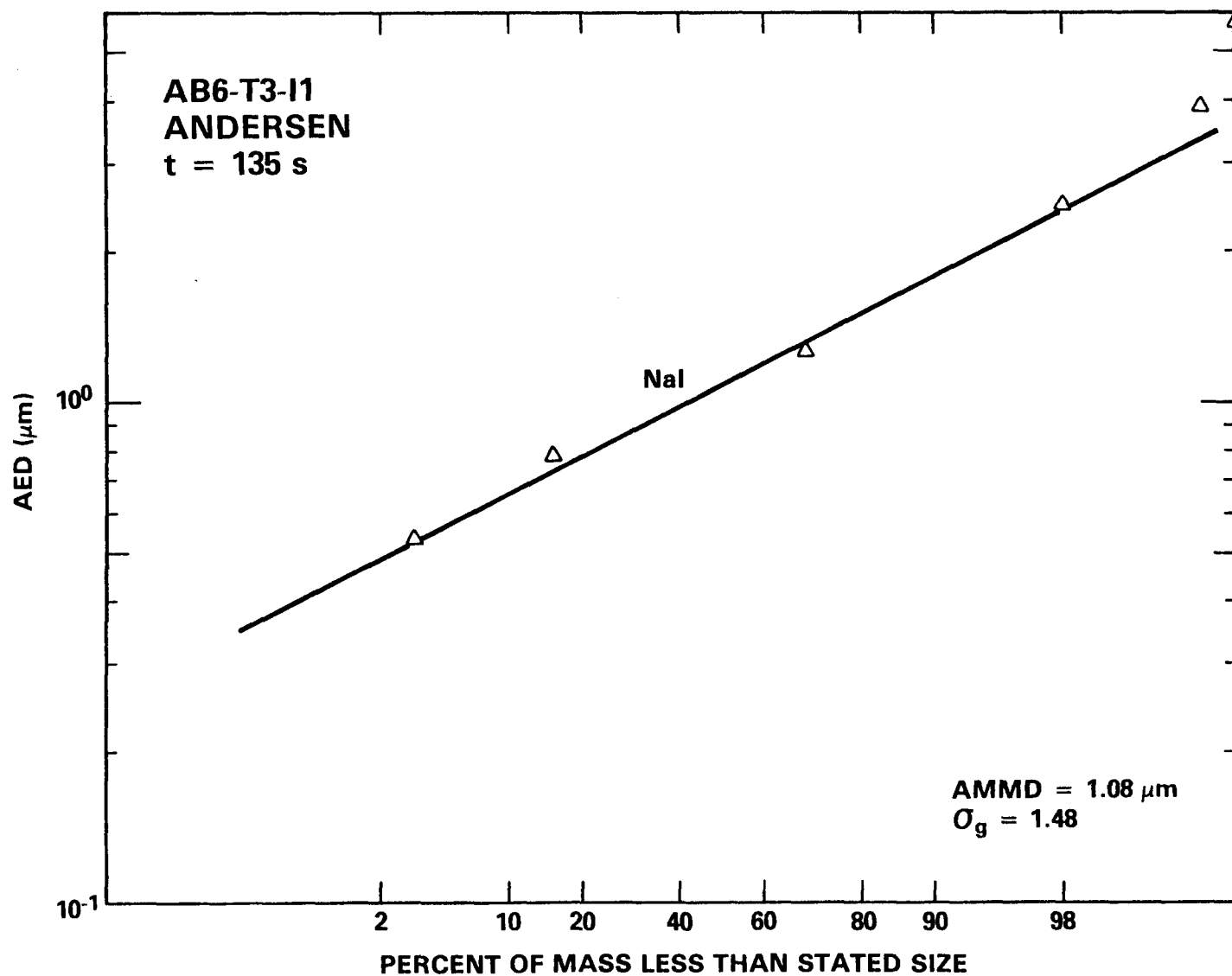
STAGE NUMBER	LAB MG NaI	NET MG NaI	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.01	0.01	0.024	0.976	19.806
2	0.06	0.06	0.159	0.817	12.104
3	0.20	0.20	0.528	0.290	4.841
4	0.07	0.07	0.188	0.102	2.916
5	0.03	0.03	0.074	0.028	1.871
6	0.00	0.00	0.012	0.016	1.045
BU	0.01	0.01	0.016		
TOTAL		0.39	1.00		

TABLE D-31 NaI

TEST: AB-6 T3-16 TIME = 29.13 MINUTES SIERRA IMPACTOR

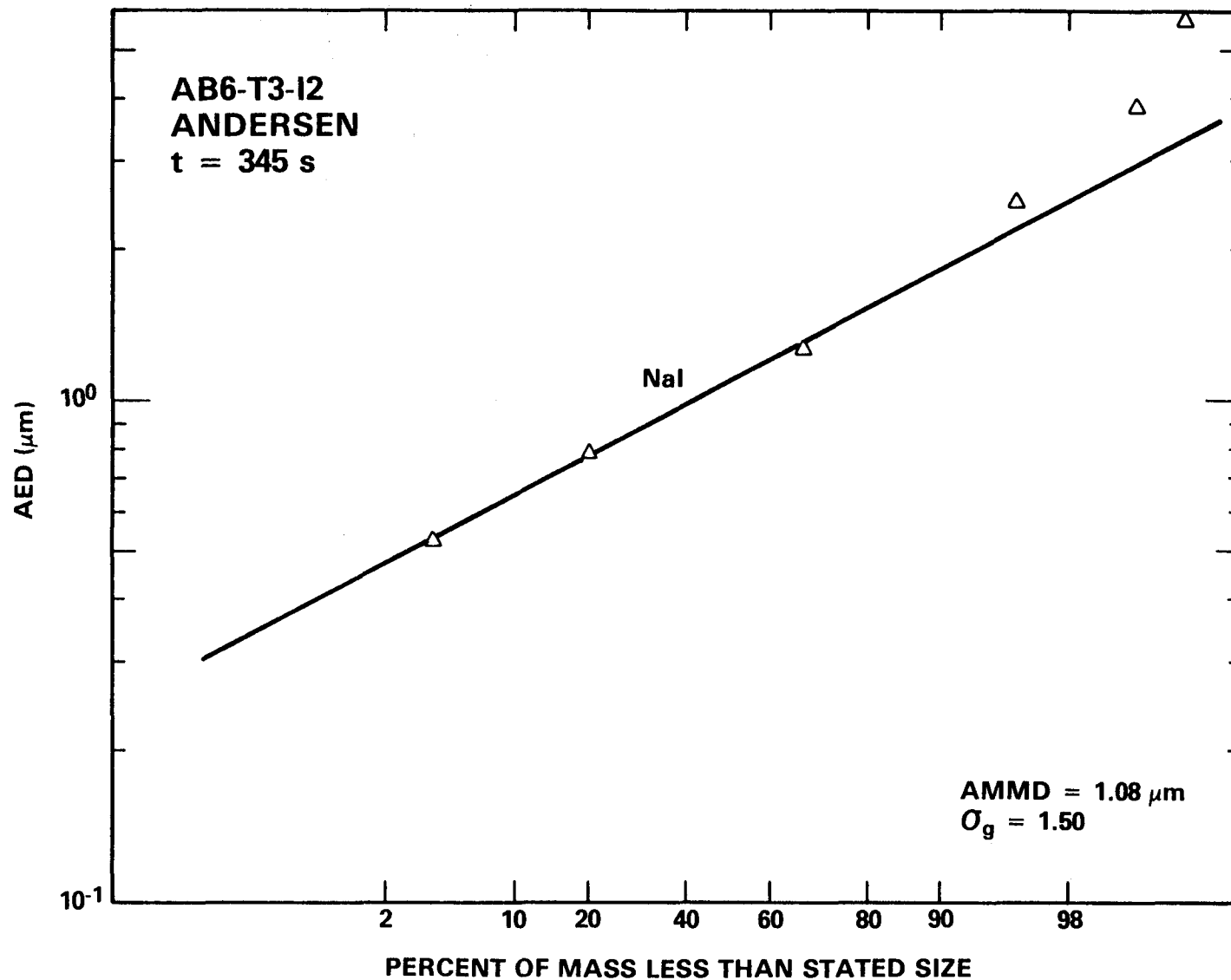
TEMP. AT DAS # 70 DEG F 225.10 ROTOMETER RDG., SCFM 0.20
 FIRST BACKGROUND 0.00 CV PRESSURE, PSIA 20.72
 SECOND BACKGROUND 0.00 SAMPLE DURATION, MIN. 0.25

STAGE NUMBER	LAB MG NaI	NET MG NaI	MASS FRACTION	FRACTION LESS THAN CUT SIZE	CUT DIAM MICRO- METERS
1	0.00	0.00	0.020	0.979	20.306
2	0.02	0.02	0.158	0.822	12.409
3	0.04	0.04	0.408	0.414	4.964
4	0.03	0.03	0.269	0.144	2.990
5	0.01	0.01	0.139	0.005	1.918
6	0.00	0.00	0.005	0.000	1.072
BU	0.00	0.00	0.000		
TOTAL		0.10	1.00		



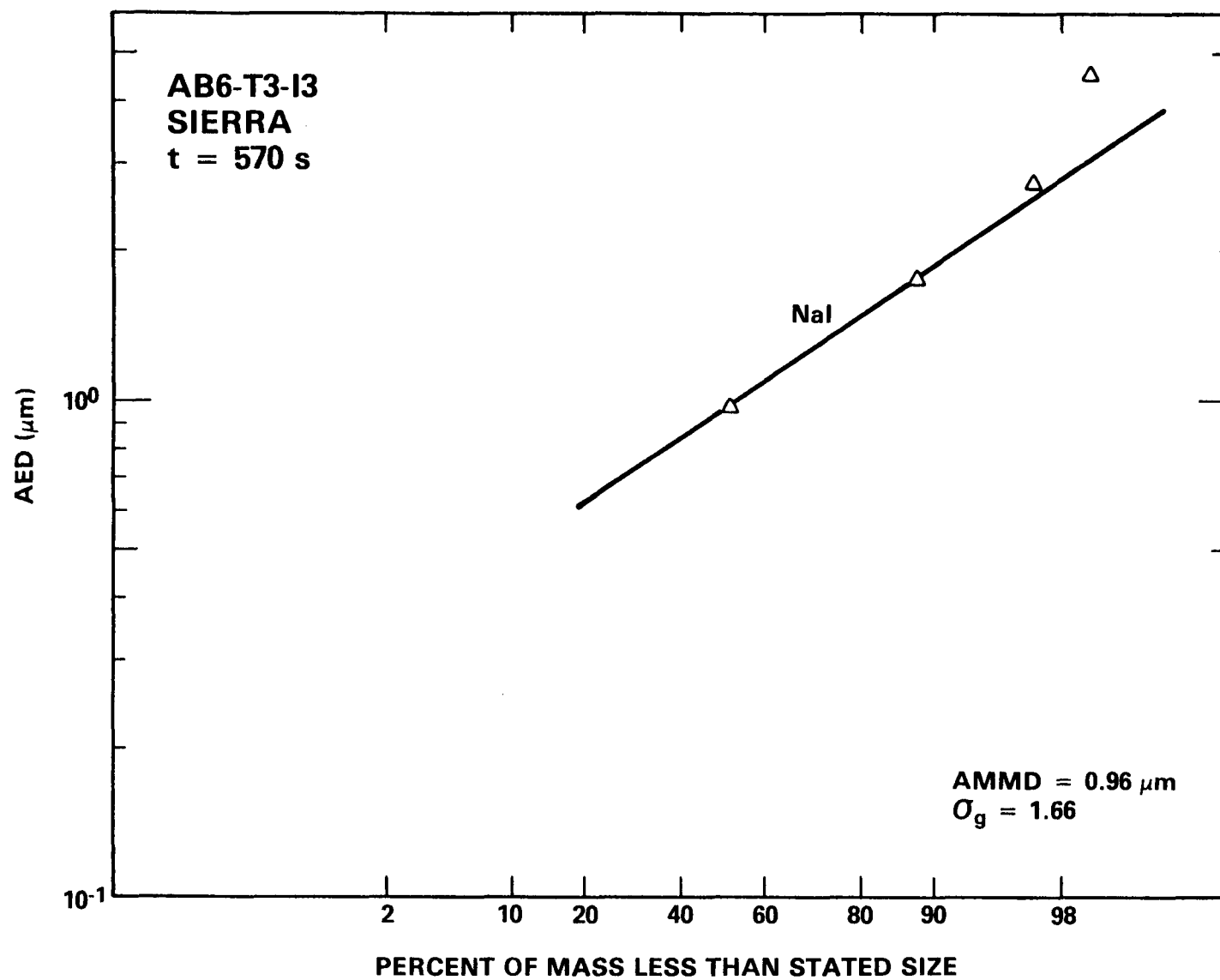
HEDL 8412-035.24

FIGURE D-1. Log-Probability Plot of Impactor Sample T3-I1.



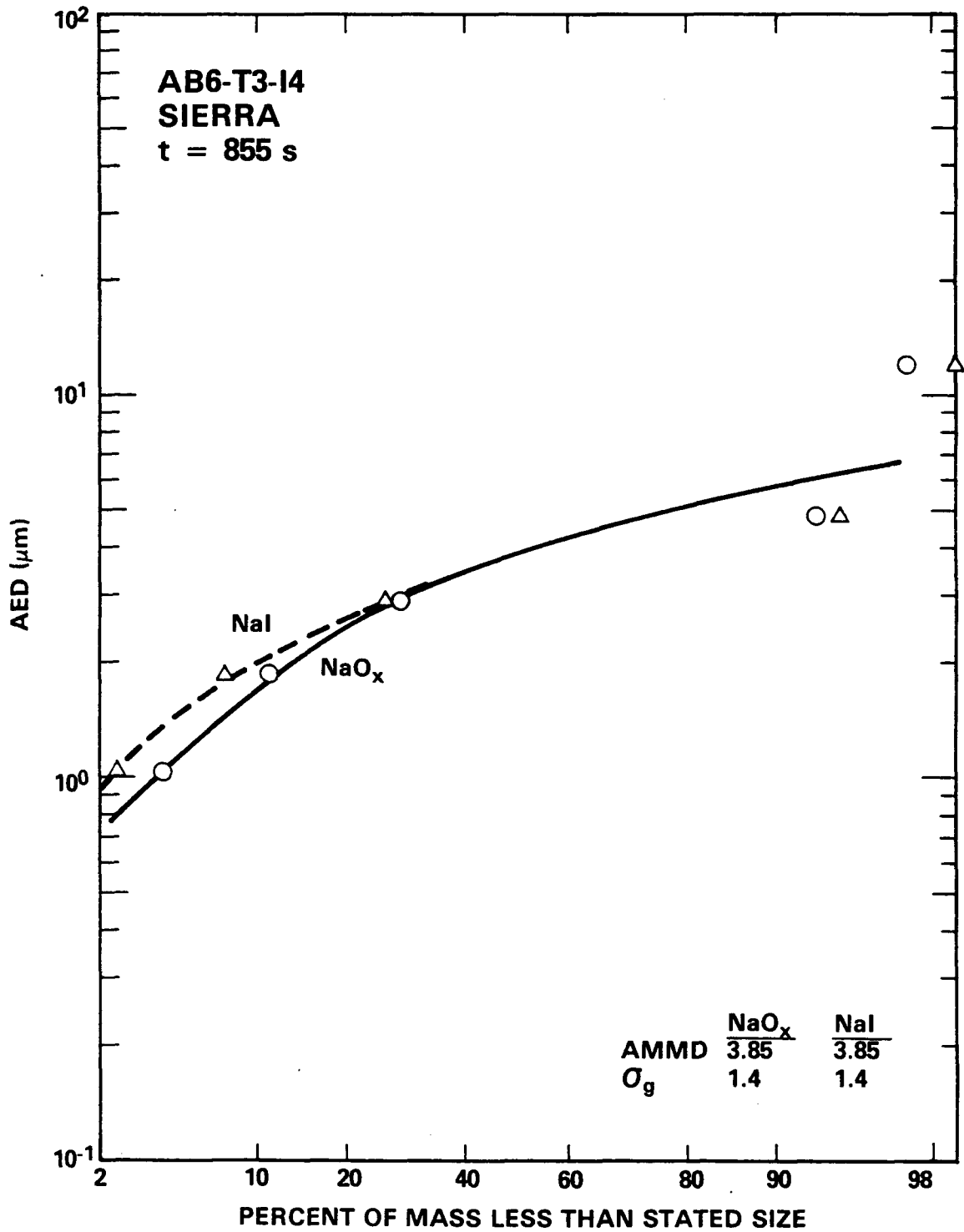
HEDL 8412-035.23

FIGURE D-2. Log-Probability Plot of Impactor Sample T3-I2.



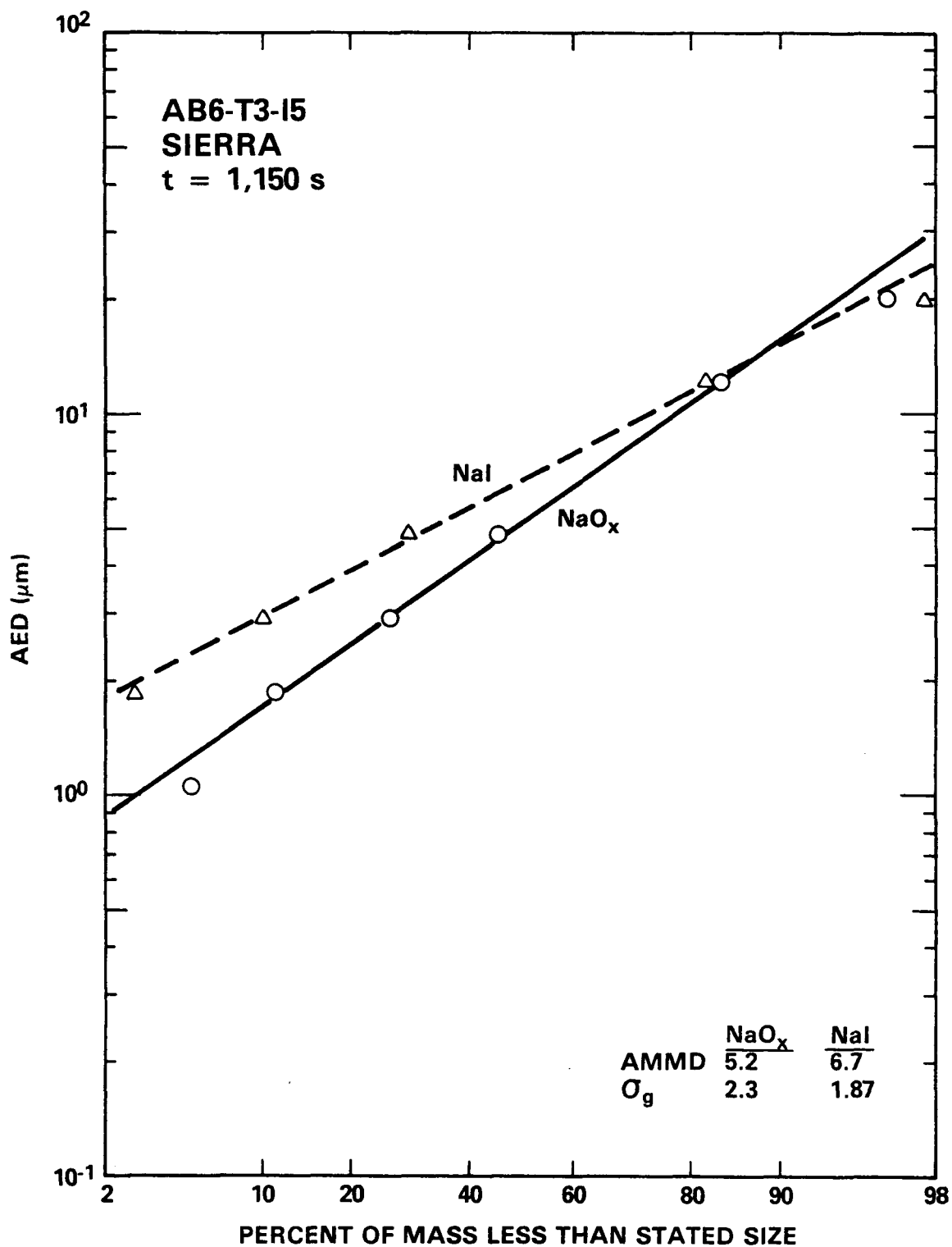
HEDL 8412-036.22

FIGURE D-3. Log-Probability Plot of Impactor Sample T3-I3.



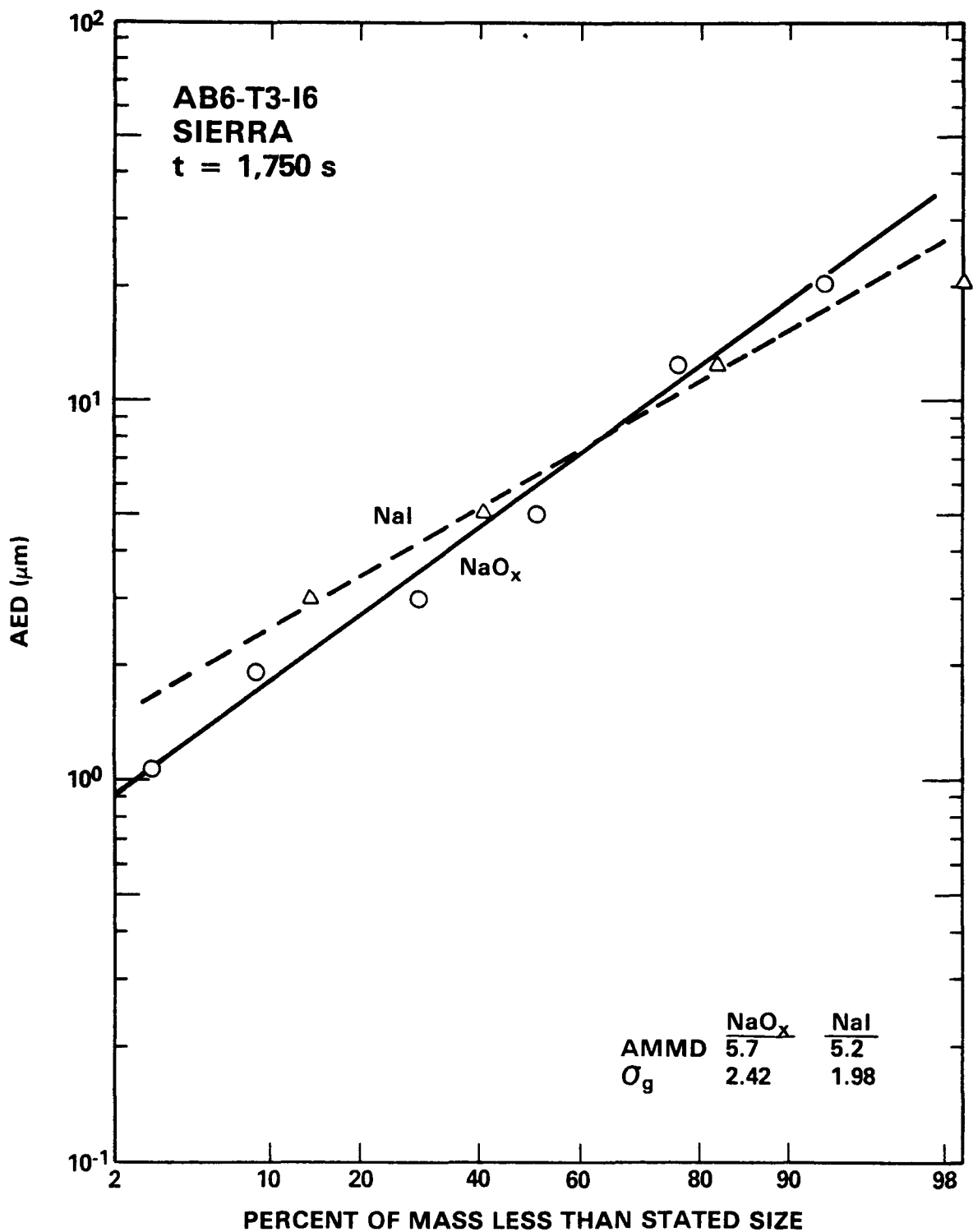
HEDL 8412-035.25

FIGURE D-4. Log-Probability Plot of Impactor Sample T3-I4.



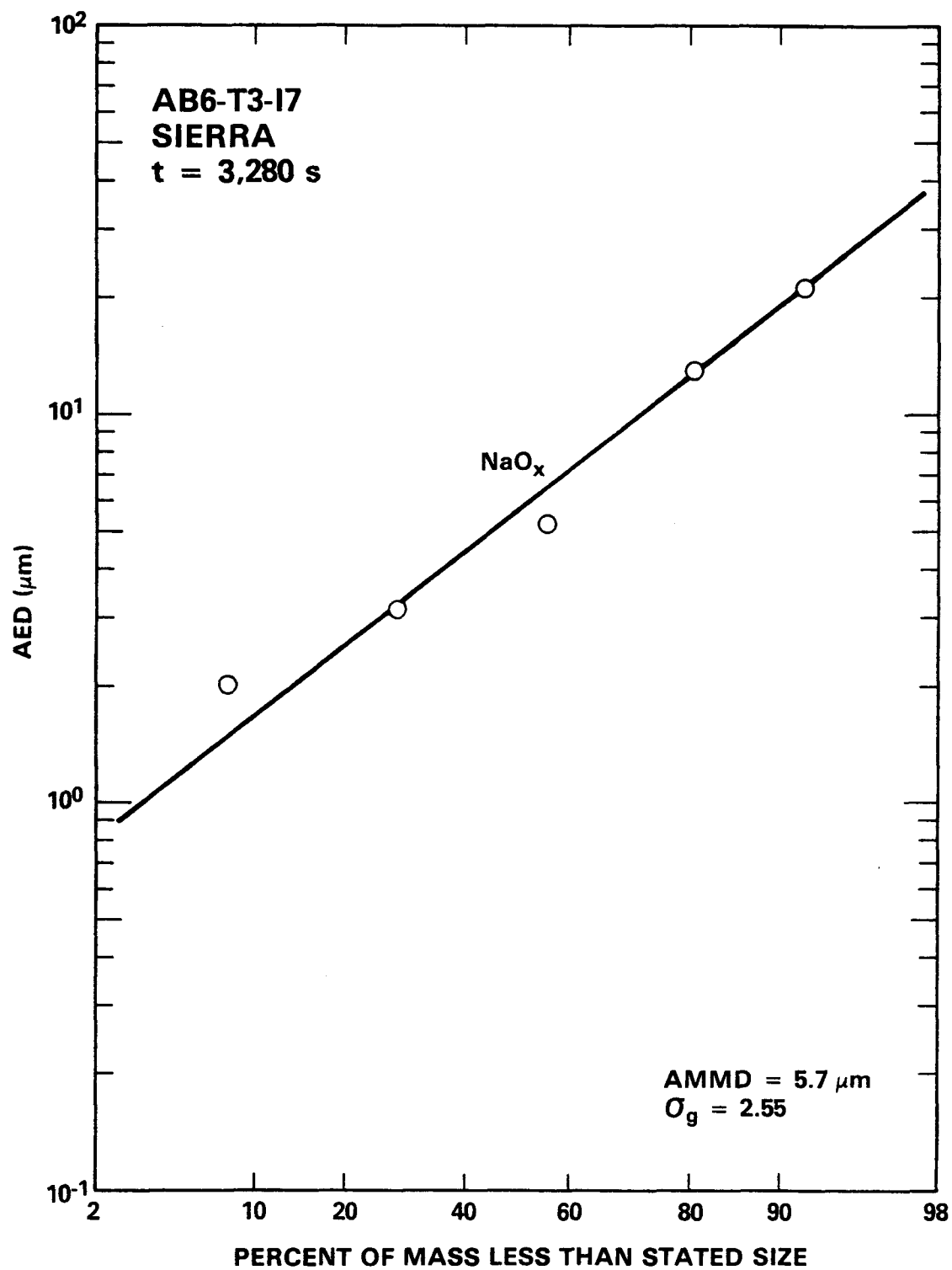
HEDL 8412-035.10

FIGURE D-5. Log-Probability Plot of Impactor Sample T3-I5.



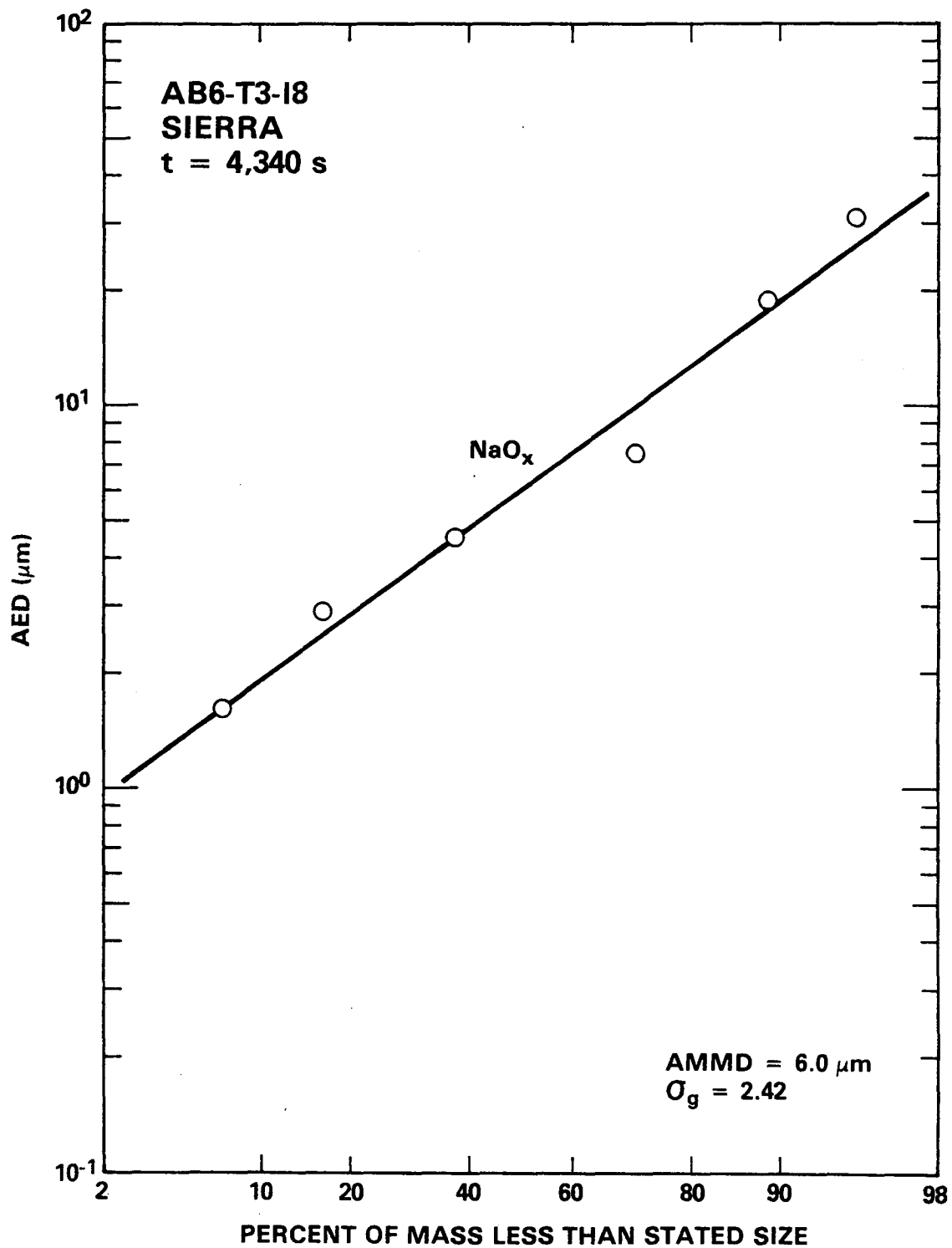
HEDL 8412-035.15

FIGURE D-6. Log-Probability Plot of Impactor Sample T3-I6.



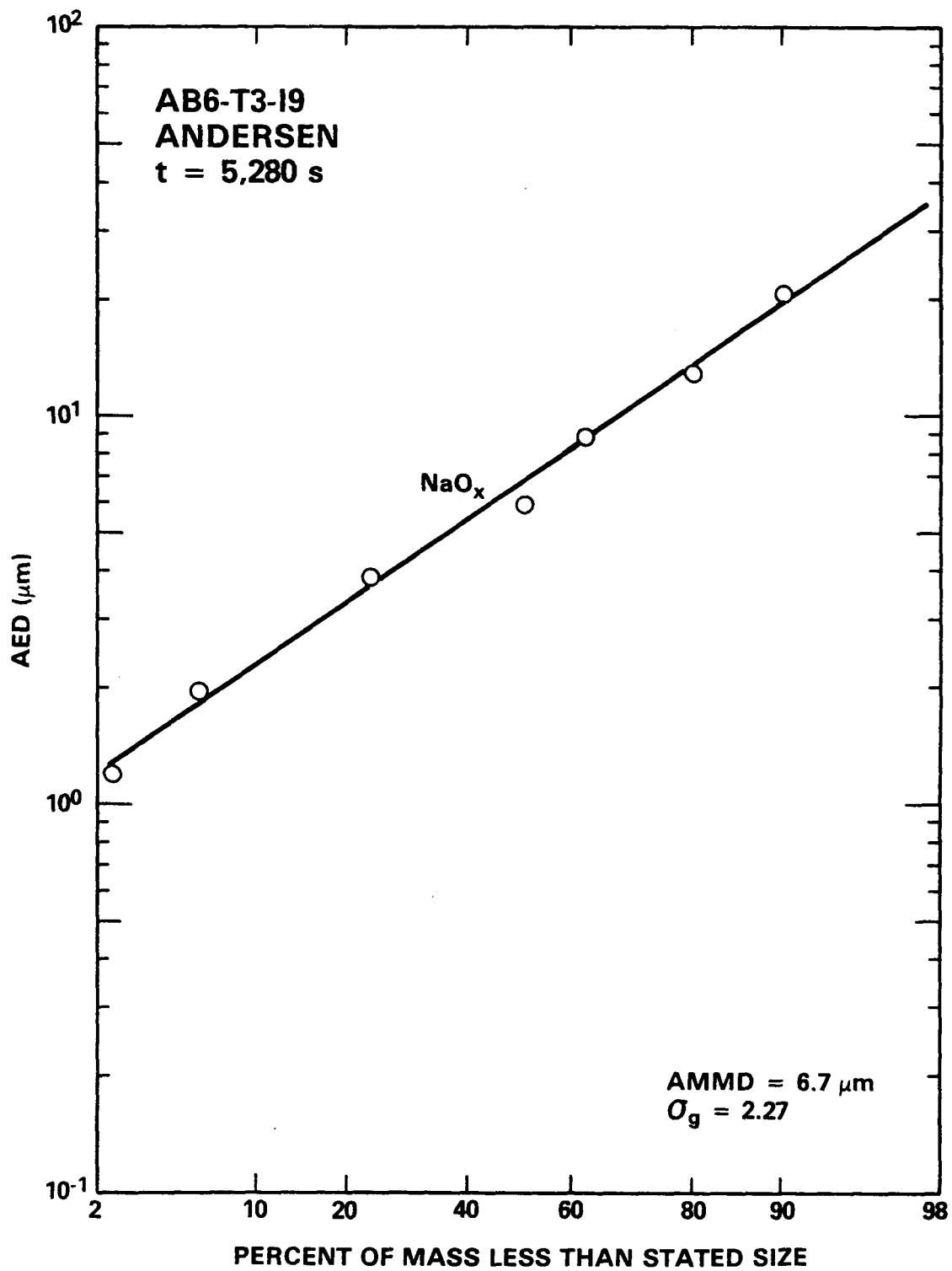
HEDL 8412-035.12

FIGURE D-7. Log-Probability Plot of Impactor Sample T3-I7.



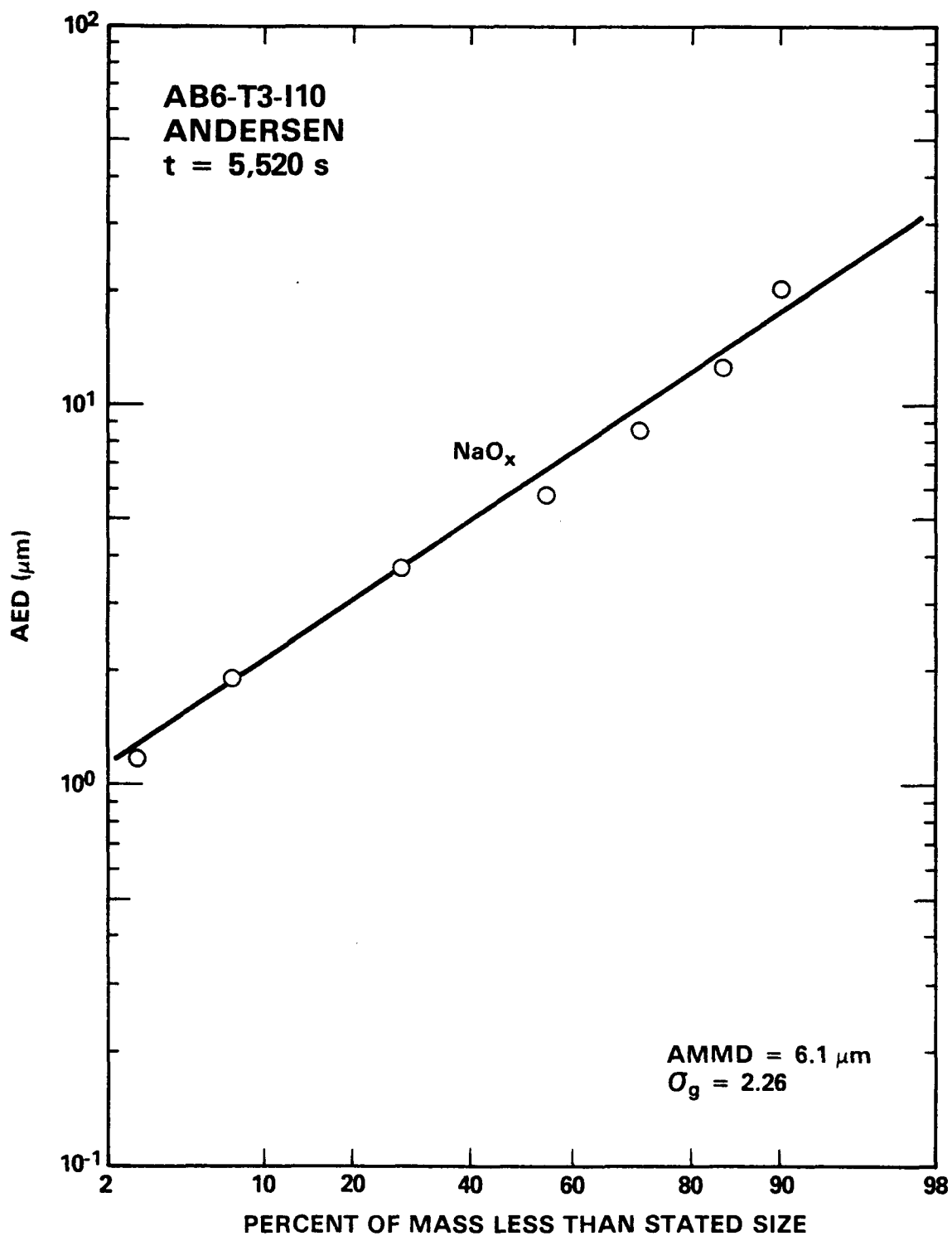
HEDL 8412-035.13

FIGURE D-8. Log-Probability Plot of Impactor Sample T3-I8.



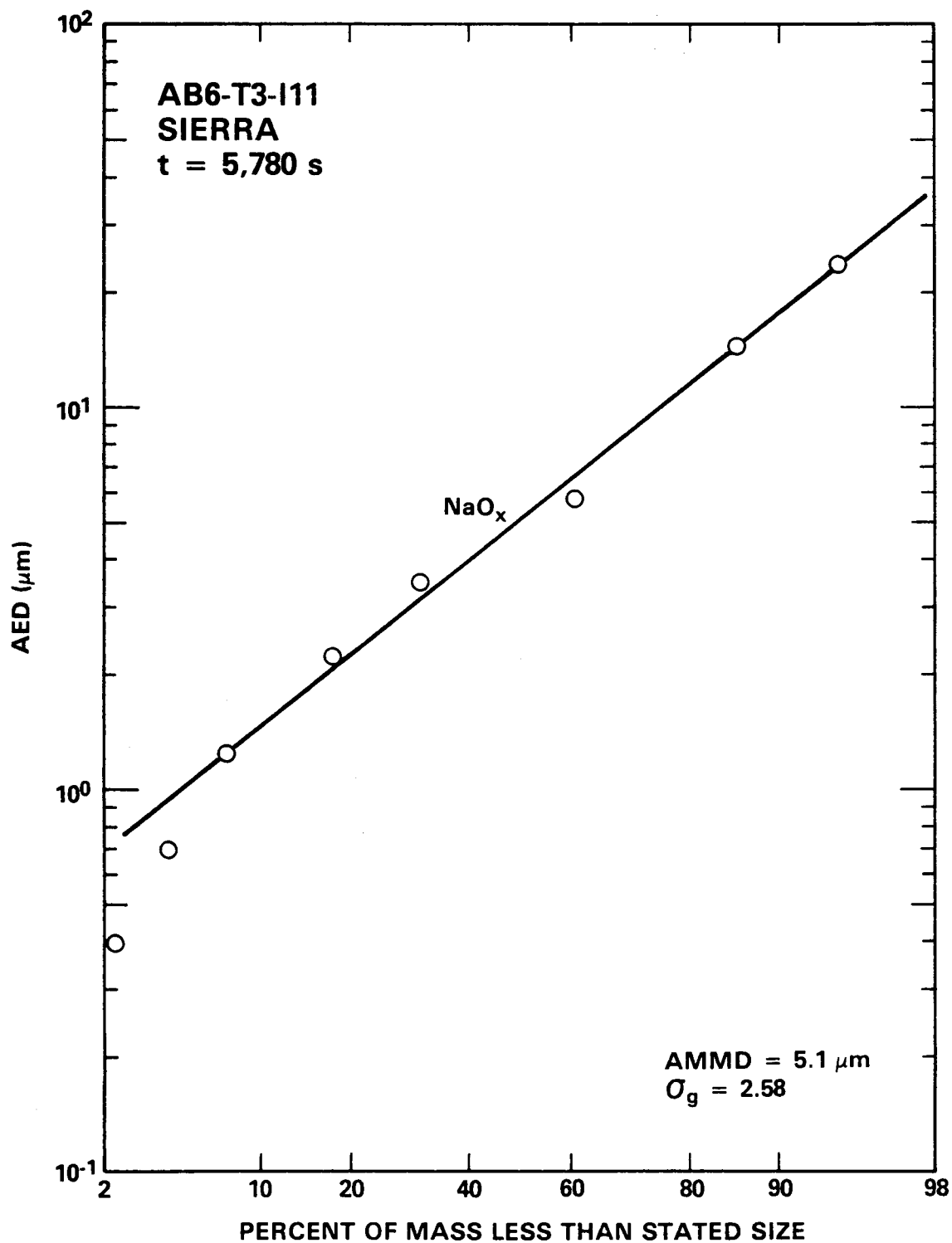
HEDL 8412-035.14

FIGURE D-9. Log-Probability Plot of Impactor Sample T3-19.



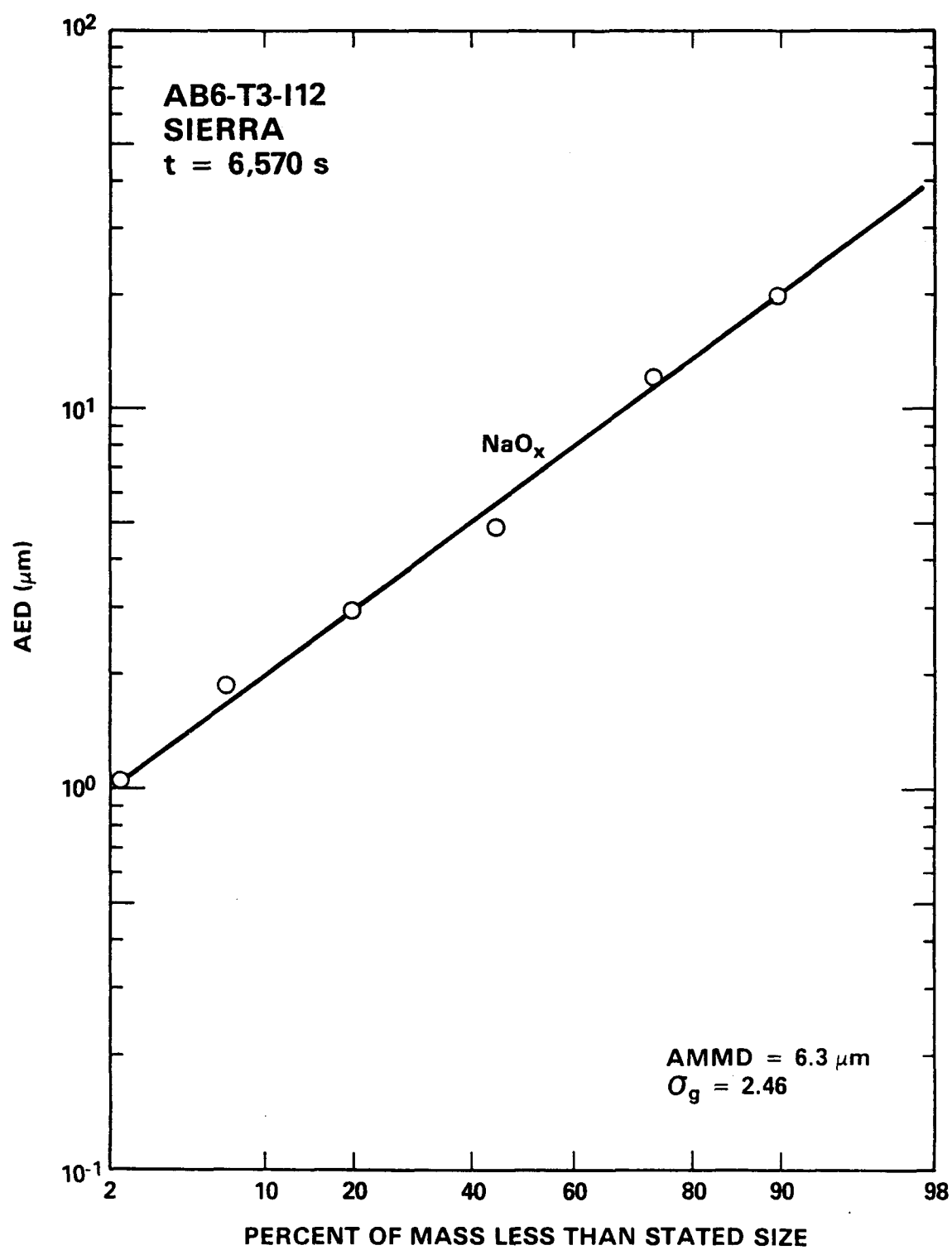
HEDL 8412-035.11

FIGURE D-10. Log-Probability Plot of Impactor Sample T3-I10.



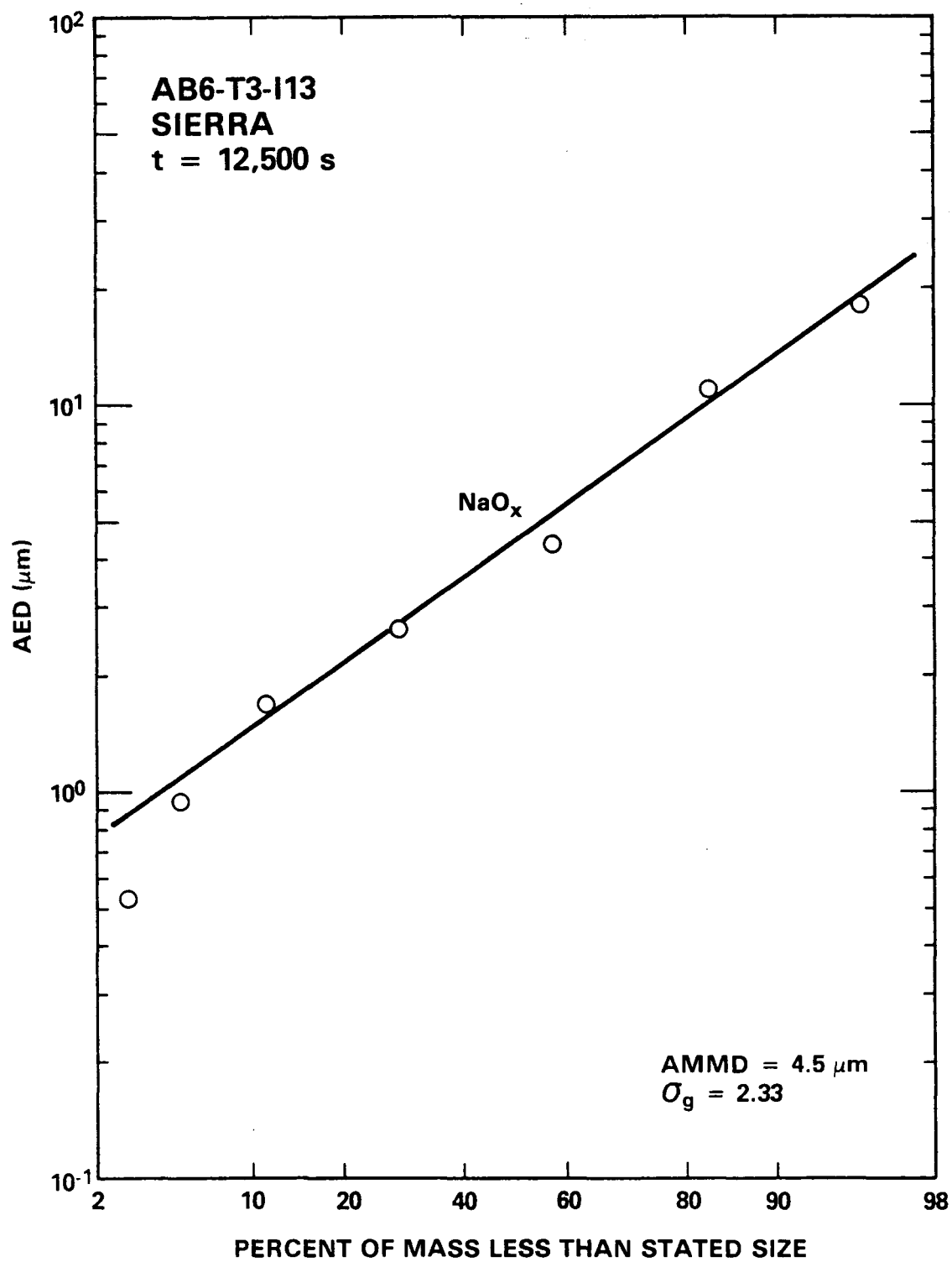
HEDL 8412-035.16

FIGURE D-11. Log-Probability Plot of Impactor Sample T3-I11.



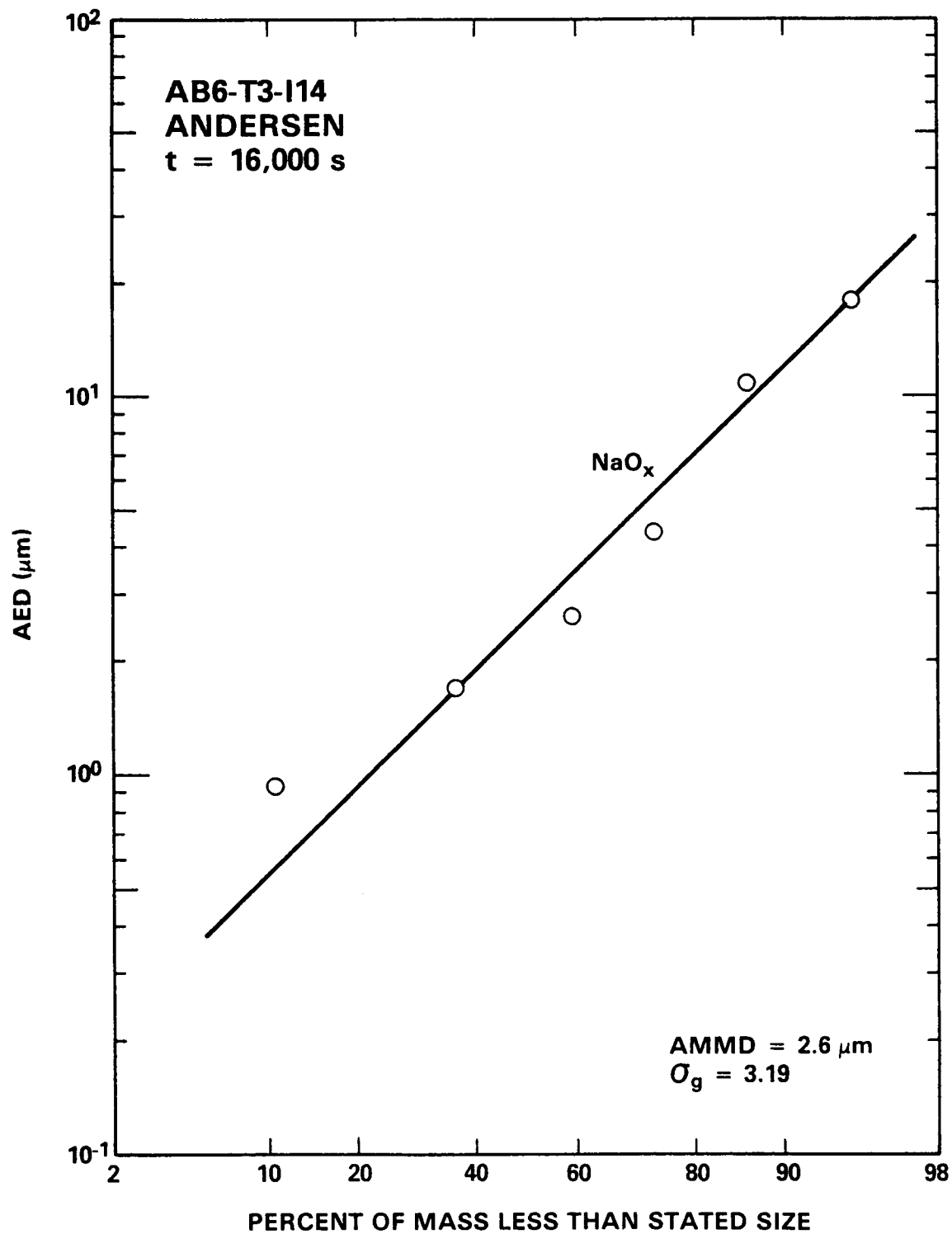
HEDL 8412-035.17

FIGURE D-12. Log-Probability Plot of Impactor Sample T3-I12.



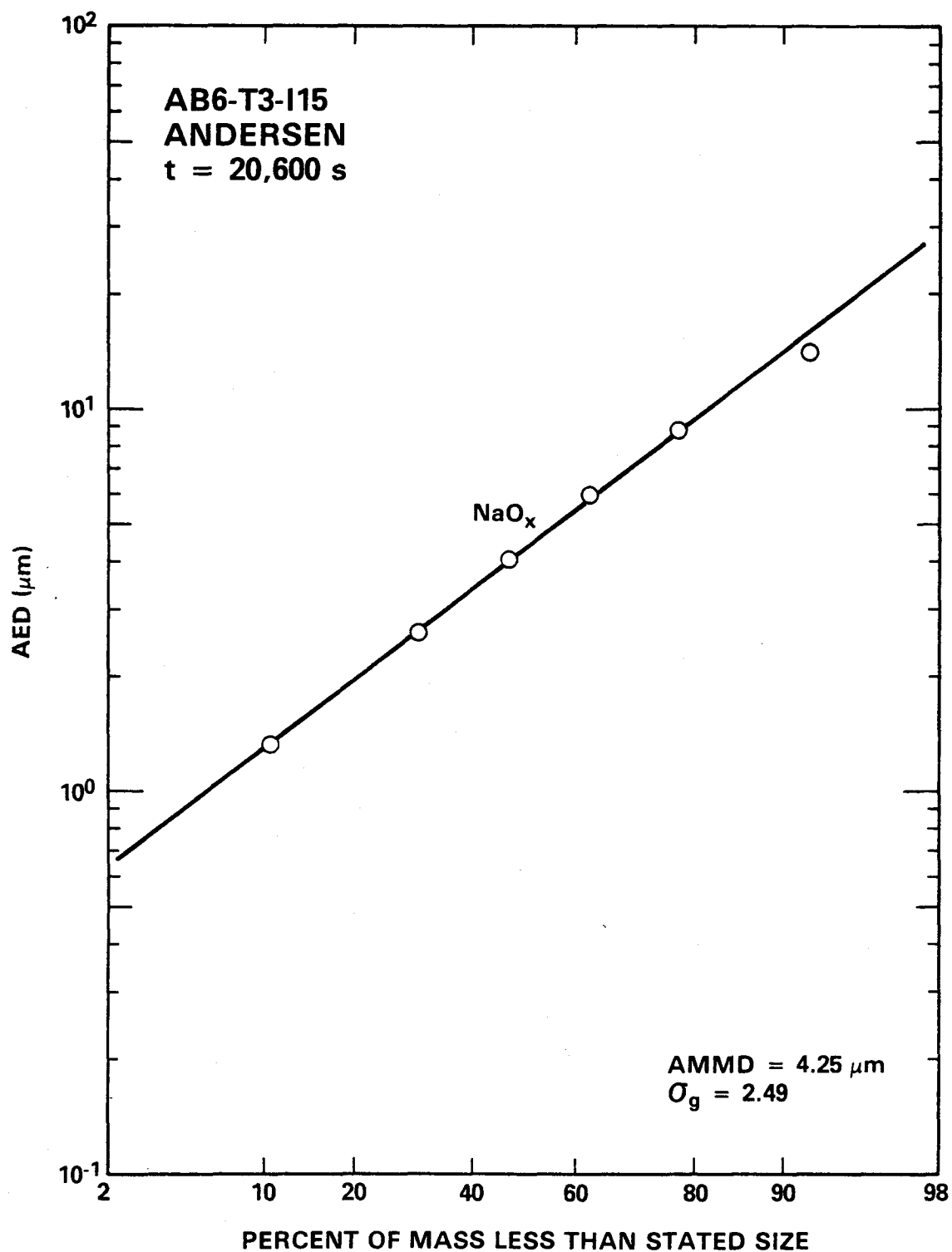
HEDL 8412-035.18

FIGURE D-13. Log-Probability Plot of Impactor Sample T3-I13.



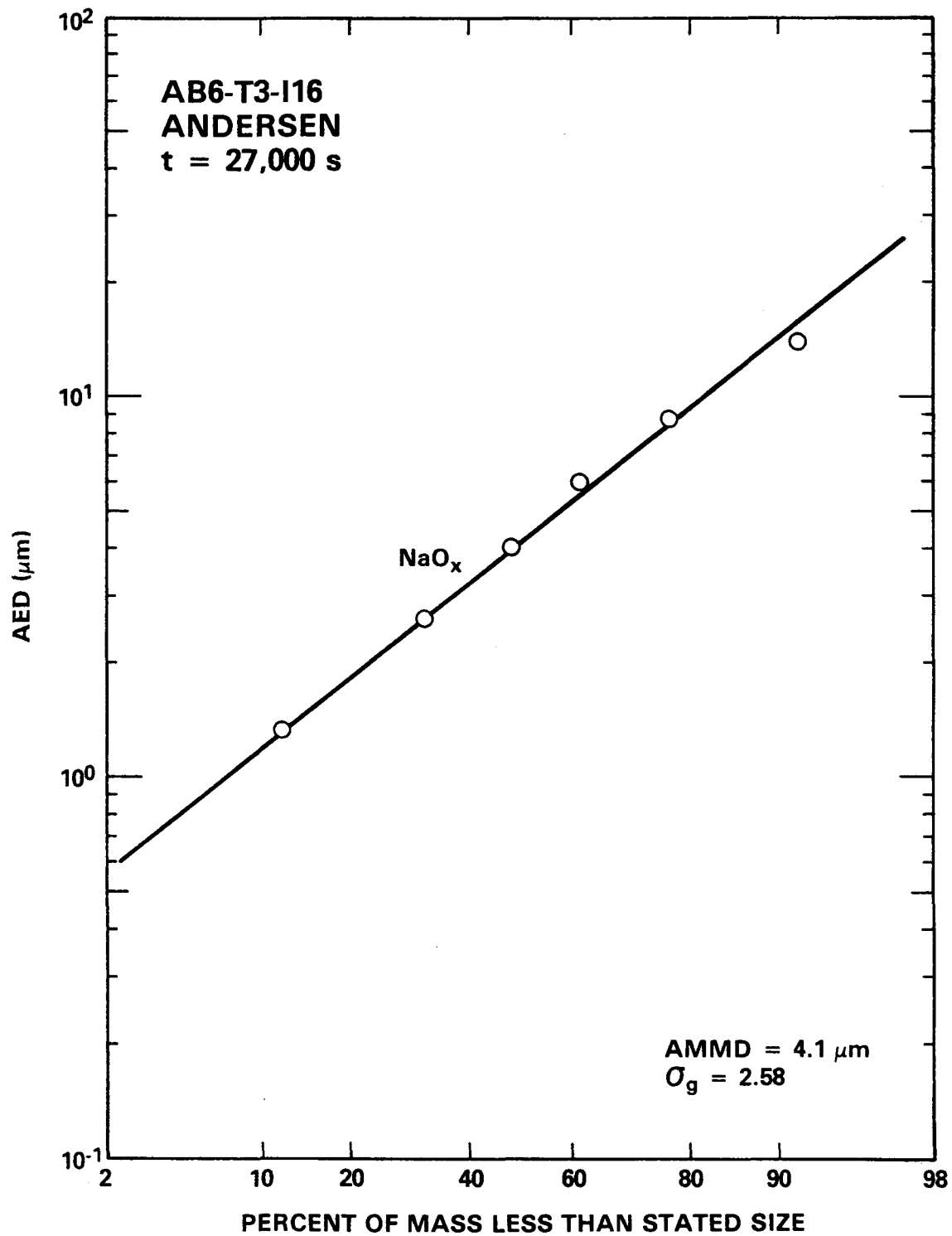
HEDL 8412-035.19

FIGURE D-14. Log-Probability Plot of Impactor Sample T3-I14.



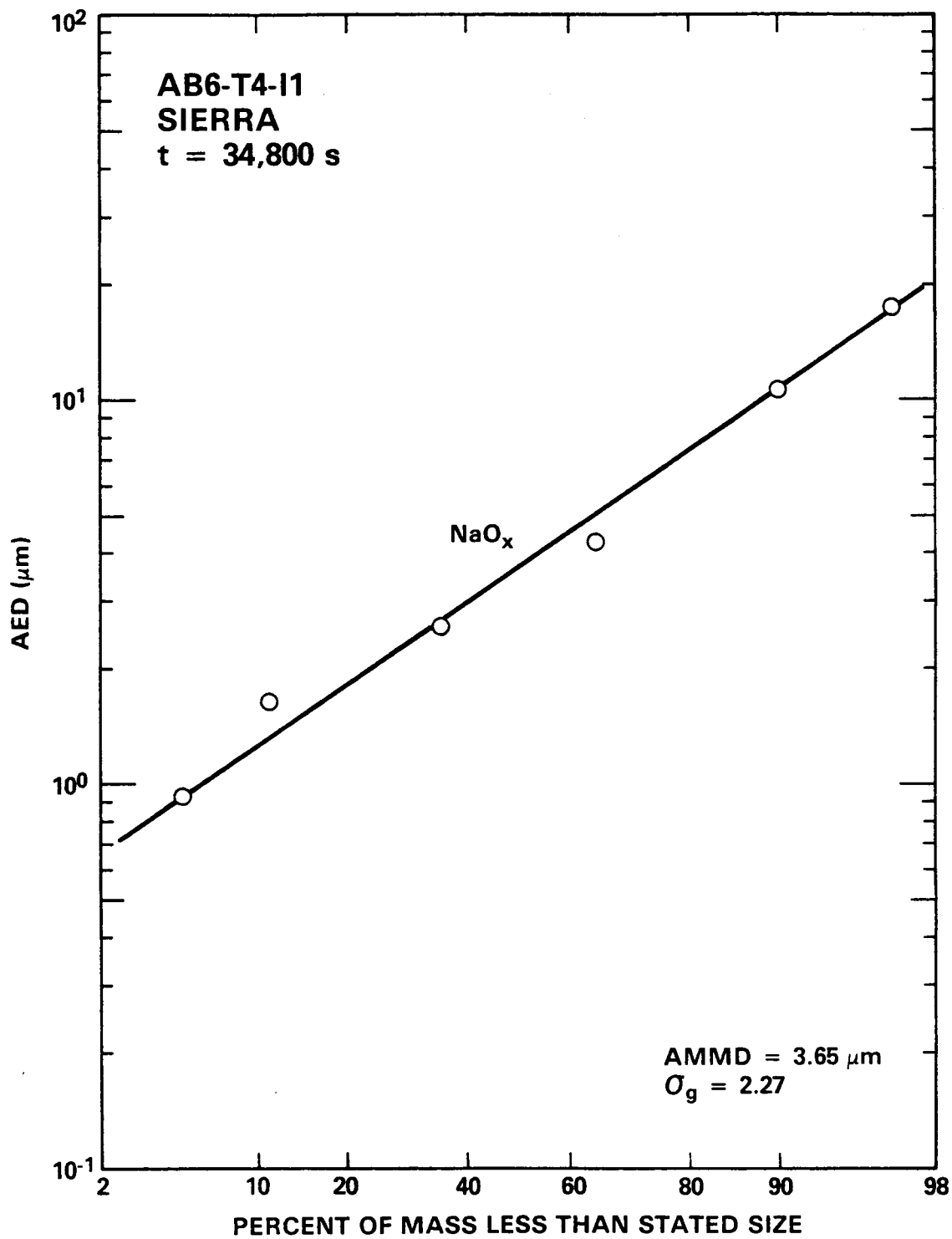
HEDL 8412-035.20

FIGURE D-15. Log-Probability Plot of Impactor Sample T3-I15.



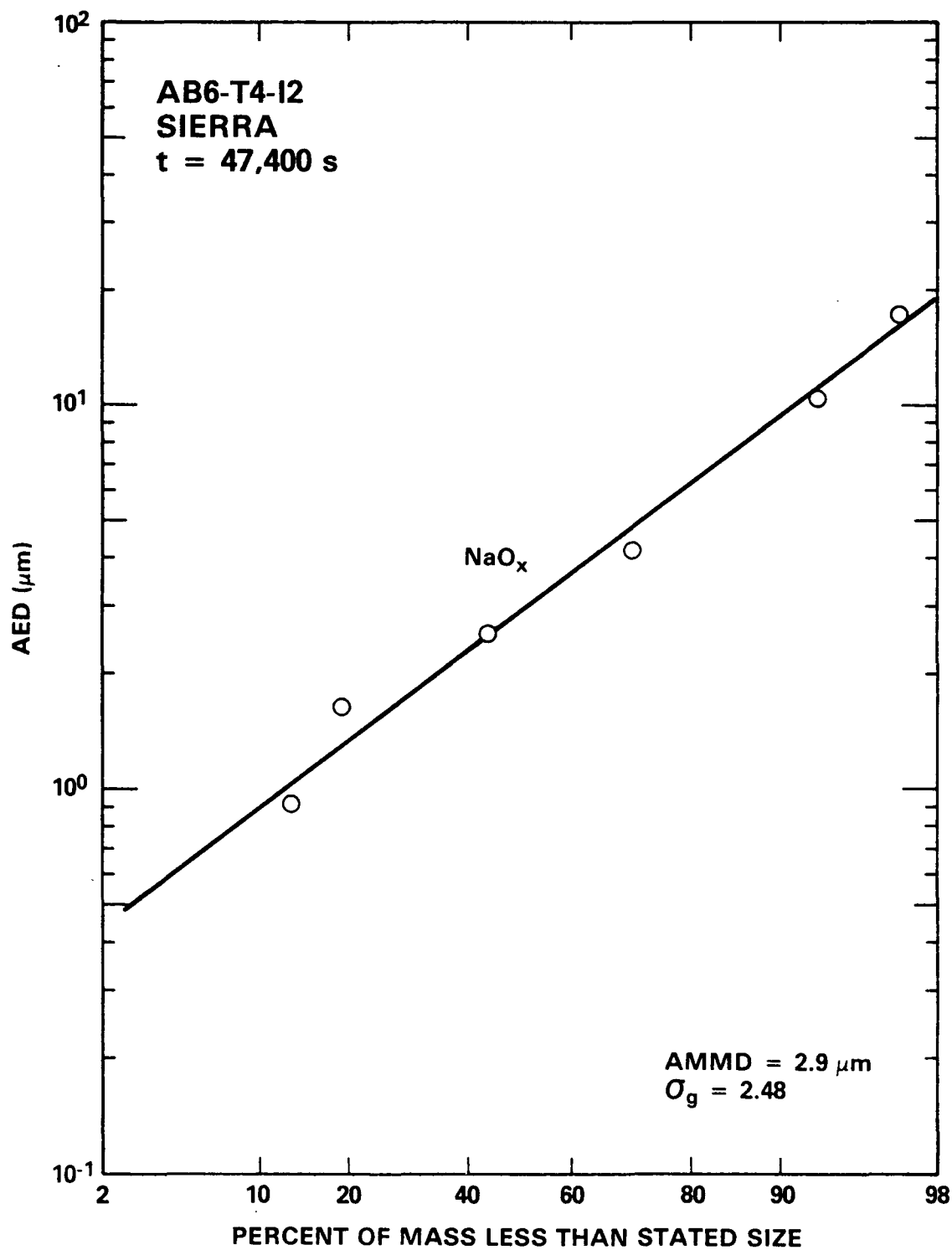
HEDL 8412-035.21

FIGURE D-16. Log-Probability Plot of Impactor Sample T3-I16.



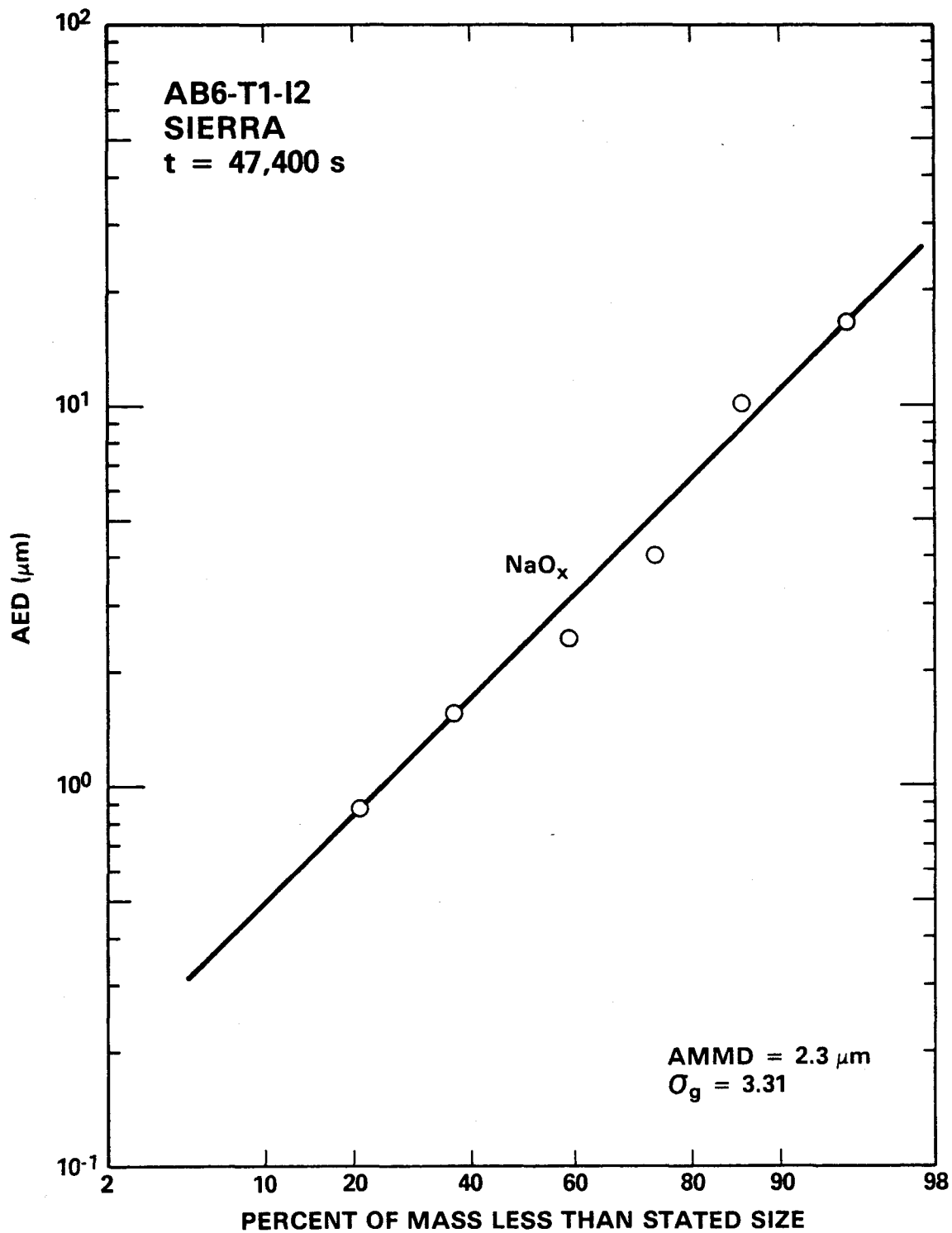
HEDL 8412-036.1

FIGURE D-17. Log-Probability Plot of Impactor Sample T4-I1.



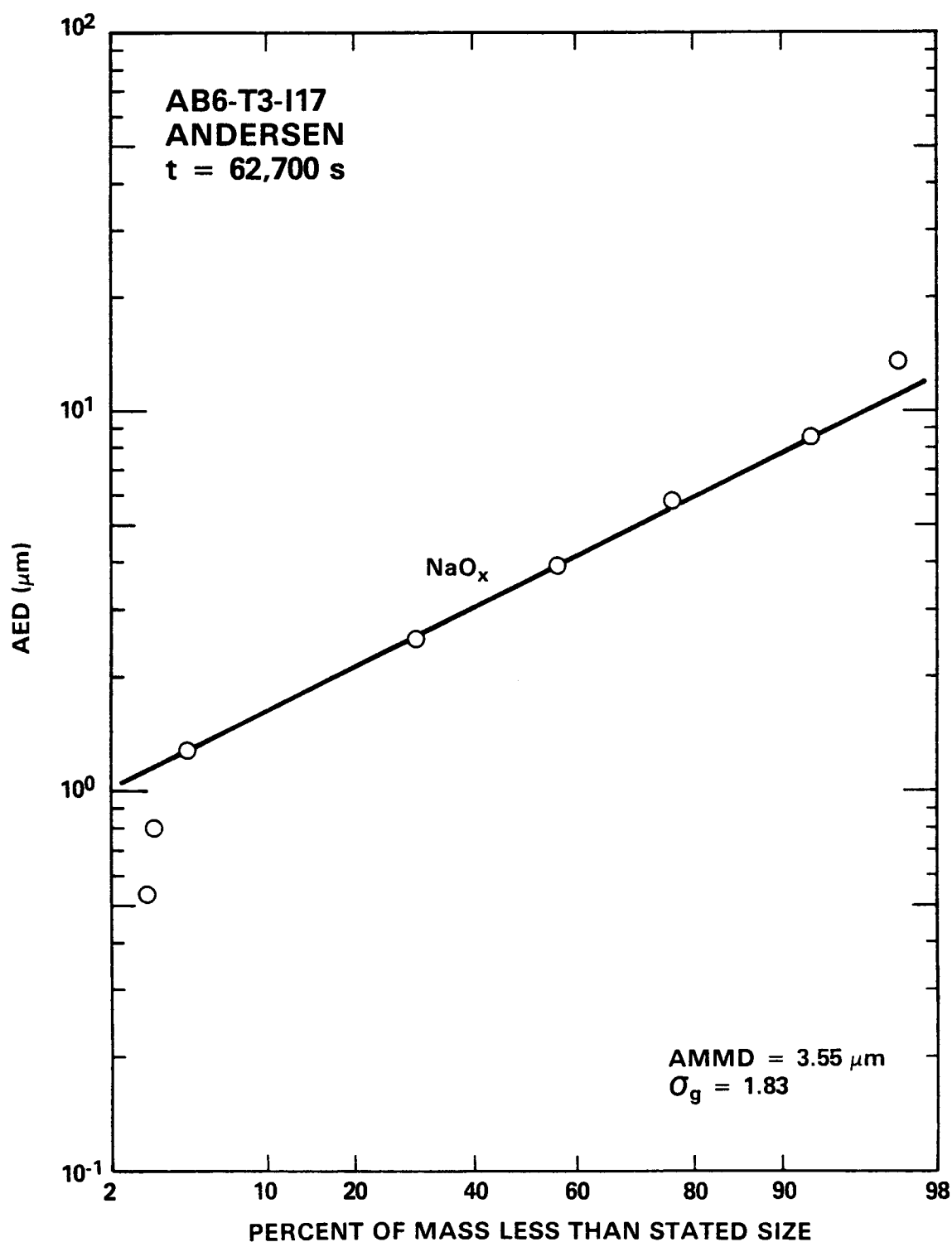
HEDL 8412-035.2

FIGURE D-18. Log-Probability Plot of Impactor Sample T4-I2.



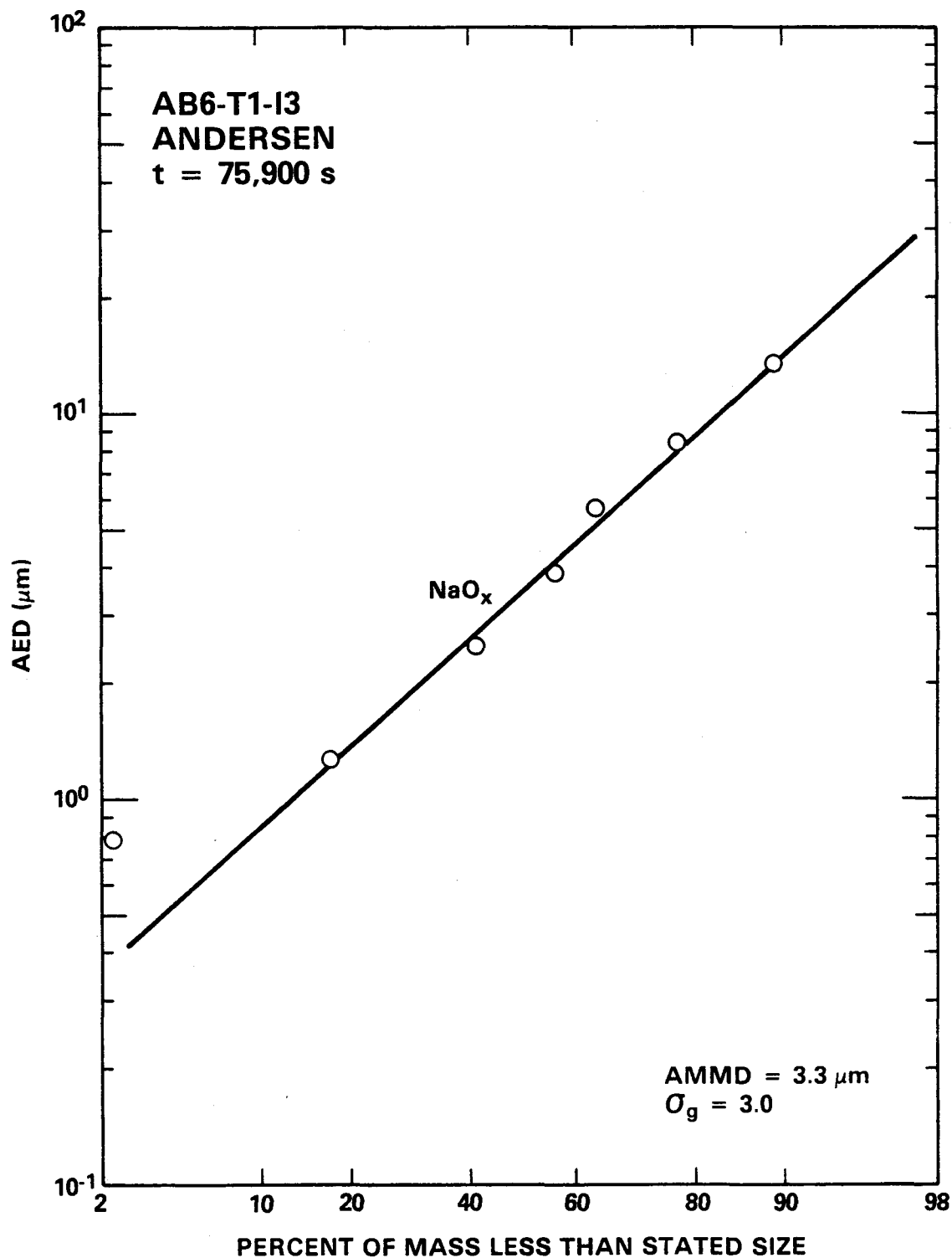
HEDL 8412-035.3

FIGURE D-19. Log-Probability Plot of Impactor Sample T1-I2.



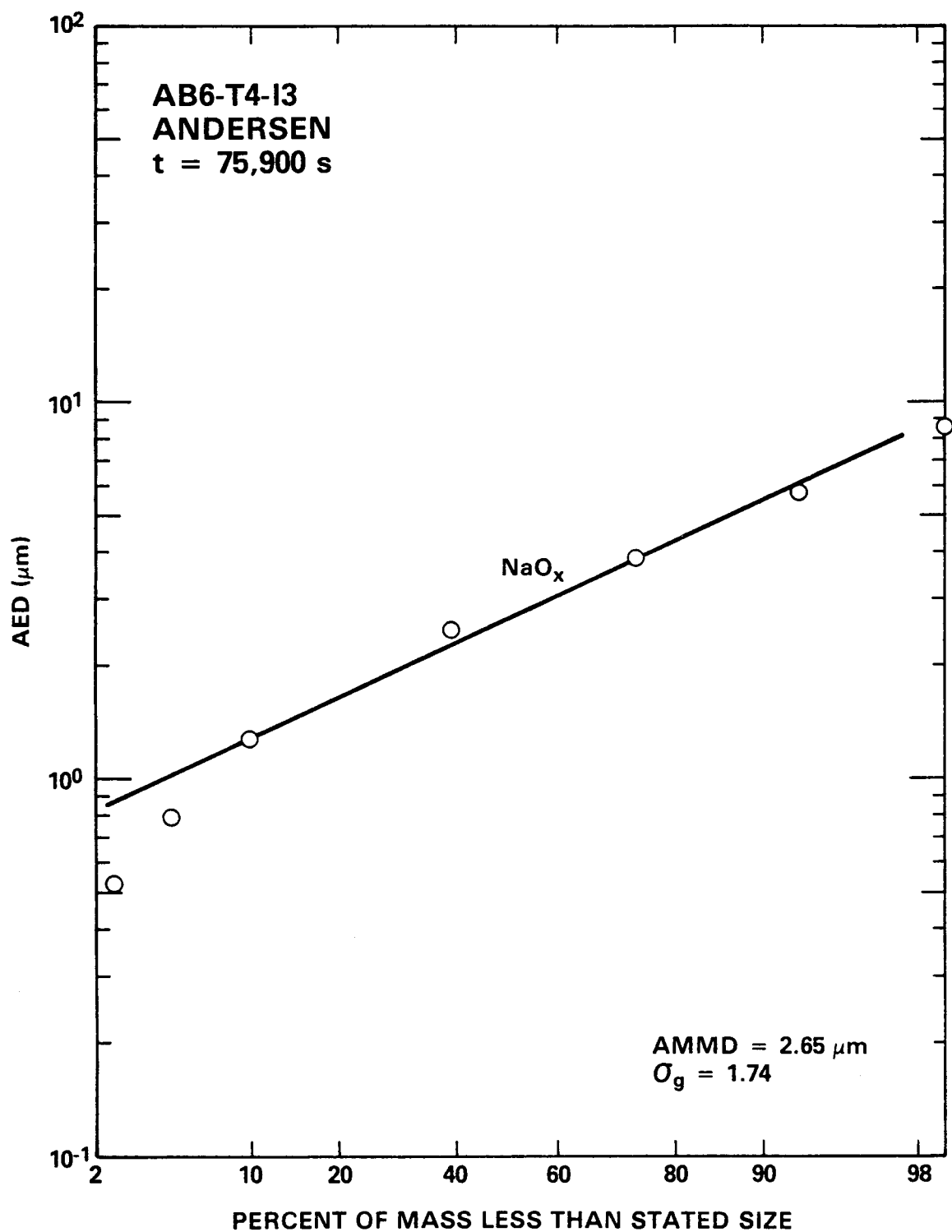
HEDL 8412-035.4

FIGURE D-20. Log-Probability Plot of Impactor Sample T3-I17.



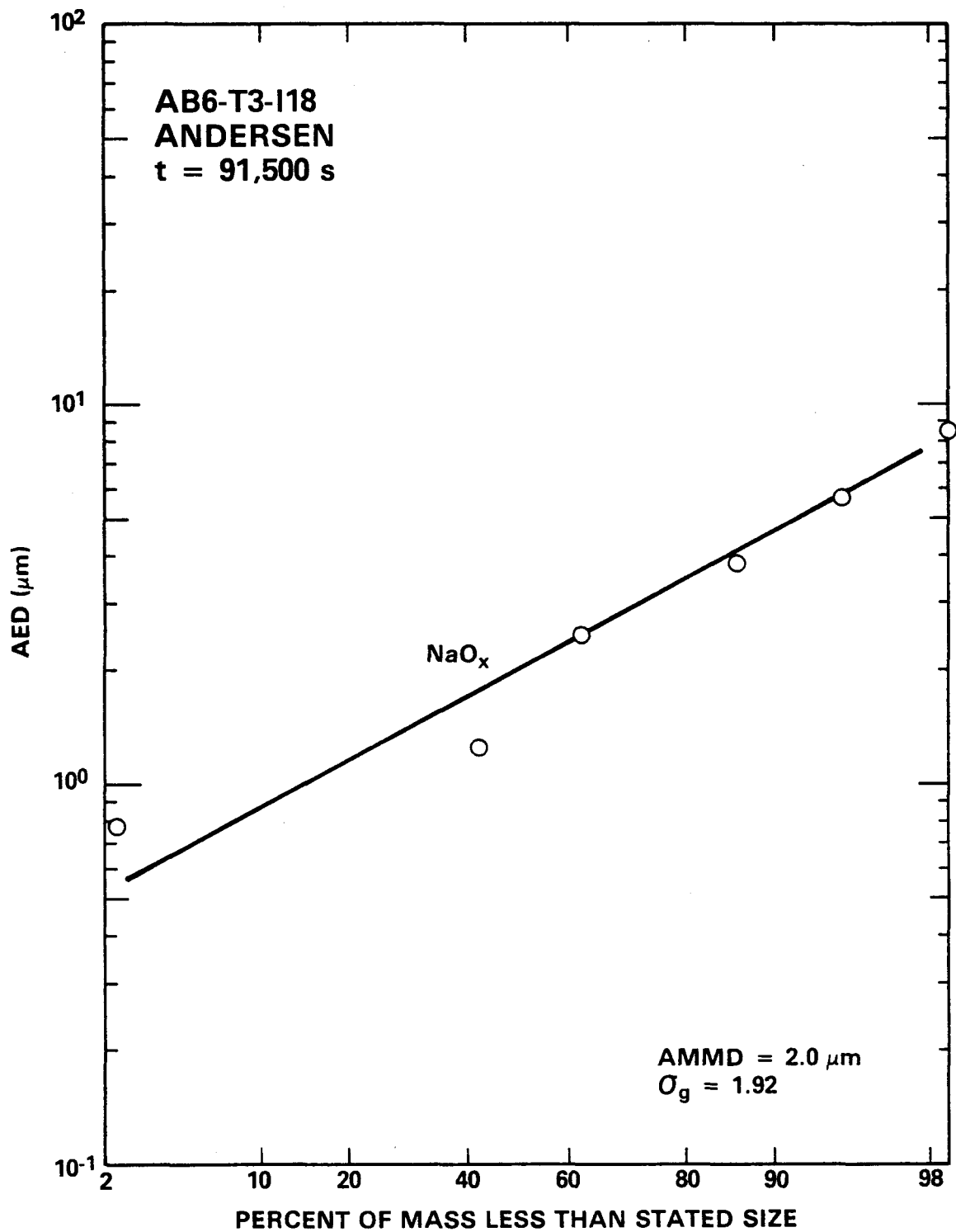
HEDL 8412-035.7

FIGURE D-21. Log-Probability Plot of Impactor Sample T1-I3.



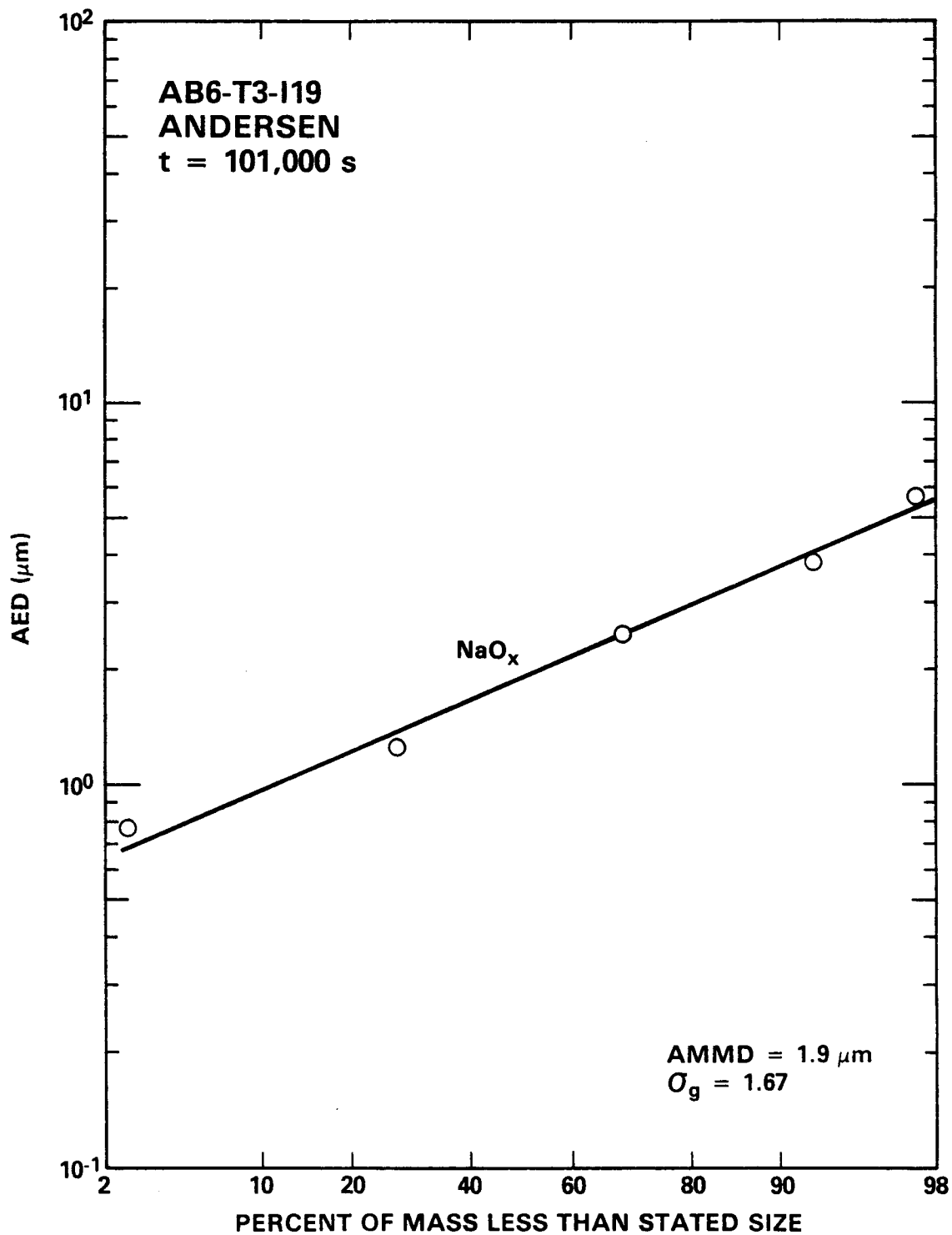
HEDL 8412-035.8

FIGURE D-22. Log-Probability Plot of Impactor Sample T4-I3.



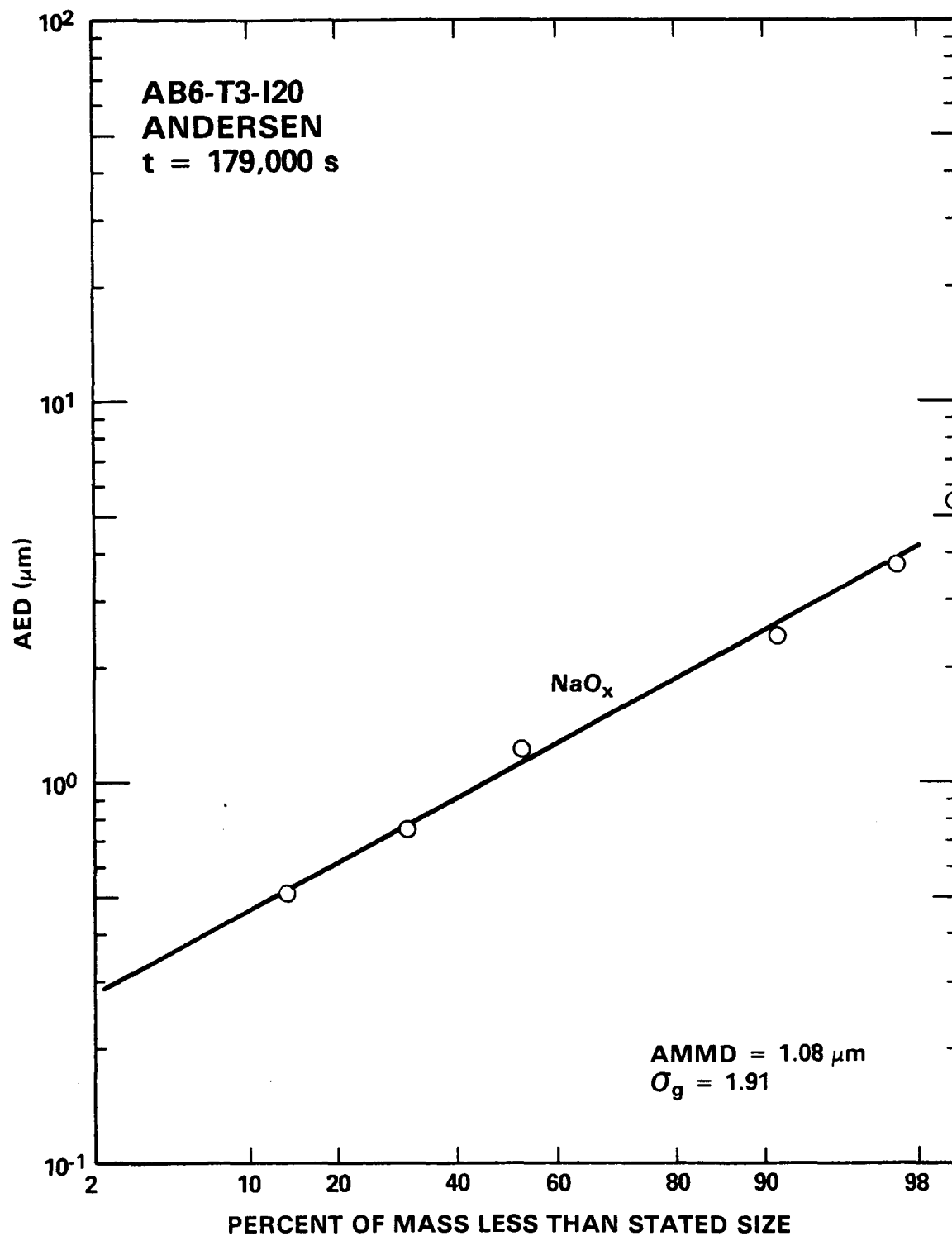
HEDL 8412-035.6

FIGURE D-23. Log-Probability Plot of Impactor Sample T3-I18.



HEDL 8412-035.5

FIGURE D-24. Log-Probability Plot of Impactor Sample T3-I9.



HEDL 8412-035.9

FIGURE D-25. Log-Probability Plot of Impactor Sample T3-I20.

TABLE E-7

PRETEST PREDICTIONS OF ABCOVE TEST AB6 BY SNL USING CONTAIN-1B, MOD415

Time (s)	Susp. Conc. (g/m ³)		AMMD (μm)(a)	ASD (μm)(a)	Leaked Mass (g)		Settled Mass (g)		Plated Mass (g)		Deposition Rate(a) (s-l)
	NaO _x	NaI			NaO _x	NaI	NaO _x	NaI	NaO _x	NaI	
6.00(2) ^(b)	0	1.41(-1) ^(b)	0.704	1.11	0	8.34(-2)	0	1.78(-1)	0	1.87(-1)	9.71(-8)
9.00(2)	2.67(1)	2.08(-1)	1.87	2.34	4.01(1)		3.15(1)	5.90(-1)	2.30(2)	3.17(0)	7.59(-6)
1.50(3)	5.01(1)	1.83(-1)	4.40	31.3	3.23(2)		2.48(4)	1.35(2)	1.44(3)	9.03(0)	2.29(-3)
2.40(3)	5.12(1)	1.35(-1)	4.21	27.3	7.75(2)		9.09(4)	3.52(2)	3.30(3)	1.42(1)	1.75(-3)
3.00(3)	5.13(1)	1.34(-1)	4.22	27.4	1.08(3)		1.36(5)	4.69(2)	4.54(3)	1.75(1)	1.76(-3)
3.25(3)	5.13(1)	7.84(-2)	4.22	27.4	1.39(3)		1.54(5)	5.15(2)	5.05(3)	1.84(1)	1.75(-3)
3.55(3)	5.13(1)	3.05(-2)	4.22	27.4	1.86(3)		1.77(5)	5.55(2)	5.69(3)	1.90(1)	1.75(-3)
4.16(3)	5.13(1)	2.14(-3)	4.22	27.3	3.71(3)		2.22(5)	5.79(2)	6.94(3)	1.92(1)	1.75(-3)
4.76(3)	5.14(1)	8.12(-5)	4.22	27.3	5.53(3)		2.66(5)	5.81(2)	8.18(3)	1.92(1)	1.75(-3)
5.40(3)	5.14(1)	1.73(-6)	4.22	27.3	7.60(3)		3.14(5)	5.81(2)	9.51(3)	1.92(1)	1.75(-3)
5.60(3)	3.03(1)	3.54(-7)	6.14	29.1	7.76(3)		3.32(5)	5.81(2)	9.51(3)	1.92(1)	2.63(-3)
7.20(3)	4.25(0)	5.66(-9)	5.97	14.0	8.41(3)		3.54(5)	5.81(2)	9.52(3)	1.92(1)	6.15(-4)
1.00(4)	1.44(0)	8.52(-10)	5.02	9.08	8.90(3)		3.57(5)	5.81(2)	9.52(3)	1.92(1)	2.60(-4)
3.00(4)	1.58(-1)	2.43(-11)	3.25	4.29	9.78(3)		3.58(5)	5.81(2)	9.53(3)	1.92(1)	6.04(-5)
1.00(5)	1.51(-2)	6.26(-13)	2.17	2.51	1.33(4)		3.58(5)	5.81(2)	9.53(3)	1.92(1)	2.22(-5)
4.00(5)	2.65(-4)	1.11(-15)	1.38	1.51	2.18(4)		3.58(5)	5.81(2)	9.53(3)	1.92(1)	9.82(-6)

(a) Total aerosol.

(b) Numbers in parenthesis are exponents of 10.

A P P E N D I X E

PRETEST CODE PREDICTIONS SUBMITTED BY CODE USERS

APPENDIX E

PRETEST CODE PREDICTIONS SUBMITTED BY CODE USERS

Pretest code predictions were sent to the test performer and other ABCOVE program participants prior to performance of the test. Copies of the tabular data submitted by each participant are presented in Tables E-1 through E-7 as follows:

<u>Table</u>	<u>Code Case</u>	<u>Code</u>	<u>User</u>
E-1	1	HAA-3C	HEDL
E-2	2	HAA-4	RI/ESG
E-3	3	HAARM-3	HEDL
E-4	4	SOFIA	W/AESD
E-5	5	QUICKM	BCL
E-6	6	MAEROS	HEDL
E-7	7	CONTAIN	SNL

TABLE E-1

PRETEST PREDICTION OF ABCOVE TEST AB6 BY HEDL/SSD USING HAA-3C CODE

Time (Sec)	Sust. Conc. (g/m ³)		Particle Size Distribution		Leaked Mass (g)		Settled Mass (g)		Plated Mass (g)		Total Aerosol Removal Rate (Sec ⁻¹)
	NaI	NaOx	AMMD (μ m)	σ_g	NaI	NaOx	NaI	NaOx	NaI	NaOx	
	(a)										
600	1.2(-1)	0	0.43	1.9	3.6(-3)	0	4.3(-2)	0	2.1(-1)	0	6.33(-4)
900	1.6(-1)	2.5(1)	0.67	1.7	9.2(-3)	3.91(-1)	1.3(-1)	6.8(0)	4.6(1)	1.4(3)	4.0(-4)
1500	2.8(-1)	7.2(1)	2.4	2.5	2.3(-2)	3.2(0)	1.4(0)	3.0(2)	7.5(1)	7.3(3)	1.9(-4)
2400	2.4(-1)	8.0(1)	6.8	3.2	4.6(-2)	1.0(1)	1.9(2)	5.8(4)	8.7(1)	1.1(4)	1.1(-3)
3000	2.3(-1)	8.1(1)	6.8	3.2	5.9(-2)	1.5(1)	3.1(2)	1.0(5)	9.3(1)	1.3(4)	1.1(-3)
3250	1.8(-1)	8.1(1)	6.8	3.2	6.3(-2)	1.7(1)	3.4(2)	1.2(5)	9.5(1)	1.4(4)	1.1(-3)
3555	1.3(-1)	8.1(1)	6.8	3.2	6.7(-2)	1.9(1)	3.8(2)	1.4(5)	9.7(1)	1.5(4)	1.1(-3)
4160	6.6(-2)	8.2(1)	6.8	3.2	7.0(-2)	2.4(1)	4.1(2)	1.8(5)	9.9(1)	1.8(4)	1.1(-3)
4760	3.4(-2)	8.2(1)	6.8	3.2	7.2(-2)	2.9(1)	4.3(2)	2.3(5)	1.0(2)	2.0(4)	1.1(-3)
5400	1.7(-2)	8.2(1)	6.8	3.2	7.4(-2)	3.4(1)	4.4(2)	2.7(5)	1.0(2)	2.3(4)	1.1(-3)
5600	1.1(-2)	5.3(1)	16.2	2.7	7.4(-2)	3.5(1)	4.4(2)	3.0(5)	1.0(2)	2.3(4)	2.8(-3)
7200	6.3(-4)	2.1(0)	14.2	1.7	7.4(-2)	3.8(1)	4.5(2)	3.4(5)	1.0(2)	2.3(4)	1.0(-3)
1E4	8.7(-5)	3.7(-1)	10.00	1.5	7.4(-2)	3.8(1)	4.5(2)	3.4(5)	1.0(2)	2.3(4)	4.2(-4)
3E4	<1(-6)	6.2(-3)	5.9	1.3	7.4(-2)	3.8(1)	4.5(2)	3.4(5)	1.0(2)	2.3(4)	1.4(-4)
1E5	<1(-6)	1.99(-6)	4.4	1.2	7.4(-2)	3.8(1)	4.5(2)	3.4(5)	1.0(2)	2.3(4)	--
4E5	<1(-6)	<1(-10)	--	--	--	--	--	--	--	--	--

(a) 1.2(-1) means 1.2×10^{-1}

TABLE E-2

HAA-4A CODE AB6 PRETEST ANALYSIS RESULTS

Time (s)	C(g/m ³)		AED ₅₀ (μ)	σ	M _L (g)	
	NaI	Na ₂ O ₂			NaI	Na ₂ O ₂
600	1.4 - 1	0.0	1.2	1.86	4.2 - 3	0.0
900	2.0 - 1	2.6 + 1	5.5	1.80	9.2 - 3	3.9 - 1
1500	2.6 - 1	6.3 + 1	12.7	2.22	2.3 - 2	3.2
2400	1.9 - 1	6.2 + 1	13.8	2.25	4.3 - 2	8.7
3000	1.7 - 1	6.3 + 1	13.9	2.25	5.3 - 2	1.24 + 1
3250	1.2 - 1	6.0 + 1	17.3	2.16	5.7 - 2	1.39 + 1
3555	6.4 - 2	5.4 + 1	18.7	2.11	6.0 - 2	1.56 + 1
4160	2.0 - 2	5.0 + 1	18.3	2.08	6.2 - 2	1.87 + 1
4760	6.9 - 3	5.0 + 1	18.2	2.08	6.3 - 2	2.16 + 1
5400	2.2 - 3	5.0 + 1	18.2	2.08	6.3 - 2	2.48 + 1
5600	1.5 - 3	3.5 + 1	18.8	2.00	6.3 - 2	2.56 + 1
7200	2.5 - 4	5.7	14.4	1.63	6.3 - 2	2.78 + 1
1 + 4	6.3 - 5	1.4	10.8	1.47	6.3 - 2	2.86 + 1
3 + 4	1.9 - 6	4.3 - 2	6.3	1.27	6.3 - 2	2.92 + 1
1 + 5	1.4 - 8	3.2 - 4	4.4	1.18	6.3 - 2	2.93 + 1
4 + 5	6.6 - 13	1.5 - 8	3.0	1.12	6.3 - 2	2.93 + 1

Time (s)	M _p (g)		M _s (g)		R(g/s)	
	NaI	Na ₂ O ₂	NaI	Na ₂ O ₂	NaI	Na ₂ O ₂
600	1.1 - 2	0.0	2.7 - 1	0.0	1.0 - 3	0.0
900	5.0	4.7 + 2	5.0	3.8 + 2	5.2 - 2	6.7
1500	2.9 + 1	5.3 + 3	5.1 + 1	1.0 + 4	2.7 - 1	6.6 + 1
2400	6.2 + 1	1.5 + 4	2.6 + 2	7.0 + 4	2.3 - 1	7.6 + 1
3000	8.0 + 1	2.1 + 4	3.7 + 2	1.1 + 5	2.1 - 1	7.6 + 1
3250	8.6 + 1	2.3 + 4	4.2 + 2	1.3 + 5	1.8 - 1	9.4 + 1
3555	9.0 + 1	2.6 + 4	4.6 + 2	1.5 + 5	1.1 - 1	9.0 + 1
4160	9.3 + 1	3.0 + 4	4.9 + 2	2.0 + 5	3.2 - 2	7.7 + 1
4760	9.4 + 1	3.4 + 4	5.0 + 2	2.4 + 5	1.1 - 2	7.6 + 1
5400	9.5 + 1	3.9 + 4	5.0 + 2	2.9 + 5	3.3 - 3	7.6 + 1
5600	9.5 + 1	4.0 + 4	5.0 + 2	3.0 + 5	2.3 - 3	5.2 + 1
7200	9.5 + 1	4.0 + 4	5.1 + 2	3.2 + 5	1.6 - 4	3.6
1 + 4	9.5 + 1	4.0 + 4	5.1 + 2	3.3 + 5	1.9 - 5	4.4 - 1
3 + 4	9.5 + 1	4.0 + 4	5.1 + 2	3.3 + 5	1.8 - 7	4.0 - 3
1 + 5	9.5 + 1	4.0 + 4	5.1 + 2	3.3 + 5	6.2 - 10	1.4 - 5
4 + 5	9.5 + 1	4.0 + 4	5.1 + 2	3.3 + 5	1.4 - 14	3.2 - 10

TABLE E-3

PRETEST PREDICTION OF ABOVE TEST AB6 BY HEDL/SSD USING HAARM-3 CODE

Time (Sec)	Sust. Conc. (g/m ³)		Particle Size Distribution		Leaked Mass		Settled Mass	Plated Mass	Total Aerosol Removal Rate (Sec ⁻¹)
	NaI	NaOx	AMMD (μm)	σ _g	NaI	NaOx	(g) NaOx	(g) NaOx	
600	1.2(-1)	0	9.1(-1)	1.82(0)	3.7(-3)	0	0	0	5.08(-4)
900	1.75(-1)	2.32(1)	1.36(0)	1.82(0)	1.6(-2)	3.9(-1)	3.41(1)	9.3(2)	2.1(-4)
1500	2.4(-1)	6.08(1)	7.96(0)	3.02(0)	3.35(-2)	3.2(0)	1.44(4)	2.39(3)	1.2(-3)
2400	1.96(-1)	6.54(1)	8.56(0)	3.05(0)	5.46(-2)	8.9(0)	7.79(4)	3.68(3)	1.35(-3)
3000	1.83(-1)	6.58(1)	8.6(0)	3.05(0)	6.48(-2)	1.28(1)	1.26(5)	4.55(3)	1.35(-3)
3250	1.31(-1)	6.59(1)	8.61(0)	3.05(0)	6.96(-2)	1.44(1)	1.41(5)	4.91(3)	1.35(-3)
3555	9.2(-2)	6.91(1)	7.89(0)	2.99(0)	7.28(-2)	1.65(1)	1.61(5)	5.38(3)	1.15(-3)
4160	4.45(-2)	7.16(1)	8.16(0)	3.0(0)	7.67(-2)	2.07(1)	2.04(5)	6.34(3)	1.23(-3)
4760	2.1(-2)	7.22(1)	8.22(0)	3.0(0)	7.87(-2)	2.5(1)	2.49(5)	7.3(3)	1.23(-3)
5400	9.6(-3)	7.25(1)	8.24(0)	3.01(0)	7.96(-2)	2.95(1)	2.96(5)	8.33(3)	1.23(-3)
5600	5.1(-3)	3.82(1)	1.7(1)	2.8(0)	7.98(-2)	3.06(1)	3.25(5)	8.45(3)	3.51(-3)
7200	3.5(-4)	2.6(0)	1.18(1)	2.02(0)	8.00(-2)	3.22(1)	3.55(5)	8.60(3)	1.05(-3)
1E4	5.5(-5)	4.0(-1)	9.4(0)	1.7(0)	8.00(-2)	3.25(1)	3.57(5)	8.63(3)	4.89(-4)
3E4	1.1(-6)	7.9(-3)	5.1(0)	1.35(0)	8.00(-2)	3.26(1)	3.57(5)	8.65(3)	1.2(-4)
1E5	3.8(-9)	2.3(-5)	3.6(0)	1.21(0)	8.00(-2)	3.26(1)	3.57(5)	8.65(3)	6.94(-5)

(a) 1.2(-1) means 1.2×10^{-1}

TABLE E-4
PRETEST PREDICTION OF ABCOVE TEST AB6
BY W/AESD USING SOPHIA CODE

<u>Time (sec)</u>	<u>Total Aerosol Concentration ($\mu\text{gm/cc}$)</u>	<u>NaI Conc. ($\mu\text{gm/cc}$)</u>	<u>AMMD (μm)</u>	<u>Sigma</u>	<u>ICRR (1/sec)</u>
600	0.138	0.138	0.40	1.89	3.6(-6)
900	25.3	0.189	1.81	1.99	4.3(-4)
1500	60.4	0.240	8.43	2.82	8.9(-4)
2400	72.9	0.222	9.53	2.85	1.2(-3)
3000	74.3	0.210	9.65	2.85	1.2(-3)
3250	74.0	0.155	9.90	2.84	1.2(-3)
3555	73.8	0.107	9.89	2.84	1.2(-3)
4160	73.9	5.26(-2)	9.90	2.84	1.2(-3)
4760	74.2	2.58(-2)	9.91	2.84	1.2(-3)
5400	74.5	1.22(-2)	9.92	2.84	1.2(-3)
5600	48.4	7.95(-3)	22.6	2.48	3.3(-3)
7200	2.06	3.38(-4)	13.6	1.84	6.9(-4)
1(4)	0.959	1.57(-4)	7.91	1.79	1.9(-4)
3(4)	0.250	4.04(-5)	3.97	1.66	3.8(-5)
1(5)	5.53(-2)	8.88(-6)	2.61	1.48	1.5(-5)
4(5)	4.68(-3)	7.49(-7)	1.72	1.32	5.6(-6)

Leaked Mass = .076 lbs. = 34.5 gms.

<u>Plated Mass</u>	<u>Na*(gm/m^2)</u>	<u>NaI(gm/m^2)</u>
Normal Wall	23.1	0.085
Cold Wall	25.4	0.094
Interior Plates	3.4	0.013

* Sodium content of the deposit.

TABLE E-5

PRETEST PREDICTIONS OF ABCOVE TEST AB6 BY BCL USING QUICKM CODE

Time (Sec)	AMMD (μm)	σ_g	Susp. Conc. (g/m^3)		Settled Mass (g)		Plated Mass (g)		Leaked Mass (g)		Sedimentation Rate (s^{-1})	
			NaI	NaO_x	NaI	NaO_x	NaI	NaO_x	NaI	NaO_x	NaI	NaO_x
600	0.812	1.84	0.144	0	0.189	0	2.03(-2) ^(a)	0	3.73(-3)	0	6.08(-6)	---
900	1.95	1.73	0.216	2.76(1)	0.791	4.45(1)	3.02(-2)	7.77(-1)	9.05(-3)	4.03(-1)	2.16(-7)	2.13(-5)
1500	3.71	3.54	0.150	4.70(1)	1.80(2)	3.05(4)	3.89(-2)	3.12(0)	2.22(-2)	3.05(0)	7.93(-6)	1.84(-3)
2400	3.81	3.56	0.125	4.76(1)	3.86(2)	1.01(5)	4.81(-2)	6.59(0)	3.36(-2)	7.27(0)	5.05(-6)	1.93(-3)
3000	3.81	3.56	0.124	4.76(1)	5.09(2)	1.48(5)	5.41(-2)	8.91(0)	4.10(-2)	1.01(1)	5.04(-6)	1.93(-3)
3250	3.81	3.56	6.63(-2)	4.76(1)	5.59(2)	1.67(5)	5.54(-2)	9.88(0)	4.33(-2)	1.13(1)	4.44(-6)	1.93(-3)
3555	3.81	3.56	1.91(-2)	4.77(1)	5.99(2)	1.91(5)	5.57(-2)	1.11(1)	4.45(-2)	1.27(1)	1.97(-6)	1.93(-3)
4160	3.81	3.56	4.35(-4)	4.77(1)	6.15(2)	2.39(5)	5.58(-2)	1.34(1)	4.49(-2)	1.55(1)	6.69(-8)	1.93(-3)
4760	3.81	3.56	3.52(-6)	4.77(1)	6.15(2)	2.86(5)	5.58(-2)	1.57(1)	4.49(-2)	1.84(1)	6.34(-10)	1.93(-3)
5400	3.81	3.56	1.11(-8)	4.77(1)	6.15(2)	3.36(5)	5.58(-2)	1.82(1)	4.49(-2)	2.14(1)	2.17(-12)	1.93(-3)
5600	5.50	3.28	1.81(-9)	3.04(1)	6.15(2)	3.51(5)	5.58(-2)	1.87(1)	4.49(-2)	2.22(1)	4.98(-13)	2.41(-3)
7200	5.48	2.48	1.23(-11)	4.29(0)	6.15(2)	3.74(5)	5.58(-2)	1.94(1)	4.49(-2)	2.39(1)	3.73(-15)	6.27(-4)
1×10^4	4.67	2.12	1.42(-12)	1.43(0)	6.15(2)	3.77(5)	5.58(-2)	1.98(1)	4.49(-2)	2.46(1)	4.87(-16)	2.63(-4)
3×10^4	3.18	1.65	2.81(-14)	1.55(-1)	6.15(2)	3.78(5)	5.58(-2)	2.03(1)	4.49(-2)	2.54(1)	1.87(-17)	6.05(-5)
1×10^5	2.18	1.44	4.60(-16)	1.46(-2)	6.15(2)	3.78(5)	5.58(-2)	2.05(1)	4.49(-2)	2.58(1)	1.26(-18)	2.19(-5)
4×10^5	1.31	1.33	1.80(-19)	3.65(-4)	6.15(2)	3.78(5)	5.58(-2)	2.06(1)	4.49(-2)	2.59(1)	9.89(-21)	7.63(-6)

(a) Numbers in parenthesis are exponents of 10.

TABLE E-6
PRETEST PREDICTIONS OF ABCOVE TEST AB6 BY HEDL/SSD
USING THE MAEROS CODE

Time (s)	Susp. Conc. (g/m ³)		AMMD (μ m) (a)		σ_g (a)		Settled Mass (g)		Plated Mass (g)	
	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI
6.00(2) ^(b)	0	1.39(-1) ^(b)	---	0.85	---	1.87	---	3.36(-1)	---	9.25(-1)
9.00(2)	2.68(1)	2.08(-1)	1.94	2.19	1.56	1.52	7.68(1)	1.22(0)	5.76(1)	1.76(0)
1.50(3)	4.63(1)	1.61(-1)	3.90	5.69	5.20	4.93	2.90(4)	1.59(2)	4.71(2)	4.20(0)
2.40(3)	4.81(1)	1.26(-1)	4.02	4.02	4.90	4.90	9.57(4)	3.67(2)	1.08(3)	5.75(0)
3.00(3)	4.82(1)	1.26(-1)	3.91	3.91	4.96	4.96	1.41(5)	4.86(2)	1.51(3)	6.87(0)
3.25(3)	4.82(1)	7.05(-2)	4.12	7.57	4.78	4.01	1.60(5)	5.33(2)	1.68(3)	7.23(0)
3.55(3)	4.82(1)	2.49(-2)	4.09	12.1	4.92	3.33	1.83(5)	5.71(2)	1.90(3)	7.43(0)
4.16(3)	4.82(1)	1.32(-3)	4.10	17.8	4.90	2.83	2.29(5)	5.91(2)	2.34(3)	7.50(0)
4.76(3)	4.82(1)	3.61(-5)	4.12	20.8	4.78	2.63	2.75(5)	5.92(2)	2.77(3)	7.51(0)
5.40(3)	4.82(1)	5.27(-7)	4.02	21.6	4.83	2.55	3.23(5)	5.92(2)	3.23(3)	7.51(0)
5.60(3)	3.16(1)	1.40(-7)	6.05	21.5	4.31	2.52	3.37(5)	5.92(2)	3.35(3)	7.51(0)
7.20(3)	4.42(0)	2.20(-9)	5.91	11.4	2.86	2.05	3.60(5)	5.92(2)	3.53(3)	7.51(0)
1.00(4)	1.39(0)	3.10(-10)	5.10	7.93	2.15	1.78	3.63(5)	5.92(2)	3.61(3)	7.51(0)
3.00(4)	1.02(-1)	6.19(-12)	3.13	3.92	1.55	1.48	3.64(5)	5.92(2)	3.67(3)	7.51(0)
1.00(5)	2.29(-3)	---	2.08		1.33		3.64(5)	5.92(3)	3.76(3)	7.51(0)
4.00(5)	4.68(-8)	---	1.39		1.20					

(a) Calculated by plotting reported size distribution on log-probability paper.

(b) Numbers in parenthesis are exponents of 10.

A P P E N D I X F

BLIND POST-TEST PREDICTIONS SUBMITTED BY CODE USERS

APPENDIX F

BLIND POST-TEST PREDICTIONS SUBMITTED BY CODE USERS

Blind post-test predictions were sent to the test performer and other ABCOVE program participants prior to release of test results of aerosol behavior. Copies of the tabular data submitted by each participant are presented in Tables F-1 through F-7 as follows:

<u>Table</u>	<u>Code Case</u>	<u>Code</u>	<u>User</u>
F-1	1	HAA-3C	HEDL
F-2	2	HAA-4	RI/ESG
F-3	3	HAARM-3	HEDL
F-4	4	SOFIA	W/AESD
F-5	5	QUICKM	BCL
F-6	6	MAEROS	HEDL
F-7	7	CONTAIN	SNL

TABLE F-1

POST-TEST PREDICTIONS OF ABCOVE TEST AB6 BY HEDL/SSD USING HAA-3C CODE

Time (Sec)	Susp. Conc. (g/m ³)		Particle Size Distribution ^(b)		Leaked Mass (g)		Settled Mass (g)		Plated Mass (g)		Total Aerosol Removal Rate (Sec ⁻¹)
	NaO _x	NaI	AMMD (μm)	σ _g	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI	
600	0.00E+0	7.99E-2 ^(a)	5.2(-1)	1.86	0.00E+0	2.51E-3	0.00E+0	2.81E-2	0.00E+0	1.61E+1	6.62E-4
900	2.41E+1	1.15E-1	6.72(-1)	1.73	3.48E-1	5.37E-3	6.15E+0	6.89E-2	1.26E+3	2.94E+1	3.93E-4
1500	7.18E+1	1.89E-1	2.85	2.59	3.19E+0	1.43E-2	6.08E+2	1.43E+0	6.77E+3	4.88E+1	2.76E-4
2400	7.80E+1	1.61E-1	6.65	3.16	9.99E+0	2.99E-2	6.21E+4	1.38E+2	1.01E+4	5.67E+1	1.15E-3
3000	7.90E+1	1.52E-1	6.71	3.16	1.46E+1	3.91E-2	1.06E+5	2.25E+2	1.23E+4	6.10E+1	1.14E-3
3250	7.92E+1	1.15E-1	6.72	3.16	1.66E+1	4.23E-2	1.24E+5	2.55E+2	1.32E+4	6.25E+1	1.14E-3
3555	7.96E+1	8.10E-2	6.74	3.16	1.90E+1	4.52E-2	1.46E+5	2.83E+2	1.43E+4	6.39E+1	1.14E-3
4160	8.01E+1	4.08E-2	6.78	3.16	2.37E+1	4.88E-2	1.91E+5	3.15E+2	1.66E+4	6.56E+1	1.13E-3
4760	8.05E+1	2.09E-2	6.8	3.16	2.85E+1	5.05E-2	2.35E+5	3.32E+2	1.89E+4	6.64E+1	1.13E-3
5400	8.09E+1	1.00E-2	6.82	3.16	3.36E+1	5.15E-2	3.82E+5	3.40E+2	2.13E+4	6.69E+1	1.13E-3
5600	5.00E+1	6.06E-3	1.63(1)	2.66	3.49E+1	5.16E-2	3.07E+5	3.43E+2	2.16E+4	6.69E+1	3.01E-3
7200	2.00E+1	4.89E-4	1.45(1)	1.68	3.67E+1	5.19E-2	3.48E+5	3.49E+2	2.18E+4	6.69E+1	8.78(-4)
10000	4.05E-1	1.66E-4	1.02(1)	1.47	3.69E+1	5.19E-2	3.50E+5	3.49E+2	2.18E+4	6.69E+1	3.82E-4
30000	7.02(-3)	7.80E-6	6.03	1.26	3.71E+1	5.20E-2	3.50E+5	3.49E+2	2.18E+4	6.70E+1	~1.41(-4)
1E5	2.22E-6	---	4.45	1.17	3.71E+1	5.20E-2	3.50E+5	3.49E+2	2.18E+4	6.70E+1	---

(a) 7.99E-2 means 7.99×10^{-2}

(b) Combined Aerosol

TABLE F-2

HAA-4 CODE AB6 BLIND POST TEST ANALYSIS RESULTS

Time (s)	C(g/m ³)		AED ₅₀ (μ)	σ	M _L (g)	
	NaI	Na ₂ O ₂			NaI	Na ₂ O ₂
600	9.8 - 2	0.0	1.1	1.53	2.9 - 3	0.0
900	1.4 - 1	2.5 + 1	6.3	1.65	6.4 - 3	3.5 + 1
1500	1.8 - 1	6.2 + 1	16.4	2.16	1.7 - 2	3.2 + 0
2400	1.1 - 1	6.3 + 1	16.5	2.15	2.8 - 2	8.1 + 0
3000	1.0 - 1	5.4 + 1	16.5	2.15	3.5 - 2	1.12 + 1
3250	6.5 - 2	5.3 + 1	18.0	2.12	3.7 - 2	1.26 + 1
3555	3.6 - 2	5.1 + 1	18.4	2.10	3.8 - 2	1.41 + 1
4160	1.2 - 2	5.0 + 1	18.2	2.09	3.9 - 2	1.71 + 1
4750	4.0 - 3	5.0 + 1	18.2	2.09	4.0 - 2	2.01 + 1
5400	1.3 - 3	5.1 + 1	18.3	2.09	4.0 - 2	2.33 + 1
5600	8.7 - 4	3.5 + 1	18.9	2.01	4.0 - 2	2.41 + 1
7200	1.5 - 4	5.9 + 0	14.5	1.63	4.0 - 2	2.64 + 1
1.0 + 4	3.8 - 5	1.5 + 0	11.0	1.47	4.0 - 2	2.72 + 1
3.0 - 4	1.2 - 6	4.9 - 2	6.5	1.28	4.0 - 2	2.78 + 1
1.0 + 5	8.6 - 9	3.4 - 4	4.5	1.19	4.0 - 2	2.79 + 1
4.0 + 5	2.7 - 13	1.1 - 8	3.1	1.12	4.0 - 2	2.79 + 1

Time (s)	M _p (g)		M _s (g)		R (g/s)	
	NaI	Na ₂ O ₂	NaI	Na ₂ O ₂	NaI	Na ₂ O ₂
600	8.4 - 2	0.0	1.4 - 1	0.0	8.4 - 4	0.0
900	9.3 - 1	9.9 + 1	3.9	4.0 + 2	2.2 - 2	3.9 + 0
1500	3.8 + 0	8.9 + 2	5.1 + 1	1.5 + 4	2.7 - 1	9.4 + 1
2400	6.8 + 0	2.1 + 3	2.3 + 2	9.1 + 4	1.6 - 1	7.7 + 1
3000	8.4 + 0	3.0 + 3	3.2 + 2	1.4 + 5	1.4 - 1	7.7 + 1
3250	9.0 + 0	3.3 + 3	3.5 + 2	1.6 + 5	1.0 - 1	8.4 + 1
3555	9.3 + 0	3.7 + 3	3.8 + 2	1.8 + 5	5.9 - 2	8.2 + 1
4160	9.7 + 0	4.5 + 3	4.0 + 2	2.3 + 5	1.8 - 2	7.8 + 1
4760	9.8 + 0	5.3 + 3	4.0 + 2	2.7 + 5	6.1 - 3	7.7 + 1
5400	9.8 + 0	6.2 + 3	4.0 + 2	3.2 + 5	1.9 - 3	7.7 + 1
5600	9.8 + 0	6.4 + 3	4.0 + 2	3.4 + 5	1.3 - 3	5.3 + 1
7200	9.9 + 0	6.6 + 3	4.1 + 2	3.6 + 5	8.9 - 5	3.6 + 0
1.0 + 4	9.9 + 0	6.6 + 3	4.1 + 2	3.6 + 5	1.1 - 5	4.5 - 1
3.0 + 4	9.9 + 0	6.6 + 3	4.1 + 2	3.6 + 5	1.1 - 7	4.6 - 3
1.0 + 5	9.9 + 0	6.6 + 3	4.1 + 2	3.6 + 5	3.9 - 10	1.5 - 5
4.0 + 5	9.9 + 0	6.6 + 3	4.1 + 2	3.6 + 5	6.0 - 15	2.4 - 10

TABLE F-3

POST-TEST PREDICTION OF ABCOVE TEST AB6 BY HEDL/SSD USING HAARM-3 CODE

Time (Sec)	Susp. Conc. (g/m ³)		Particle Size Distribution ^(b)		Leaked Mass (g)		Settled Mass (g)		Plated Mass (g)		Total Aerosol Removal Rate (Sec-1)
	NaO _x	NaI	AMMD (μm)	σ _g	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI	
600	0.00E+0	7.65E-2 ^(a)	9.23(-1)	1.82	0.00E+0	2.44E-3	0.00E+0	1.81E-1	0.00E+0	1.87E+1	7.99E-4
900	2.37E+1	1.13E-1	1.69	1.9	3.32E-1	5.20E-3	5.85E+1	5.72E-1	1.05E+3	3.09E+1	2.71E-4
1500	5.75E+1	1.48E-1	7.07	2.96	2.91E+0	1.33E-2	1.57E+4	4.70E+1	2.38E+3	3.59E+1	1.05E-3
2400	6.62E+1	1.34E-1	8.07	3.02	8.55E+0	2.59E-2	7.58E+4	1.79E+2	3.64E+3	3.87E+1	1.32E-3
3000	6.71E+1	1.28E-1	8.16	3.03	1.25E+1	3.36E-2	1.20E+5	2.66E+2	4.49E+3	4.04E+1	1.32E-3
3250	6.73E+1	9.26E-2	8.19	3.03	1.42E+1	3.62E-2	1.38E+5	2.96E+2	4.85E+3	4.09E+1	1.32E-3
3555	6.75E+1	6.21E-2	8.21	3.03	1.62E+1	3.85E-2	1.61E+5	3.21E+2	5.29E+3	4.14E+1	1.32E-3
4160	6.83E+1	2.82E-2	7.98	3.01	2.02E+1	4.11E-2	2.06E+5	3.50E+2	6.17E+3	4.20E+1	1.28E-3
4760	6.97E+1	1.31E-2	8.13	3.01	2.43E+1	4.23E-2	2.49E+5	3.63E+2	7.07E+3	4.23E+1	1.27E-3
5400	7.00E+1	5.65E-3	8.18	3.02	2.87E+1	4.29E-2	2.97E+5	3.69E+2	8.04E+3	4.24E+1	1.51E-3
5600	3.63E+1	3.88E-3	1.68(1)	2.8	2.95E+1	4.29E-2	3.17E+5	3.70E+2	8.13E+3	4.24E+1	2.01E-3
7200	2.74E+0	1.03E-3	1.16(1)	2.04	3.10E+1	4.32E-2	3.49E+5	3.74E+2	8.28E+3	4.24E+1	1.48E-3
10000	4.72E-1	2.34E-4	9.5	1.73	3.16E+1	4.33E-2	3.56E+5	3.76E+2	8.34E+3	4.24E+1	5.21E-4
30000	1.05E-2	1.61E-5	5.2	1.37	3.18E+1	4.34E-2	3.56E+5	3.76E+2	8.36E+3	4.25E+1	1.36E-4
100000	3.15E-5	5.02E-7	3.59	1.21	3.18E+1	4.35E-2	3.56E+5	3.76E+2	8.36E+3	4.25E+1	7.14E-5

(a) 7.65E-2 means 7.65×10^{-2}

(b) Combined Aerosol

TABLE F-4

SOFIA AEROSOL RESULTS, BLIND POST-TEST PREDICTION
ABCOVE TEST AB6

<u>Time (sec)</u>	<u>Total Aerosol Concentration ($\mu\text{gm/cc}$)</u>	<u>NaI Conc. ($\mu\text{gm/cc}$)</u>	<u>AMMD (μm)</u>	<u>Sigma</u>	<u>ICRR (1/sec)</u>
600	0.097	0.097	0.40	1.90	3.6(-6)
900	23.2	0.135	1.75	1.97	4.3(-4)
1500	59.2	0.176	8.36	2.82	8.9(-4)
2400	72.8	0.163	9.58	2.84	1.2(-3)
3000	74.2	0.153	9.72	2.84	1.2(-3)
3250	74.1	0.115	9.92	2.84	1.2(-3)
3555	74.0	8.00(-2)	9.91	2.84	1.2(-3)
4160	74.0	4.01(-2)	9.92	2.84	1.2(-3)
4760	74.2	2.01(-2)	9.93	2.84	1.2(-3)
5400	74.5	9.73(-3)	9.96	2.84	1.2(-3)
5600	49.4	6.44(-3)	22.2	2.49	3.3(-3)
7200	2.10	2.73(-4)	13.8	1.84	6.9(-4)
1(4)	0.970	1.26(-4)	7.97	1.79	1.9(-4)
3(4)	0.252	3.23(-5)	3.98	1.66	3.8(-5)
1(5)	5.57(-2)	7.10(-6)	2.62	1.48	1.5(-5)
4(5)	4.84(-3)	6.16(-7)	1.72	1.32	5.6(-6)

Leaked Mass = .075 lbs. = 34 gms.

Plated Mass	Na*(gm/m^2)	NaI(gm/m^2)
Normal Wall	21.9	0.060
Cold Wall	24.1	0.066
Interior Plates	3.2	0.009

* Sodium content of the deposit.

TABLE F-5

BLIND POST-TEST PREDICTIONS OF ABCOVE TEST AB6

BY BCL USING QUICKM CODE

Time (Sec)	Susp. Conc. (g/m ³)		AMMD (μm)		σ _g		Leaked Mass (g)		Settled Mass (g)		Plated Mass (g)		Removal Rate(sec ⁻¹)	
	NaO _x	NaI	NaO _x ^(a)	NaI ^(b)	NaO _x ^(a)	NaI	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI
620	0	1.04E-1 ^(c)	---	0.840	---	1.53	0	2.78E-3	0	9.91E-2	0	1.11E-2	---	4.27E-6
900	2.60E1	1.50E-1	1.86	2.12	1.71	---	3.56E-1	6.28E-3	3.57E1	4.19E-1	1.51E2	1.23E0	1.88E-5	2.28E-5
1500	4.69E1	1.06E-1	3.68	4.75	3.55	---	2.97E0	1.56E-2	2.92E4	1.20E2	1.04E3	4.00E0	1.86E-3	2.28E-3
2400	4.76E1	8.69E-2	3.78	3.65	3.57	---	7.19E0	2.36E-2	9.91E4	2.64E2	2.45E3	6.64E0	1.93E-3	1.90E-3
3000	4.76E1	8.69E-2	3.78	3.65	3.57	---	1.00E1	2.87E-2	1.46E5	3.48E2	3.42E3	8.46E0	1.93E-3	1.90E-3
3250	4.76E1	4.63E-2	3.78	7.20	3.57	---	1.12E1	3.04E-2	1.66E5	3.82E2	3.91E3	8.93E0	1.93E-3	3.16E-3
3555	4.76E1	1.33E-2	3.78	12.9	3.57	---	1.26E1	3.12E-2	1.89E5	4.10E2	4.34E3	9.09E0	1.93E-3	4.93E-3
4160	4.76E1	2.96E-4	3.78	22.0	3.57	---	1.55E1	3.15E-2	2.37E5	4.22E2	5.35E3	9.13E0	1.93E-3	7.38E-3
4760	4.76E1	2.29E-6	3.78	26.4	3.57	---	1.83E1	3.15E-2	2.84E5	4.22E2	6.35E3	9.13E0	1.93E-3	8.67E-3
5400	4.76E1	6.84E-9	3.78	29.0	3.57	---	2.13E1	3.15E-2	3.34E5	4.22E2	7.42E3	9.13E0	1.93E-3	9.40E-3
5600	3.02E1	1.10E-9	5.48	27.5	3.28	---	2.21E1	3.15E-2	3.49E5	4.22E2	7.58E3	9.13E0	2.41E-3	8.40E-3
7200	4.25E0	7.27E-12	5.46	12.2	2.48	---	2.38E1	3.15E-2	3.72E5	4.22E2	7.67E3	9.13E0	6.25E-4	1.31E-3
1x10 ⁴	1.42E0	8.37E-13	4.66	8.30	2.13	---	2.44E1	3.15E-2	3.74E5	4.22E2	7.67E3	9.13E0	2.63E-4	4.93E-4
3x10 ⁴	1.55E-1	1.63E-14	3.17	4.63	1.64	---	2.53E1	3.15E-2	3.75E5	4.22E2	7.67E3	9.13E0	6.03E-5	1.03E-4
1x10 ⁵	1.47E-2	2.70E-16	2.18	3.00	1.44	---	2.57E1	3.15E-2	3.76E5	4.22E2	7.67E3	9.13E0	2.18E-5	4.01E-5
4x10 ⁵	3.71E-4	1.08E-19	1.31	2.26	1.33	---	2.58E1	3.15E-2	3.75E5	4.22E2	7.67E3	9.13E0	7.61E-6	1.99E-5

(a) Combined aerosol.

(b) From log-probability plot of reported size data.

(c) Numbers in parenthesis are exponents of 10.

TABLE F-6

BLIND POST-TEST PREDICTIONS OF ABCOVE TEST AB6
BY HEDL/SSD USING MAEROS CODE

Time (Sec)	Susp. Conc. (g/m ³)		AMMD (μm) ^(a)		σ _g ^(a)		Settled Mass (g)		Plated Mass (g)	
	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI
600	0	9.69E-2	---	0.83	---	1.92	0	2.26E-1	0	6.25E-1
900	2.55E1	1.45E-1	1.71	1.94	1.49	1.44	6.22E1	7.71E-1	5.28E1	1.22E0
1500	4.69E1	1.14E-1	3.71	5.44	5.28	4.91	2.81E4	1.08E2	4.28E2	2.79E0
2400	4.87E1	8.71E-2	3.76	3.76	4.90	4.90	9.62E4	2.56E2	1.03E3	3.84E0
3000	4.87E1	8.70E-2	3.78	3.78	4.86	4.86	1.43E5	3.38E2	1.47E3	4.62E0
3250	4.87E1	4.85E-2	3.76	7.03	4.85	4.01	1.62E5	3.71E2	1.65E3	4.87E0
3555	4.87E1	1.69E-2	3.76	11.2	4.86	3.33	1.85E5	3.98E2	1.87E3	5.01E0
4160	4.87E1	8.69E-4	3.76	17.1	4.86	2.73	2.32E5	4.11E2	2.31E3	5.06E0
4760	4.87E1	2.29E-5	3.76	20.1	4.86	2.54	2.79E5	4.12E2	2.74E3	5.06E0
5400	4.87E1	3.20E-7	3.76	21.6	4.86	2.46	3.28E5	4.12E2	3.21E3	5.06E0
5600	3.18E1	8.40E-8	5.60	21.0	4.36	2.41	3.42E5	4.12E2	3.42E3	5.06E0
7200	4.44E0	1.30E-9	5.78	10.9	2.72	2.00	3.65E5	4.12E2	3.60E3	5.06E0
1 10 ⁴	1.40E0	1.86E-10	4.75	7.41	2.17	1.83	3.67E5	4.12E2	3.68E3	5.06E0
3 10 ⁴	1.03E-1	4.05E-12	2.89	3.86	1.59	1.43	3.68E5	4.12E2	3.75E3	5.06E0
1 10 ⁵	8.47E-3	---	1.92	---	1.31	---	3.68E5	4.12E2	3.75E3	5.06E0
4 10 ⁵	1.43E-4	---	1.19	---	1.25	---	3.68E5	4.12E2	3.75E3	5.06E0

(a) From log-probability plot of reported size data.

A P P E N D I X G

CODE COMPARISONS OF SUSPENDED MASS CONCENTRATION

TABLE 61

SUSPENDED MASS CONCENTRATION AT 600 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL					^(c) 1.2 E-1	7.99E-2	0.859	0.810
HAA-4	RI/ESG					1.4 E-1	9.8 E-2	1.054	0.994
HAARM-3	HEDL					1.2 E-1	7.65E-2	0.823	0.776
SOFIA	W-AESD					1.38E-1	9.7 E-2	1.043	0.984
QUICK M	BCL					1.44E-1	^(d) 1.04E-1	1.118	1.055
MAEROS	HEDL					1.39E-1	9.69E-2	1.042	0.983
CONTAIN	SNL					1.41E-1	9.86E-2	1.060	1.000
AVERAGE						1.35E-1	9.30E-2		0.943

(a) TEST AB6 RESULT FOR NaOx = 0

(b) TEST AB6 RESULT FOR NaI = 0.0986 g/CU M

(c) 1.2E-1 MEANS 1.2×10^{-1}

(d) AT TIME = 620 SECONDS

TABLE 62
SUSPENDED MASS CONCENTRATION AT 900 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	2.5 E1 ^(c)	2.41E1	0.980	1.15	1.6 E-1	1.15E-1	0.852	0.418
HAA-4	RI/ESG	2.6 E1	2.5 E1	1.016	1.19	2.0 E-1	1.4 E-1	1.037	0.509
HAARM-3	HEDL	2.32E1	2.37E1	0.963	1.13	1.75E-1	1.13E-1	0.837	0.411
SOFIA	W-AESD	2.51E1	2.31E1	0.939	1.10	1.80E-1	1.35E-1	1.000	0.491
QUICK M	BCL	2.76E1	2.60E1	1.057	1.24	2.16E-1	1.50E-1	1.111	0.545
MAEROS	HEDL	2.68E1	2.55E1	1.037	1.21	2.08E-1	1.45E-1	1.074	0.527
CONTAIN	SNL	2.67E1	2.54E1	1.033	1.21	2.08E-1	1.45E-1	1.074	0.527
AVERAGE		2.58E1	2.46E1		1.17	1.94E-1	1.35E-1		0.491

(a) TEST AB6 RESULT FOR NaOx = $2.10E1 \pm 6.3E0$ g/CU M

(b) TEST AB6 RESULT FOR NaI = $2.75E-1 \pm 2.0E-1$ g/CU M

(c) 2.50E1 MEANS 2.5×10^1

TABLE 63

SUSPENDED MASS CONCENTRATION AT 1500 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	7.2 E1 ^(c)	7.18E1	1.287	2.28	2.8 E-1	1.89E-1	1.286	0.879
HAA-4	RI/ESG	6.3 E1	6.2 E1	1.111	1.97	2.6 E-1	1.8 E-1	1.224	0.837
HAARM-3	HEDL	6.08E1	5.75E1	1.030	1.82	2.4 E-1	1.48E-1	1.007	0.688
SOFIA	W-AESD	6.02E1	5.90E1	1.057	1.87	2.4 E-1	1.78E-1	1.197	0.819
QUICK M	BCL	4.70E1	4.69E1	0.841	1.49	1.50E-1	1.06E-1	0.721	0.493
MAEROS	HEDL	4.63E1	4.71E1	0.844	1.50	1.61E-1	1.15E-1	0.782	0.534
CONTAIN	SNL	5.01E1	4.63E1	0.830	1.47	1.83E-1	1.14E-1	0.776	0.530
AVERAGE		5.71E1	5.58E1		1.77	2.16E-1	1.47E-1		0.684

(a) TEST AB6 RESULT FOR NaOx = $3.15E1 \pm 5.2E0$ g/CU M(b) TEST AB6 RESULT FOR NaI = $2.15E-1 \pm 5.3E-2$ g/CU M(c) 7.2 E1 MEANS 7.2×10^1

TABLE 64

SUSPENDED MASS CONCENTRATION AT 2400 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	8.0 E1 ^(c)	7.80E1	1.283	3.36	2.4 E-1	1.61E-1	1.345	1.400
HAA-4	RI/ESG	6.2 E1	6.3 E1	1.036	2.72	1.9 E-1	1.1 E-1	0.919	0.957
HAARM-3	HEDL	6.54E1	6.62E1	1.089	2.85	1.96E-1	1.34E-1	1.120	1.165
SOFIA	W-AESD	7.27E1	7.26E1	1.194	3.13	2.22E-1	1.63E-1	1.362	1.417
QUICK M	BCL	4.76E1	4.76E1	0.783	2.05	1.25E-1	8.69E-2	0.726	0.756
MAEROS	HEDL	4.81E1	4.88E1	0.803	2.10	1.26E-1	8.74E-2	0.730	0.760
CONTAIN	SNL	5.12E1	4.95E1	0.814	2.13	1.35E-1	9.04E-2	0.755	0.786
AVERAGE		6.10E1	6.08E1		2.62	1.76E-1	1.20E-1		1.043

(a) TEST AB6 RESULT FOR NaOx = $2.32E1 \pm 7.0E0$ g/CU M(b) TEST AB6 RESULT FOR NaI = $1.15E-1 \pm 4.8E-2$ g/CU M(c) 8.0 E1 MEANS 8.0×10^1

TABLE 65

SUSPENDED MASS CONCENTRATION AT 3000 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	8.1 E1 ^(c)	7.90E1	1.317	3.32	2.3 E-1	1.52E-1	1.335	1.788
HAA-4	RI/ESG	6.3 E1	5.4 E1	0.900	2.27	1.7 E-1	1.0 E-1	0.878	1.176
HAARM-3	HEDL	6.58E1	6.71E1	1.118	2.82	1.83E-1	1.28E-1	1.078	1.506
SOFIA	W-AESD	7.41E1	7.40E1	1.233	3.11	2.1 E-1	1.53E-1	1.344	1.800
QUICK M	BCL	4.76E1	4.76E1	0.793	2.00	1.24E-1	8.69E-2	0.763	1.022
MAEROS	HEDL	4.82E1	4.88E1	0.813	2.05	1.26E-1	8.72E-2	0.766	1.026
CONTAIN	SNL	5.13E1	4.95E1	0.825	2.08	1.34E-1	9.01E-2	0.791	1.060
AVERAGE		6.16E1	6.00E1		2.52	1.68E-1	1.14E-1		1.34

(a) TEST AB6 RESULT FOR NaOx = $2.38E1 \pm 7.1E0$ g/CU M(b) TEST AB6 RESULT FOR NaI = $8.5E-2 \pm 2.7E-2$ g/CU M(c) 8.1 E1 MEANS 8.1×10^1

TABLE 66
SUSPENDED MASS CONCENTRATION AT 3250 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	8.1 E1 ^(c)	7.92E1	1.322	3.13	1.8 E-1	1.15E-1	1.508	3.194
HAA-4	RI/ES6	8.0 E1	5.3 E1	0.885	2.09	1.2 E-1	6.5 E-2	0.852	1.806
HAARM-3	HEDL	6.59E1	6.73E1	1.123	2.66	1.31E-1	9.20E-2	1.214	2.572
SOFIA	W-AESD	7.38E1	7.40E1	1.235	2.92	1.55E-1	1.15E-1	1.508	3.194
QUICK M	BCL	4.76E1	4.76E1	0.795	1.88	6.63E-2	4.63E-2	0.607	1.286
MAEROS	HEDL	4.82E1	4.88E1	0.814	1.93	7.05E-2	4.87E-2	0.639	1.353
CONTAIN	SNL	5.13E1	4.95E1	0.826	1.96	7.84E-2	5.13E-2	0.673	1.425
AVERAGE		6.11E1	5.99E1		2.37	1.14E-1	7.63E-2		2.119

(a) TEST AB6 RESULT FOR NaOx = $2.53E1 \pm 7.6E0$ g/CU M

(b) TEST AB6 RESULT FOR NaI = $3.6E-2 \begin{smallmatrix} +3.6E-2 \\ -1.8E-2 \end{smallmatrix}$ g/CU M

(c) 8.1 E1 MEANS 8.1×10^1

TABLE 67
SUSPENDED MASS CONCENTRATION AT 3555 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	8.1 E1 ^(c)	7.96E1	1.332	3.00	1.3 E-1	8.10E-2	1.839	10.125
HAA-4	RI/ESG	5.4 E1	5.1 E1	0.854	1.92	6.4 E-2	3.6 E-2	0.817	4.500
HAARM-3	HEDL	6.59E1	6.75E1	1.130	2.55	1.31E-1	6.21E-2	1.408	7.763
SOFIA	W-AESD	7.37E1	7.40E1	1.239	2.79	1.07E-1	8.00E-2	1.816	10.000
QUICK M	BCL	4.77E1	4.76E1	0.797	1.80	1.91E-2	1.33E-2	0.302	1.663
MAEROS	HEDL	4.82E1	4.89E1	0.818	1.85	2.49E-2	1.71E-2	0.388	2.138
CONTAIN	SNL	5.13E1	4.96E1	0.829	1.87	3.05E-2	1.88E-2	0.427	2.350
AVERAGE		6.03E1	5.97E1		2.25	7.22E-2	4.40E-2		5.500

(a) TEST AB6 RESULT FOR NaOx = $2.65E1 \pm 8.0E0$ g/CU M

(b) TEST AB6 RESULT FOR NaI = $8.0E-3 \pm 6.0E-3$ g/CU M

(c) 8.1 E1 MEANS 8.1×10^1

TABLE 68

SUSPENDED MASS CONCENTRATION AT 4160 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	8.2 E1 ^(c)	8.01E1	1.336	2.88	6.6 E-2	4.08E-2	2.318	13.600
HAA-4	RI/ESG	5.0 E1	5.0 E1	0.834	1.80	2.0 E-2	1.2 E-2	0.682	4.000
HAARM-3	HEDL	7.10E1	6.83E1	1.139	2.46	4.45E-2	2.82E-2	1.602	9.400
SOFIA	W-AESD	7.39E1	7.40E1	1.234	2.66	5.26E-2	4.01E-2	2.278	13.367
QUICK M	BCL	4.77E1	4.76E1	0.794	1.71	4.35E-4	2.96E-4	0.017	0.089
MAEROS	HEDL	4.82E1	4.89E1	0.816	1.76	1.32E-3	8.91E-4	0.051	0.297
CONTAIN	SNL	5.13E1	5.08E1	0.847	1.83	2.14E-3	1.24E-3	0.070	0.413
AVERAGE		6.07E1	6.00E1		2.16	2.67E-2	1.76E-2		5.867

(a) TEST AB6 RESULT FOR NaOx = $2.78E1 \pm 8.3E0$ g/CU M(b) TEST AB6 RESULT FOR NaI = $3.0E-3 \pm 2.0E-3$ g/CU M(c) 8.2 E1 MEANS 8.2×10^1

TABLE 69
SUSPENDED MASS CONCENTRATION AT 4760 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	8.2 E1 ^(c)	8.05E1	1.328	2.86	3.4 E-2	2.09E-2	2.515	10.450
HAA-4	RI/ESG	5.0 E1	5.0 E1	0.830	1.79	6.9 E-3	4.0 E-3	0.481	2.000
HAARM-3	HEDL	7.22E1	6.97E1	1.157	2.49	2.1 E-2	1.31E-2	1.576	6.550
SOFIA	W-AESD	7.42E1	7.42E1	1.292	2.65	2.58E-2	2.01E-2	2.419	10.050
QUICK M	BCL	4.77E1	4.76E1	0.790	1.70	3.52E-6	2.29E-6	2.8 E-4	0.001
MAEROS	HEDL	4.82E1	4.89E1	0.812	1.75	3.61E-5	2.39E-5	2.9 E-3	0.012
CONTAIN	SNL	5.14E1	5.07E1	0.842	1.81	8.12E-5	4.19E-5	0.005	0.021
AVERAGE		6.08E1	6.02E1		2.15	1.25E-2	8.31E-3		4.155

(a) TEST AB6 RESULT FOR NaOx = $2.80E1 \pm 8.4E0$ g/CU M

(b) TEST AB6 RESULT FOR NaI = $2.0E-3 \pm 1.2E-3$ g/CU M

(c) 8.2 E1 MEANS 8.2×10^1

TABLE 610

SUSPENDED MASS CONCENTRATION AT 5400 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	8.2 E1 ^(c)	8.09E1	1.337	2.89	1.7 E-2	1.00E-2	2.624	6.667
HAA-4	RI/ESG	5.0 E1	5.1 E1	0.843	1.82	2.2 E-3	1.3 E-3	0.341	0.867
HAARM-3	HEDL	7.25E1	7.00E1	1.157	2.50	9.6 E-3	5.65E-3	1.482	3.767
SOFIA	W-AESD	7.45E1	7.45E1	1.231	2.66	1.22E-2	9.73E-3	2.553	6.487
QUICK M	BCL	4.77E1	4.76E1	0.787	1.70	1.11E-8	6.84E-9	1.8E-6	4.56E-6
MAEROS	HEDL	4.82E1	4.89E1	0.808	1.75	5.27E-7	3.40E-7	8.9E-5	2.27E-4
CONTAIN	SNL	5.14E1	5.07E1	0.838	1.81	1.73E-6	7.86E-7	2.07E-4	5.24E-4
AVERAGE		6.09E1	6.05E1		2.16	5.86E-3	3.81E-3		2.540

(a) TEST AB6 RESULT FOR NaOx = $2.80E1 \pm 8.4E0$ g/CU M(b) TEST AB6 RESULT FOR NaI = $1.5E-3 \pm 0.6E-3$ g/CU M(c) 8.2 E1 MEANS 8.2×10^1

TABLE 611
SUSPENDED MASS CONCENTRATION AT 5600 SECONDS

CODE	USER	NaO _x				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(c) 5.3 E1	5.00E1	1.334	2.78	1.1 E-2	6.06E-3	2.460	5.050
HAA-4	RI/ESG	3.5 E1	3.5 E1	0.934	1.94	1.5 E-3	8.7 E-4	0.353	0.725
HAARM-3	HEDL	3.82E1	3.63E1	0.969	2.02	5.1 E-2	3.88E-3	1.575	3.233
SOFIA	W-AESD	4.84E1	4.94E1	1.318	2.74	7.95E-3	6.44E-3	2.613	5.367
QUICK M	BCL	3.04E1	3.02E1	0.806	1.68	1.81E-9	1.10E-9	4.5E-7	9.17E-7
MAEROS	HEDL	3.16E1	3.19E1	0.851	1.77	1.40E-7	8.98E-8	3.6E-5	7.48E-5
CONTAIN	SNL	3.03E1	3.05E1	0.814	1.69	3.54E-7	1.70E-7	6.9E-5	1.42E-4
AVERAGE		3.81E1	3.75E1		2.08	1.02E-2	2.46E-3		2.050

(a) TEST AB6 RESULT FOR NaO_x = $1.80E1 \pm 5.4E0$ g/CU M

(b) TEST AB6 RESULT FOR NaI = $1.2E-3 \pm 0.6E-3$ g/CU M

(c) 5.3 E1 MEANS 5.3×10^1

TABLE 612
SUSPENDED MASS CONCENTRATION AT 7200 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	2.1 E0 ^(c)	2.00E0	0.543	0.588	6.3 E-4	4.89E-4	1.763	2.574
HAA-4	RI/ESG	5.7 E0	5.9 E0	1.003	1.74	2.5 E-4	1.5 E-4	0.541	0.789
HAARM-3	HEDL	2.6 E0	2.74E0	0.745	0.806	3.5 E-4	1.03E-3	3.713	5.421
SOFIA	W-AESD	2.06E0	2.10E0	0.571	0.618	3.38E-4	2.73E-4	0.984	1.437
QUICK M	BCL	4.29E0	4.26E0	1.158	1.25	1.23E-11	7.27E-12	2.6E-8	3.83E-8
MAEROS	HEDL	4.42E0	4.46E0	1.212	1.31	2.20E-9	2.31E-8	8.3E-5	1.22E-4
CONTAIN	SNL	4.25E0	4.30E0	1.168	1.26	5.66E-9	2.75E-8	9.9E-6	1.45E-5
AVERAGE		3.63E0	3.68E0		1.08	2.24E-4	2.77E-4		1.458

(a) TEST AB6 RESULT FOR NaOx = $3.4E0 \pm 1.0E0$ g/CU M

(b) TEST AB6 RESULT FOR NaI = $1.9E-4 \pm 8.5E-5$ g/CU M

(c) 2.1 E0 MEANS 2.1×10^0

TABLE 613
SUSPENDED MASS CONCENTRATION AT 10000 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	3.7 E-1 ^(c)	4.05E-1	0.372	0.314	8.7 E-5	1.66E-4	2.060	3.192
HAA-4	RI/ESG	1.4 E0	1.5 E0	1.377	1.16	6.3 E-5	3.8 E-5	0.472	0.731
HAARM-3	HEDL	4.0 E-1	4.72E-1	0.433	0.366	5.5 E-5	2.34E-4	2.904	4.500
SOFIA	W-AESD	9.59E-1	9.70E-1	0.890	0.752	1.57E-4	1.26E-4	1.564	2.423
QUICK M	BCL	1.43E0	1.42E0	1.303	1.10	1.42E-12	8.37E-13	1.04E-8	1.61E-8
MAEROS	HEDL	1.39E0	1.40E0	1.285	1.09	3.10E-10	1.95E-10	2.42E-6	3.75E-6
CONTAIN	SNL	1.44E0	1.46E0	1.340	1.13	8.52E-10	4.18E-10	5.19E-6	8.04E-6
AVERAGE		1.06E0	1.09E0		0.845	5.19E-5	8.06E-5		1.550

(a) TEST AB6 RESULT FOR NaOx = $1.29E0 + 3.9E-1$ g/CU M

(b) TEST AB6 RESULT FOR NaI = $5.2E-5 \pm 5.2E-5$ g/CU M

(c) 3.7 E-1 MEANS 3.7×10^{-1}

TABLE 614
SUSPENDED MASS CONCENTRATION AT 30000 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(c) 6.2 E-3	7.02E-3	0.067	0.047	<1 E-6	7.80E-6	0.951	8.667
HAA-4	RI/ESG	4.3 E-2	4.9 E-2	0.465	0.327	1.9 E-6	3.8 E-5	0.146	1.333
HAARM-3	HEDL	7.9 E-3	1.05E-2	0.100	0.070	1.1 E-6	1.61E-5	1.963	17.889
SOFIA	W-AESD	2.50E-1	2.52E-1	2.393	1.68	4.04E-5	3.23E-5	3.939	35.889
QUICK M	BCL	1.55E-1	1.55E-1	1.472	1.03	2.81E-14	1.65E-14	2.01E-9	1.83E-8
MAEROS	HEDL	1.02E-1	1.03E-1	0.978	0.687	6.19E-12	3.87E-12	4.72E-7	4.3 E-6
CONTAIN	SNL	1.58E-1	1.60E-1	1.520	1.07	2.43E-11	1.24E-11	1.51E-6	1.38E-5
AVERAGE		1.03E-1	1.05E-1		0.700	6.34E-6	8.20E-6		9.111

(a) TEST AB6 RESULT FOR NaOx = $1.50E-1 \pm 4.5E-2$ g/CU M

(b) TEST AB6 RESULT FOR NaI = $9.0E-7 \pm \begin{smallmatrix} 1E-8 \\ 5E-7 \end{smallmatrix}$ g/CU M

(c) 6.2 E-3 MEANS 6.2×10^{-3}

TABLE 615

SUSPENDED MASS CONCENTRATION AT 100000 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	^(c) 1.99E-6	2.22E-6	1.6 E-4	4.0 E-4				
HAA-4	RI/ESG	3.2 E-4	3.4 E-4	0.025	0.059	1.4 E-8	8.6 E-9	5.65E-3	
HAARM-3	HEDL	2.3 E-5	3.15E-5	2.3 E-3	0.006	3.8 E-9	5.02E-7	0.330	
SOFIA	W-AESD	5.53E-2	5.57E-2	4.130	9.74	8.88E-6	7.10E-6	4.665	
QUICK M	BCL	1.46E-2	1.47E-2	1.089	2.57	4.60E-16	2.70E-16	1.8 E-10	
MAEROS	HEDL	2.29E-3	8.43E-3	0.625	1.477				
CONTAIN	SNL	1.51E-2	1.52E-2	1.127	2.66	6.26E-13	3.33E-13	2.2 E-7	
AVERAGE		1.25E-2	1.35E-2		2.36	1.78E-6	1.52E-6		

(a) TEST AB6 RESULT FOR NaOx = $5.72\text{E-}3 \pm 1.14\text{E-}3$ g/CU M

(b) TEST AB6 RESULT FOR NaI IS NOT MEASURED

(c) 1.99 E-6 MEANS 1.99×10^{-6}

TABLE 616
SUSPENDED MASS CONCENTRATION AT 400000 SECONDS

CODE	USER	NaOx				NaI			
		CONCENTRATION (g/CU M)		RATIO		CONCENTRATION (g/CU M)		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL								
HAA-4	RI/ESG	^(c) 1.5 E-8	1.1 E-8	9.8 E-6	3.0 E-4	6.6 E-13	2.7 E-13	1.8 E-6	
HAARM-3	HEDL								
SOFIA	W-AESD	4.68E-3	4.84E-3	4.314	121	7.49E-7	6.16E-7	4.000	
QUICK M	BCL	3.65E-4	3.71E-4	0.331	9.28	1.80E-19	1.08E-19	7.0 E-13	
MAEROS	HEDL	4.68E-8	1.37E-4	0.122	3.43				
CONTAIN	SNL	2.65E-4	2.61E-4	0.233	6.53	1.11E-15	6.38E-16	4.1 E-9	
AVERAGE		1.06E-3	1.12E-3		28.0	1.87E-7	1.54E-7		

(a) TEST AB6 RESULT FOR NaOx = $4.0E-5 \pm 1.0E-5$ g/CU M

(b) TEST AB6 RESULT FOR NaI IS NOT MEASURED

(c) 1.5E-8 MEANS 1.5×10^{-8}

TABLE F-7

BLIND POST-TEST PREDICTIONS OF ABCOVE TEST AB6

BY SNL USING CONTAIN-1B, MOD 415 CODE

Time (Sec)	Susp. Conc. (g/m ³)		AMMD (μm)		σ _g		Leaked Mass (g)		Settled Mass (g)		Plated Mass (g)		Removal Rate (s ⁻¹)(a)
	NaO _x	NaI	NaO _x ^(a)	NaI ^(b)	NaO _x ^(a)	NaI	NaO _x	NaI	NaO _x	NaI	NaO _x	NaI	
600	0	9.86E-2 ^(c)	---	0.725	---	1.58	0	3.01E-3	0	8.61E-2	0	1.04E-1	7.49(-6)
900	2.54E1	1.45E-1	1.75	2.07	1.72	---	4.83E-1	6.84E-3	3.06E1	3.54E-1	1.88E2	2.01E0	7.10E-5
1500	4.63E1	1.14E-1	3.80	5.47	3.72	---	3.24E0	1.63E-2	2.80E4	1.07E2	1.23E3	5.57E0	2.08E-3
2400	4.95E1	9.04E-2	4.02	4.00	3.62	---	7.57E0	2.47E-2	9.36E4	2.50E2	2.92E3	8.84E0	1.86E-3
3000	4.95E1	9.01E-2	4.02	3.92	3.62	---	1.05E1	3.00E-2	1.39E5	3.32E2	4.08E3	1.10E1	1.85E-3
3250	4.95E1	5.13E-2	4.02	7.35	3.62	---	1.17E1	3.13E-2	1.58E5	3.65E2	4.57E3	1.16E1	1.85E-3
3555	4.96E1	1.88E-2	4.02	12.0	3.62	---	1.32E1	3.18E-2	1.81E5	3.92E2	5.16E3	1.19E1	1.85E-3
4160	5.08E1	1.24E-3	4.13	19.1	3.62	---	1.62E1	3.19E-2	2.25E5	4.07E2	6.40E3	1.21E1	1.82E-3
4760	5.07E1	4.19E-5	4.12	23.0	3.62	---	1.92E1	3.19E-2	2.72E5	4.08E2	7.62E3	1.21E1	1.81E-3
5400	5.07E1	7.86E-7	4.12	24.5	3.62	---	1.17E1	3.19E-2	3.20E5	4.08E2	8.93E3	1.21E1	1.81E-3
5600	3.05E1	1.70E-7	6.07	22.5	3.33	---	1.32E1	3.19E-2	3.37E5	4.08E2	8.93E3	1.21E1	2.57E-3
7200	4.30E0	2.75E-9	6.02	11.9	2.56	---	1.62E1	3.19E-2	3.60E5	4.08E2	8.94E3	1.21E1	6.17E-4
10,000	1.46E0	4.18E-10	5.06	8.45	2.17	---	2.48E1	3.19E-2	3.62E5	4.08E2	8.94E3	1.21E1	2.60E-4
30,000	1.60E-1	1.24E-11	3.28	4.49	1.70	---	2.56E1	3.19E-2	3.63E5	4.08E2	8.94E3	1.21E1	6.03E-5
10 ⁵	1.52E-2	3.33E-13	2.18	2.97	1.47	---	2.59E1	3.19E-2	3.63E5	4.08E2	8.94E3	1.21E1	2.22E-5
4x10 ⁵	2.61E-4	6.38E-16	1.38	1.6	1.34	---	2.60E1	3.19E-2	3.63E5	4.08E2	8.94E3	1.21E1	9.93E-6

(a) Combined aerosol.

(b) From log-probability plot of reported size data.

(c) Numbers in parenthesis are exponents of 10.

A P P E N D I X H

CODE COMPARISONS OF AERODYNAMIC MASS MEDIAN DIAMETER

TABLE H1
AERODYNAMIC MASS MEDIAN DIAMETER AT 600 SECONDS

CODE	USER	NaOx				NaI			
		AMMD MICROMETERS		RATIO		AMMD MICROMETERS		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL					0.43	0.52	0.702	0.500
HAA-4	RI/ES6					1.2	1.1	1.49	1.058
HAARM-3	HEDL					0.91	0.765	1.03	0.736
SOFIA	W-AESD					0.40	0.40	0.541	0.385
QUICK M	BCL					0.81	^(d) 0.840	1.14	0.808
MAEROS	HEDL					^(c) 0.85	^(c) 0.83	1.12	0.798
CONTAIN	SNL					^(c) 0.85	0.725	0.974	0.697
AVERAGE						0.778	0.740		0.712

(a) TEST AB6 RESULT FOR NaOx = NOT APPLICABLE

(b) TEST AB6 RESULT FOR NaI = 1.04 ± 0.10 MICROMETERS

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) FOR TIME = 620 SECONDS

TABLE H2
AERODYNAMIC MASS MEDIAN DIAMETER AT 900 SECONDS

CODE	USER	NaOx				NaI			
		AMMD MICROMETERS		RATIO		AMMD MICROMETERS		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	^(c) 0.67	^(c) 0.67	0.298	0.149				
HAA-4	RI/ESG	^(c) 5.5	^(c) 6.3	2.80	1.400				
HAARM-3	HEDL	^(c) 1.36	^(c) 1.69	0.751	0.376				
SOFIA	W-AESD	^(c) 1.81	^(c) 1.75	0.778	0.389				
QUICK M	BCL	^(c) 1.95	^(c) 1.86	0.827	0.413		^(d) 2.12	1.04	0.471
MAEROS	HEDL	^(d) 1.94	^(d) 1.71	0.760	0.380	^(d) 2.19	^(d) 1.94	0.951	0.431
CONTAIN	SNL	^(c) 1.87	^(c) 1.75	0.778	0.389	^(d) 2.12	^(d) 2.07	1.05	0.46
AVERAGE		2.16	2.25		0.500	2.15	2.04		0.453

(a) TEST AB6 RESULT FOR NaOx = 4.5 ± 0.9 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = 4.5 ± 0.9 MICROMETERS

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H3

AERODYNAMIC MASS MEDIAN DIAMETER AT 1500 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	^(c) 2.4	^(c) 2.85	0.435	0.514				
HAA-4	RI/ESG	^(c) 12.7	^(c) 16.4	2.50	2.955				
HAARM-3	HEDL	^(c) 7.96	^(c) 7.07	1.08	1.274				
SOFIA	W-AESD	^(c) 8.43	^(c) 8.36	1.28	1.506				
QUICK M	BCL	^(c) 3.71	^(c) 3.68	0.562	0.663		^(d) 4.75	0.910	0.754
MAEROS	HEDL	^(d) 3.90	^(d) 3.71	0.566	0.668	^(d) 5.69	^(d) 5.44	1.04	0.863
CONTAIN	SNL	^(c) 4.40	^(c) 3.80	0.580	0.685	^(d) 6.32	^(d) 5.47	1.05	0.868
AVERAGE		6.21	6.55		1.180	6.00	5.22		0.829

(a) TEST AB6 RESULT FOR NaOx = 5.55 ± 1.11 MICROMETERS(b) TEST AB6 RESULT FOR NaI = 6.30 ± 1.26 MICROMETERS

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H4
AERODYNAMIC MASS MEDIAN DIAMETER AT 2400 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(c) 6.8	^(c) 6.65	0.889	1.137				
HAA-4	RI/ESG	^(c) 13.8	^(c) 16.5	2.21	2.821				
HAARM-3	HEDL	^(c) 8.56	^(c) 8.07	1.08	1.379				
SOFIA	W-AESD	^(c) 9.53	^(c) 9.58	1.28	1.638				
QUICK M	BCL	^(c) 3.81	^(c) 3.78	0.505	0.646		^(d) 3.65	0.961	0.608
MAEROS	HEDL	^(d) 4.02	^(d) 3.76	0.503	0.643	^(d) 4.02	^(d) 3.76	0.989	0.627
CONTAIN	SNL	^(c) 4.21	^(c) 4.02	0.537	0.687	^(d) 4.13	^(d) 4.00	1.05	0.667
AVERAGE		7.25	7.48		1.279	4.07	3.80		0.633

(a) TEST AB6 RESULT FOR NaOx = 5.85 ± 1.17 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = 6.0 ± 1.2 MICROMETERS

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H5

AERODYNAMIC MASS MEDIAN DIAMETER AT 3000 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	^(c) 6.8	^(c) 6.71	0.892	1.118				
HAA-4	RI/ESG	^(c) 13.9	^(c) 16.5	2.19	2.75				
HAARM-3	HEDL	^(c) 8.6	^(c) 8.16	1.09	1.360				
SOFIA	W-AESD	^(c) 9.65	^(c) 9.72	1.29	1.620				
QUICK M	BCL	^(c) 3.81	^(c) 3.78	0.503	0.630		^(d) 3.65	0.966	0.608
MAEROS	HEDL	^(d) 3.91	^(d) 3.78	0.503	0.630	^(d) 3.91	^(d) 3.78	1.00	0.630
CONTAIN	SNL	^(c) 4.22	^(c) 4.02	0.535	0.670	^(d) 4.20	^(d) 3.92	1.04	0.653
AVERAGE		7.27	7.52		1.253	4.05	3.78		0.630

(a) TEST AB6 RESULT FOR NaOx = 6.0 ± 1.2 MICROMETERS(b) TEST AB6 RESULT FOR NaI = 6.0 ± 1.2 MICROMETERS

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H6

AERODYNAMIC MASS MEDIAN DIAMETER AT 3250 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	^(c) 6.8	^(c) 6.72	0.865	1.111				
HAA-4	RI/ESG	^(c) 17.3	^(c) 18.0	2.32	2.975				
HAARM-3	HEDL	^(c) 8.61	^(c) 8.19	1.05	1.354				
SOFIA	W-AESD	^(c) 9.90	^(c) 9.92	1.28	1.64				
QUICK M	BCL	^(c) 3.81	^(c) 3.78	0.486	0.625		^(d) 7.20	1.00	
MAEROS	HEDL	^(d) 4.12	^(d) 3.76	0.484	0.621	^(d) 7.57	^(d) 7.03	0.978	
CONTAIN	SNL	^(c) 4.22	^(c) 4.02	0.517	0.664	^(d) 7.38	^(d) 7.35	1.02	
AVERAGE		7.83	7.77		1.284	7.48	7.19		

(a) TEST AB6 RESULT FOR NaOx = 6.05 ± 1.20 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H7
AERODYNAMIC MASS MEDIAN DIAMETER AT 3555 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(c) 6.8	^(c) 6.74	0.861	1.109				
HAA-4	RI/ESG	^(c) 18.7	^(c) 18.4	2.35	3.026				
HAARM-3	HEDL	^(c) 7.89	^(c) 8.21	1.05	1.350				
SOFIA	W-AESD	^(c) 9.89	^(c) 9.91	1.27	1.63				
QUICK M	BCL	^(c) 3.81	^(c) 3.78	0.483	0.622		^(d) 12.9	1.08	
MAEROS	HEDL	^(d) 4.09	^(d) 3.76	0.480	0.618	^(d) 12.1	^(d) 11.2	0.933	
CONTAIN	SNL	^(c) 4.21	^(c) 4.02	0.513	0.661	^(d) 11.9	^(d) 12.0	1.00	
AVERAGE		7.91	7.83		1.288	12.0	12.0		

(a) TEST AB6 RESULT FOR NaOx = 6.08 ± 1.22 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H8

AERODYNAMIC MASS MEDIAN DIAMETER AT 4160 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	6.8 ^(c)	6.78 ^(c)	0.870	1.106				
HAA-4	RI/ESG	18.3 ^(c)	18.2 ^(c)	2.335	2.969				
HAARM-3	HEDL	8.16 ^(c)	7.98 ^(c)	1.024	1.302				
SOFIA	W-AESD	9.90 ^(c)	9.92 ^(c)	1.273	1.618				
QUICK M	BCL	3.81 ^(c)	3.78 ^(c)	0.485	0.617		22.0 ^(d)	1.134	
MAEROS	HEDL	4.10 ^(d)	3.76 ^(d)	0.482	0.613	17.8 ^(d)	17.1 ^(d)	0.881	
CONTAIN	SNL	4.22 ^(c)	4.13 ^(c)	0.530	0.674	18.6 ^(d)	19.1 ^(d)	0.985	
AVERAGE		7.90	7.79		1.271	18.2	19.4		

(a) TEST AB6 RESULT FOR NaOx = 6.13 ± 1.23 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H9

AERODYNAMIC MASS MEDIAN DIAMETER AT 4760 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(c) 6.8	^(c) 6.8	0.870	1.100				
HAA-4	RI/ESG	^(c) 18.2	^(c) 18.2	2.33	2.945				
HAARM-3	HEDL	^(c) 8.22	^(c) 8.13	1.04	1.316				
SOFIA	W-AESD	^(c) 9.91	^(c) 9.93	1.27	1.607				
QUICK M	BCL	^(c) 3.81	^(c) 3.78	0.484	0.612		^(d) 26.4	1.14	
MAEROS	HEDL	^(d) 4.12	^(d) 3.76	0.481	0.608	^(d) 20.8	^(d) 20.1	0.868	
CONTAIN	SNL	^(c) 4.22	^(c) 4.12	0.527	0.667	^(d) 23.2	^(d) 23.0	0.993	
AVERAGE		7.90	7.82		1.265	22.0	23.2		

(a) TEST AB6 RESULT FOR NaOx = 6.18 ± 1.24 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H10
AERODYNAMIC MASS MEDIAN DIAMETER AT 5400 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	6.8 ^(c)	6.82 ^(c)	0.869	1.100				
HAA-4	RI/ESG	18.2 ^(c)	18.3 ^(c)	2.332	2.952				
HAARM-3	HEDL	8.24 ^(c)	8.18 ^(c)	1.043	1.319				
SOFIA	W-AESD	9.92 ^(c)	9.96 ^(c)	1.269	1.606				
QUICK M	BCL	3.81 ^(c)	3.78 ^(c)	0.482	0.61		29.0 ^(d)	1.16	
MAEROS	HEDL	4.02 ^(d)	3.76 ^(d)	0.479	0.606	21.6 ^(d)	21.6 ^(d)	0.864	
CONTAIN	SNL	4.22 ^(c)	4.12 ^(c)	0.525	0.665	24.3 ^(d)	24.5 ^(d)	0.980	
AVERAGE		7.89	7.85		1.266	23.0	25.0		

(a) TEST AB6 RESULT FOR NaOx = 6.20 ± 1.24 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H11

AERODYNAMIC MASS MEDIAN DIAMETER AT 5600 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	16.2 ^(c)	16.3 ^(c)	1.254	2.672				
HAA-4	RI/ESG	18.8 ^(c)	18.9 ^(c)	1.454	3.098				
HAARM-3	HEDL	17.1 ^(c)	16.8 ^(c)	1.292	2.754				
SOFIA	W-AESD	22.6 ^(c)	22.2 ^(c)	1.708	3.639				
QUICK M	BCL	5.50 ^(c)	5.48 ^(c)	0.422	0.898		27.5 ^(d)	1.162	
MAEROS	HEDL	6.05 ^(d)	5.60 ^(d)	0.431	0.918	21.5 ^(d)	21.0 ^(d)	0.887	
CONTAIN	SNL	6.14 ^(c)	6.07 ^(c)	0.467	0.995	22.6 ^(d)	22.5 ^(d)	0.951	
AVERAGE		13.2	13.0		2.131	22.1	23.7		

(a) TEST AB6 RESULT FOR NaOx = 6.10 ± 1.22 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H12

AERODYNAMIC MASS MEDIAN DIAMETER AT 7200 SECONDS

CODE	USER	NaOx				NaI			
		AMMD MICROMETERS		RATIO		AMMD MICROMETERS		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	14.2 ^(c)	14.5 ^(c)	1.422	2.622				
HAA-4	RI/ESG	14.4 ^(c)	14.5 ^(c)	1.422	2.622				
HAARM-3	HEDL	11.8 ^(c)	11.6 ^(c)	1.137	2.098				
SOFIA	W-AESD	13.6 ^(c)	13.8 ^(c)	1.353	3.495				
QUICK M	BCL	5.48 ^(c)	5.46 ^(c)	0.535	0.987		12.2 ^(d)	1.046	
MAEROS	HEDL	5.91 ^(d)	5.78 ^(d)	0.567	1.045	11.4 ^(d)	10.9 ^(d)	0.934	
CONTAIN	SNL	5.97 ^(c)	6.02 ^(c)	0.590	1.088	11.6 ^(d)	11.9 ^(d)	1.020	
AVERAGE		10.2	10.2		1.844	11.5	11.7		

(a) TEST AB6 RESULT FOR NaOx = 5.53 ± 1.11 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H13
AERODYNAMIC MASS MEDIAN DIAMETER AT 10000 SECONDS

CODE	USER	NaOx				NaI			
		AMMD MICROMETERS		RATIO		AMMD MICROMETERS		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	10.0 ^(c)	10.2 ^(c)	1.344	2.073				
HAA-4	RI/ESG	10.8 ^(c)	11.0 ^(c)	1.449	2.236				
HAARM-3	HEDL	9.4 ^(c)	9.5 ^(c)	1.252	1.931				
SOFIA	W-AESD	7.91 ^(c)	7.97 ^(c)	1.050	1.62				
QUICK M	BCL	4.67 ^(c)	4.66 ^(c)	0.614	0.947		8.30 ^(d)	1.031	
MAEROS	HEDL	5.10 ^(d)	4.75 ^(d)	0.626	0.965	7.93 ^(d)	7.41 ^(d)	0.920	
CONTAIN	SNL	5.02 ^(c)	5.06 ^(c)	0.667	1.028	8.26 ^(d)	8.45 ^(d)	1.049	
AVERAGE		7.56	7.59		1.543	8.10	8.05		

(a) TEST AB6 RESULT FOR NaOx = 4.92 ± 0.98 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H14

AERODYNAMIC MASS MEDIAN DIAMETER AT 30000 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	^(c) 5.9	^(c) 6.03	1.358	1.774				
HAA-4	RI/ESG	^(c) 6.3	^(c) 6.5	1.464	1.912				
HAARM-3	HEDL	^(c) 5.1	^(c) 5.2	1.171	1.529				
SOFIA	W-AESD	^(c) 3.97	^(c) 3.98	0.896	1.171				
QUICK M	BCL	^(c) 3.18	^(c) 3.17	0.714	0.932		^(d) 4.53	1.055	
MAEROS	HEDL	^(d) 3.13	^(d) 2.89	0.651	0.850	^(d) 3.92	^(d) 3.86	0.899	
CONTAIN	SNL	^(c) 3.25	^(c) 3.28	0.739	0.965	^(d) 4.43	^(d) 4.49	1.046	
AVERAGE		4.40	4.44		1.306	4.18	4.29		

(a) TEST AB6 RESULT FOR NaOx = 3.4 ± 0.68 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

TABLE H15
AERODYNAMIC MASS MEDIAN DIAMETER AT 100000 SECONDS

CODE	USER	NaOx				NaI			
		AMMD		RATIO		AMMD		RATIO	
		MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	MICROMETERS		POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	^(c) 4.4	^(c) 4.45	1.454	2.225				
HAA-4	RI/ES6	^(c) 4.4	^(c) 4.5	1.471	2.250				
HAARM-3	HEDL	^(c) 3.6	^(c) 3.59	1.173	1.795				
SOFIA	W-AESD	^(c) 2.61	^(c) 2.62	0.856	1.310				
QUICK M	BCL	^(c) 2.18	^(c) 2.18	0.712	1.090		^(d) 3.00	1.005	
MAEROS	HEDL	^(d) 2.08	^(d) 1.92	0.627	0.960				
CONTAIN	SNL	^(c) 2.17	^(c) 2.18	0.712	1.090	^(d) 2.93	^(d) 2.97	0.995	
AVERAGE		3.06	3.06		1.530		2.98		

(a) TEST AB6 RESULT FOR NaOx = 2.0 ± 0.40 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

A P P E N D I X I

CODE COMPARISONS OF GEOMETRIC STANDARD DEVIATION

TABLE II
GEOMETRIC STANDARD DEVIATION AT 600 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL					1.9	1.86	1.08	1.163
HAA-4	RI/ESG					1.86	1.53	0.884	0.956
HAARM-3	HEDL					1.82	1.82	1.05	1.138
SOFIA	W-AESD					1.89	1.90	1.10	1.188
QUICK M	BCL					1.84	1.53	0.884	0.956
MAEROS	HEDL					^(c) 1.87	^(c) 1.92	1.11	1.200
CONTAIN	SNL					^(c) 1.89	1.58	0.913	0.988
AVERAGE						1.87	1.73		1.081

(a) TEST AB6 RESULT FOR NaOx = NOT APPLICABLE

(b) TEST AB6 RESULT FOR NaI = 1.60 ± 0.16

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

TABLE I2
GEOMETRIC STANDARD DEVIATION AT 900 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 1.7	^(d) 1.73	0.994	0.989				
HAA-4	RI/ESG	^(d) 1.80	^(d) 1.65	0.948	0.943				
HAARM-3	HEDL	^(d) 1.82	^(d) 1.90	1.09	1.086				
SOFIA	W-AESD	^(d) 1.99	^(d) 1.97	1.13	1.126				
QUICK M	BCL	^(d) 1.73	^(d) 1.71	0.983	0.977				
MAEROS	HEDL	^(c) 1.56	^(c) 1.49	0.856	0.851	^(c) 1.52	^(c) 1.44		0.823
CONTAIN	SNL	^(c) 1.55	^(d) 1.72	0.989	0.983	^(c) 1.51			
AVERAGE		1.74	1.74		0.994	1.51			

(a) TEST AB6 RESULT FOR NaOx = 1.75 ± 0.18

(b) TEST AB6 RESULT FOR NaI = 1.75 ± 0.18

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE I3
GEOMETRIC STANDARD DEVIATION AT 1500 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 2.4	^(d) 2.59	0.782	1.079				
HAA-4	RI/ESG	^(d) 2.22	^(d) 2.16	0.653	0.900				
HAARM-3	HEDL	^(d) 3.02	^(d) 2.96	0.894	1.233				
SOFIA	W-AESD	^(d) 2.82	^(d) 2.82	0.852	1.175				
QUICK M	BCL	^(d) 3.54	^(d) 3.55	1.073	1.479				
MAEROS	HEDL	^(c) 5.20	^(c) 5.28	1.595	2.200	^(c) 4.93	^(c) 4.91		2.518
CONTAIN	SNL	^(c) 5.76	^(d) 3.80	1.148	1.583	^(c) 5.55			
AVERAGE		3.57	3.31		1.379	5.24			

(a) TEST AB6 RESULT FOR NaOx = 2.4 ± 0.36

(b) TEST AB6 RESULT FOR NaI = 1.95 ± 0.30

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE I4
GEOMETRIC STANDARD DEVIATION AT 2400 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 3.2	^(d) 3.16	0.935	1.264				
HAA-4	RI/ESG	^(d) 2.25	^(d) 2.15	0.636	0.86				
HAARM-3	HEDL	^(d) 3.05	^(d) 3.02	0.893	1.208				
SOFIA	W-AESD	^(d) 2.85	^(d) 2.84	0.840	1.136				
QUICK M	BCL	^(d) 3.56	^(d) 3.57	1.056	1.428				
MAEROS	HEDL	^(c) 4.90	^(c) 4.90	1.450	1.96	^(c) 4.90	^(c) 4.90		2.29
CONTAIN	SNL	^(c) 5.06	^(d) 4.02	1.189	1.008	^(c) 5.06			
AVERAGE		3.55	3.38		1.352	4.98			

(a) TEST AB6 RESULT FOR NaOx = 2.5 ± 0.38

(b) TEST AB6 RESULT FOR NaI = 2.14 ± 0.32

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE I5
GEOMETRIC STANDARD DEVIATION AT 3000 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 3.2	^(d) 3.16	0.952	1.239				
HAA-4	RI/ESG	^(d) 2.25	^(d) 2.15	0.648	0.843				
HAARM-3	HEDL	^(d) 3.05	^(d) 3.03	0.913	1.188				
SOFIA	W-AESD	^(d) 2.85	^(d) 2.84	0.855	1.114				
QUICK M	BCL	^(d) 3.56	^(d) 3.57	1.075	1.4				
MAEROS	HEDL	^(c) 4.96	^(c) 4.86	1.464	1.906	^(c) 4.96	^(c) 4.86		2.16
CONTAIN	SNL	^(c) 5.23	^(d) 3.62	1.090	1.42	^(c) 5.23			
AVERAGE		3.59	3.32		1.302	5.10			

(a) TEST AB6 RESULT FOR NaOx = 2.55 ± 0.38

(b) TEST AB6 RESULT FOR NaI = 2.25 ± 0.40

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE I6
GEOMETRIC STANDARD DEVIATION AT 3250 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 3.2	^(d) 3.16	0.955	1.239				
HAA-4	RI/ESG	^(d) 2.16	^(d) 2.12	0.640	0.831				
HAARM-3	HEDL	^(d) 3.05	^(d) 3.03	0.915	1.188				
SOFIA	W-AESD	^(d) 2.84	^(d) 2.84	0.856	1.114				
QUICK M	BCL	^(d) 3.56	^(d) 3.57	1.079	1.4				
MAEROS	HEDL	^(c) 4.78	^(c) 4.85	1.465	1.902	^(c) 4.01	^(c) 4.01		
CONTAIN	SNL	^(c) 5.22	^(d) 3.62	1.094	1.42	^(c) 4.55			
AVERAGE		3.54	3.31		1.298	4.28			

(a) TEST AB6 RESULT FOR NaOx = 2.55 ± 0.38

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE I7
GEOMETRIC STANDARD DEVIATION AT 3555 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	3.2 ^(d)	3.16 ^(d)	0.955	1.239				
HAA-4	RI/ESG	2.11 ^(d)	2.10 ^(d)	0.634	0.824				
HAARM-3	HEDL	2.99 ^(d)	3.03 ^(d)	0.915	1.188				
SOFIA	W-AESD	2.84 ^(d)	2.84 ^(d)	0.858	1.114				
QUICK M	BCL	3.56 ^(d)	3.57 ^(d)	1.079	1.4				
MAEROS	HEDL	4.92 ^(c)	4.86 ^(c)	1.468	1.906	3.33 ^(c)	3.33 ^(c)		
CONTAIN	SNL	5.32 ^(c)	3.62 ^(d)	1.094	1.42	3.78 ^(c)			
AVERAGE		3.56	3.31		1.298	3.56			

(a) TEST AB6 RESULT FOR NaOx = 2.55 ± 0.38

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE I8
GEOMETRIC STANDARD DEVIATION AT 4160 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 3.2	^(d) 3.16	0.955	1.239				
HAA-4	RI/ESG	^(d) 2.08	^(d) 2.09	0.631	0.82				
HAARM-3	HEDL	^(d) 3.0	^(d) 3.01	0.909	1.180				
SOFIA	W-AESD	^(d) 2.84	^(d) 2.84	0.858	1.114				
QUICK M	BCL	^(d) 3.56	^(d) 3.57	1.079	1.4				
MAEROS	HEDL	^(c) 4.90	^(c) 4.86	1.468	1.906	^(c) 2.83	^(c) 2.73		
CONTAIN	SNL	^(c) 5.25	^(d) 3.62	1.094	1.42	^(c) 3.00			
AVERAGE		3.55	3.31		1.298	2.92			

(a) TEST AB6 RESULT FOR NaOx = 2.55 ± 0.38

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE I9
GEOMETRIC STANDARD DEVIATION AT 4760 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 3.2	^(d) 3.16	0.956	1.239				
HAA-4	RI/ESG	^(d) 2.08	^(d) 2.09	0.631	0.82				
HAARM-3	HEDL	^(d) 3.0	^(d) 3.01	0.909	1.180				
SOFIA	W-AESD	^(d) 2.84	^(d) 2.84	0.858	1.114				
QUICK M	BCL	^(d) 3.56	^(d) 3.57	1.079	1.4				
MAEROS	HEDL	^(c) 4.78	^(c) 4.86	1.468	1.906	^(c) 2.63	^(c) 2.54		
CONTAIN	SNL	^(c) 5.12	^(d) 3.62	1.094	1.42	^(c) 2.78			
AVERAGE		3.51	3.31		1.298	2.70			

(a) TEST AB6 RESULT FOR NaOx = 2.55 ± 0.38

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE I10
GEOMETRIC STANDARD DEVIATION AT 5400 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 3.2	^(d) 3.16	0.955	1.239				
HAA-4	RI/ESG	^(d) 2.08	^(d) 2.09	0.631	0.82				
HAARM-3	HEDL	^(d) 3.01	^(d) 3.02	0.912	1.184				
SOFIA	W-AESD	^(d) 2.84	^(d) 2.84	0.858	1.114				
QUICK M	BCL	^(d) 3.56	^(d) 3.57	1.079	1.4				
MAEROS	HEDL	^(c) 4.83	^(c) 4.86	1.468	1.906	^(c) 2.55	^(c) 2.46		
CONTAIN	SNL	^(c) 5.28	^(d) 3.62	1.094	1.42	^(c) 2.66			
AVERAGE		3.54	3.31		1.298	2.60			

(a) TEST AB6 RESULT FOR NaOx = 2.55 ± 0.38

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE III
GEOMETRIC STANDARD DEVIATION AT 5600 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 2.7	^(d) 2.66	0.890	1.043				
HAA-4	RI/ESG	^(d) 2.00	^(d) 2.01	0.672	0.788				
HAARM-3	HEDL	^(d) 2.8	^(d) 2.80	0.936	1.098				
SOFIA	W-AESD	^(d) 2.48	^(d) 2.49	0.833	0.976				
QUICK M	BCL	^(d) 3.28	^(d) 3.28	1.079	1.286				
MAEROS	HEDL	^(c) 4.31	^(c) 4.36	1.458	1.71	^(c) 2.52	^(c) 2.41		
CONTAIN	SNL	^(c) 4.05	^(d) 3.33	1.114	1.306	^(c) 2.64			
AVERAGE		3.17	2.99		1.173	2.58			

(a) TEST AB6 RESULT FOR NaOx = 2.55 ± 0.38

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE II2
GEOMETRIC STANDARD DEVIATION AT 7200 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 1.7	^(d) 1.68	0.785	0.659				
HAA-4	RI/ESG	^(d) 1.63	^(d) 1.63	0.762	0.639				
HAARM-3	HEDL	^(d) 2.02	^(d) 2.04	0.953	0.800				
SOFIA	W-AESD	^(d) 1.84	^(d) 1.84	0.860	0.722				
QUICK M	BCL	^(d) 2.48	^(d) 2.48	1.159	0.973				
MAEROS	HEDL	^(c) 2.86	^(c) 2.72	1.271	1.067	^(c) 2.05	^(c) 2.00		
CONTAIN	SNL	^(c) 3.17	^(d) 2.56	1.196	1.004	^(c) 2.13			
AVERAGE		2.24	2.14		0.839	2.09			

(a) TEST AB6 RESULT FOR NaOx = 2.55 ± 0.55

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE II3
GEOMETRIC STANDARD DEVIATION AT 10000 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 1.5	^(d) 1.47	0.795	0.576				
HAA-4	RI/ESG	^(d) 1.47	^(d) 1.47	0.795	0.576				
HAARM-3	HEDL	^(d) 1.7	^(d) 1.73	0.935	0.678				
SOFIA	W-AESD	^(d) 1.79	^(d) 1.79	0.968	0.702				
QUICK M	BCL	^(d) 2.12	^(d) 2.13	1.151	0.835				
MAEROS	HEDL	^(c) 2.15	^(c) 2.17	1.173	0.851	^(c) 1.78	^(c) 1.83		
CONTAIN	SNL	^(c) 2.32	^(d) 2.17	1.173	0.851	^(c) 1.83			
AVERAGE		1.86	1.85		0.725	1.80			

(a) TEST AB6 RESULT FOR NaOx = 2.55 ± 0.55

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE II4

GEOMETRIC STANDARD DEVIATION AT 30000 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 1.3	^(d) 1.26	0.840	0.494				
HAA-4	RI/ESG	^(d) 1.27	^(d) 1.28	0.853	0.502				
HAARM-3	HEDL	^(d) 1.35	^(d) 1.37	0.913	0.537				
SOFIA	W-AESD	^(d) 1.66	^(d) 1.66	1.107	0.651				
QUICK M	BCL	^(d) 1.65	^(d) 1.65	1.100	0.647				
MAEROS	HEDL	^(c) 1.55	^(c) 1.59	1.060	0.624	^(c) 1.48	^(c) 1.43		
CONTAIN	SNL	^(c) 1.72	^(d) 1.70	1.133	0.667	^(c) 1.47			
AVERAGE		1.51	1.50		0.588	1.48			

(a) TEST AB6 RESULT FOR NaOx = 2.55 ± 0.75

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE I15
GEOMETRIC STANDARD DEVIATION AT 100000 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	^(d) 1.2	^(d) 1.17	0.880	0.571				
HAA-4	RI/ESG	^(d) 1.18	^(d) 1.19	0.902	0.580				
HAARM-3	HEDL	^(d) 1.21	^(d) 1.21	0.917	0.590				
SOFIA	W-AESD	^(d) 1.48	^(d) 1.48	1.121	0.722				
QUICK M	BCL	^(d) 1.44	^(d) 1.44	1.091	0.702				
MAEROS	HEDL	^(c) 1.33	^(c) 1.31	0.992	0.639				
CONTAIN	SNL	^(c) 1.40	^(d) 1.47	1.114	0.717	^(c) 1.26			
AVERAGE		1.32	1.32		0.644	1.26			

(a) TEST AB6 RESULT FOR NaOx = 2.05 ± 0.50

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE I10
GEOMETRIC STANDARD DEVIATION AT 400000 SECONDS

CODE	USER	NaOx				NaI			
		SIGMA		RATIO		SIGMA		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL								
HAA-4	RI/ESG	^(d) 1.12	^(d) 1.12	0.875	0.789				
HAARM-3	HEDL								
SOFIA	W-AESD	^(d) 1.32	^(d) 1.32	1.031	0.93				
QUICK M	BCL	^(d) 1.33	^(d) 1.33	1.039	0.937				
MAEROS	HEDL	^(c) 1.20	^(c) 1.25	0.977	0.88				
CONTAIN	SNL	^(c) 1.27	^(d) 1.36	1.078	0.972	^(c) 1.13			
AVERAGE		1.25	1.28		0.901	1.13			

(a) TEST AB6 RESULT FOR NaOx = 1.42 ± 0.35

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) TAKEN FROM LOG-PROBABILITY PLOT OF REPORTED SIZE DATA

(d) COMBINED AEROSOL

TABLE H16

AERODYNAMIC MASS MEDIAN DIAMETER AT 400000 SECONDS

CODE	USER	NaOx				NaI			
		AMMD MICROMETERS		RATIO		AMMD MICROMETERS		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL								
HAA-4	RI/ESG	^(c) 3.0	^(c) 3.1	1.782	2.818				
HAARM-3	HEDL								
SOFIA	W-AESD	^(c) 1.72	^(c) 1.72	0.989	1.564				
QUICK M	BCL	^(c) 1.31	^(c) 1.31	0.753	1.191		^(d) 2.26	1.171	
MAEROS	HEDL	^(d) 1.39	^(d) 1.19	0.684	1.082				
CONTAIN	SNL	^(c) 1.38	^(c) 1.38	0.793	1.255	^(d) 1.94	^(d) 1.6	0.829	
AVERAGE		1.76	1.74		1.582		1.93		

(a) TEST AB6 RESULT FOR NaOx = 1.1 ± 0.40 MICROMETERS

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) COMBINED AEROSOL

(d) TAKEN FROM LOG-PROBABILITY PLOTS OF REPORTED SIZE DATA

A P P E N D I X J

CODE COMPARISONS OF LEAKED MASS

TABLE JI
LEAKED MASS AT 600 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL					^(c) 3.6 E-3	2.51E-3	0.920	0.863
HAA-4	RI/ESG					4.2 E-3	2.9 E-3	1.06	0.997
HAARM-3	HEDL					3.7 E-3	2.44E-3	0.894	0.838
SOFIA	W-AESD								
QUICK M	BCL					3.73E-3	2.78E-3	1.02	0.955
MAEROS	HEDL								
CONTAIN	SNL						3.01E-3	1.10	1.034
AVERAGE						3.81E-3	2.73E-3		0.938

(a) TEST AB6 RESULT FOR NaOx = 0

(b) TEST AB6 RESULT FOR NaI = $2.91\text{E-}3 \pm 1.5\text{E-}3$ g

(c) $3.6\text{E-}3$ MEANS 3.6×10^{-3}

TABLE J2
LEAKED MASS AT 900 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	^(c) 3.91E-1	3.48E-1	0.930	1.126	9.2 E-3	5.37E-3	0.892	0.820
HAA-4	RI/ESG	3.9 E-1	3.5 E-1	0.936	1.133	9.2 E-3	6.4 E-3	1.06	0.977
HAARM-3	HEDL	3.9 E-1	3.32E-1	0.888	1.074	1.6 E-2	5.20E-3	0.864	0.794
SOFIA	W-AESD								
QUICK M	BCL	4.03E-1	3.56E-1	0.952	1.152	9.05E-3	6.28E-3	1.04	0.959
MAEROS	HEDL								
CONTAIN	SNL		4.83E-1	1.29	1.563		6.84E-3	1.14	1.044
AVERAGE		3.94E-1	3.74E-1		1.210	1.09E-2	6.02E-3		0.919

(a) TEST AB6 RESULT FOR NaOx = $3.09E-1 \pm 9.0E-2$ g

(b) TEST AB6 RESULT FOR NaI = $6.55E-3 \pm 1.3E-3$ g

(c) 3.91E-1 MEANS 3.91×10^{-1}

TABLE J3
LEAKED MASS AT 1500 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.2 E0 ^(c)	3.19E0	1.03	1.556	2.3 E-2	1.43E-2	0.935	0.681
HAA-4	RI/ESG	3.2 E0	3.2 E0	1.03	1.561	2.3 E-2	1.7 E-2	1.11	0.810
HAARM-3	HEDL	3.2 E0	2.91E0	0.939	1.420	3.35E-2	1.93E-2	0.869	0.633
SOFIA	W-AESD								
QUICK M	BCL	3.05E0	2.97E0	0.958	1.449	2.22E-2	1.50E-2	1.02	0.743
MAEROS	HEDL								
CONTAIN	SNL		3.24E0	1.05	1.580		1.63E-2	1.07	0.776
AVERAGE		3.16E0	3.10E0		1.512	2.54E-2	1.53E-2		0.729

(a) TEST AB6 RESULT FOR NaOx = $2.05E0 \pm 6.0E-1$ g

(b) TEST AB6 RESULT FOR NaI = $2.1E-2 \pm 1.5E-2$ g

(c) 3.2E0 MEANS 3.2×10^0

TABLE J4
LEAKED MASS AT 2400 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	1.0 E1 ^(c)	9.99E0	1.21	2.340	4.6 E-2	2.99E-2	1.13	0.854
HAA-4	RI/ESG	8.7 E0	8.1 E0	0.978	1.897	4.3 E-2	2.8 E-2	1.06	0.800
HAARM-3	HEDL	8.9 E0	8.55E0	1.03	2.002	5.46E-2	2.59E-2	0.980	0.740
SOFIA	W-AESD								
QUICK M	BCL	7.27E0	7.19E0	0.868	1.684	3.36E-2	2.36E-2	0.893	0.674
MAEROS	HEDL								
CONTAIN	SNL		7.57E0	0.914	1.773		2.47E-2	0.935	0.706
AVERAGE		8.72E0	8.28E0		1.939	4.43E-2	2.64E-2		0.754

(a) TEST AB6 RESULT FOR NaOx = $4.27E0 \pm 1.07E0$ g

(b) TEST AB6 RESULT FOR NaI = $3.5E-2 \pm 2.0E-2$ g

(c) 1.0E1 MEANS 1.0×10^1

TABLE J5
LEAKED MASS AT 3000 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	1.5 E1 ^(c)	1.46E1	1.24	2.584	5.9 E-2	3.91E-2	1.17	0.954
HAA-4	RI/ESG	1.24E1	1.12E1	0.953	1.982	5.3 E-2	3.5 E-2	1.05	0.854
HAARM-3	HEDL	1.28E1	1.25E1	1.06	2.212	6.48E-2	3.36E-2	1.01	0.820
SOFIA	W-AESD								
QUICK M	BCL	1.01E1	1.00E1	0.850	1.770	4.10E-2	2.87E-2	0.862	0.700
MAEROS	HEDL								
CONTAIN	SNL		1.05E1	0.893	1.858		3.00E-2	0.901	0.732
AVERAGE		1.26E1	1.18E1		2.088	5.45E-2	3.33E-2		0.812

(a) TEST AB6 RESULT FOR NaOx = $5.65E0 \pm 1.41E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.1E-2 \pm 2.0E-2$ g

(c) 1.5E1 MEANS 1.5×10^1

TABLE J6
LEAKED MASS AT 3250 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	1.7 E1 ^(c)	1.66E1	1.25	2.652	6.3 E-2	4.23E-2	1.19	1.007
HAA-4	RI/ESG	1.39E1	1.26E1	0.950	2.013	5.7 E-2	3.7 E-2	1.04	0.881
HAARM-3	HEDL	1.44E1	1.42E1	1.07	2.268	6.96E-2	3.62E-2	1.02	0.862
SOFIA	W-AESD								
QUICK M	BCL	1.13E1	1.12E1	0.845	1.789	4.33E-2	3.04E-2	0.858	0.724
MAEROS	HEDL								
CONTAIN	SNL		1.17E1	0.882	1.869		3.13E-2	0.883	0.745
AVERAGE		1.41E1	1.33E1		2.125	5.82E-2	3.54E-2		0.843

(a) TEST AB6 RESULT FOR NaOx = $6.26E0 \pm 1.57E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.2E-2 \pm 2.1E-2$ g

(c) 1.7E1 MEANS 1.7×10^1

TABLE J7
LEAKED MASS AT 3555 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	1.9 E1 ^(c)	1.90E1	1.26	2.703	6.7 E-2	4.52E-2	1.22	1.051
HAA-4	RI/ESG	1.56E1	1.41E1	0.939	2.006	6.0 E-2	3.8 E-2	1.03	0.884
HAARM-3	HEDL	1.65E1	1.62E1	1.08	2.304	7.28E-2	3.85E-2	1.04	0.895
SOFIA	W-AESD								
QUICK M	BCL	1.27E1	1.26E1	0.839	1.792	4.45E-2	3.12E-2	0.845	0.726
MAEROS	HEDL								
CONTAIN	SNL		1.32E1	0.879	1.878		3.18E-2	0.861	0.740
AVERAGE		1.60E1	1.50E1		2.134	6.11E-2	3.69E-2		0.858

(a) TEST AB6 RESULT FOR NaOx = $7.03E0 \pm 1.76E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.3E-2 \pm 2.1E-2$ g

(c) 1.9E1 MEANS 1.9×10^1

TABLE J8
LEAKED MASS AT 4160 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	2.4 E1 ^(c)	2.37E1	1.28	2.737	7.0 E-2	4.88E-2	1.27	1.127
HAA-4	RI/ESG	1.87E1	1.71E1	0.922	1.975	6.2 E-2	3.9 E-2	1.01	0.901
HAARM-3	HEDL	2.07E1	2.02E1	1.09	2.333	7.67E-2	4.11E-2	1.07	0.949
SOFIA	W-AESD								
QUICK M	BCL	1.55E1	1.55E1	0.836	1.790	4.49E-2	3.15E-2	0.819	0.727
MAEROS	HEDL								
CONTAIN	SNL		1.62E1	0.874	1.871		3.19E-2	0.829	0.737
AVERAGE		1.97E1	1.85E1		2.136	6.34E-2	3.85E-2		0.889

(a) TEST AB6 RESULT FOR NaOx = $8.66E0 \pm 2.16E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.33E-2 \pm 2.0E-2$ g

(c) 2.4E1 MEANS 2.4×10^1

TABLE J9
LEAKED MASS AT 4760 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	2.9 E1 ^(c)	2.85E1	1.29	2.767	7.2 E-2	5.05E-2	1.29	1.161
HAA-4	RI/ESG	2.16E1	2.01E1	0.910	1.951	6.3 E-2	4.0 E-2	1.02	0.920
HAARM-3	HEDL	2.5 E1	2.43E1	1.10	2.359	7.87E-2	4.23E-2	1.08	0.972
SOFIA	W-AESD								
QUICK M	BCL	1.84E1	1.83E1	0.829	1.777	4.49E-2	3.15E-2	0.803	0.724
MAEROS	HEDL								
CONTAIN	SNL		1.92E1	0.870	1.864		3.19E-2	0.813	0.733
AVERAGE		2.35E1	2.21E1		2.146	6.47E-2	3.92E-2		0.901

(a) TEST AB6 RESULT FOR NaOx = $1.03E1 \pm 2.58E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.35E-2 \pm 2.0E-2$ g

(c) 2.9E1 MEANS 2.9×10^1

TABLE J10
LEAKED MASS AT 5400 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.4 E1 ^(c)	3.36E1	1.30	2.777	7.4 E-2	5.15E-2	1.30	1.184
HAA-4	RI/ESG	2.48E1	2.33E1	0.901	1.926	6.3 E-2	4.0 E-2	1.01	0.920
HAARM-3	HEDL	2.95E1	2.87E1	1.11	2.372	7.96E-2	4.29E-2	1.08	0.986
SOFIA	W-AESD								
QUICK M	BCL	2.14E1	2.13E1	0.824	1.760	4.49E-2	3.15E-2	0.800	0.724
MAEROS	HEDL								
CONTAIN	SNL		2.24E1	0.866	1.851		3.19E-2	0.806	0.733
AVERAGE		2.74E1	2.59E1		2.140	6.54E-2	3.96E-2		0.910

(a) TEST AB6 RESULT FOR NaOx = $1.21E1 \pm 3.02E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.35E-2 \pm 2.0E-2$ g

(c) 3.4E1 MEANS 3.4×10^1

TABLE J11
LEAKED MASS AT 5600 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	3.5 E1 ^(c)	3.49E1	1.31	2.792	7.4 E-2	5.16E-2	1.30	1.186
HAA-4	RI/ESG	2.56E1	2.41E1	0.902	1.928	6.3 E-2	4.0 E-2	1.01	0.920
HAARM-3	HEDL	3.06E1	2.95E1	1.10	2.360	7.98E-2	4.29E-2	1.08	0.986
SOFIA	W-AESD								
QUICK M	BCL	2.22E1	2.21E1	0.827	1.768	4.49E-2	3.15E-2	0.800	0.724
MAEROS	HEDL								
CONTAIN	SNL		2.30E1	0.861	1.840		3.19E-2	0.806	0.733
AVERAGE		2.84E1	2.67E1		2.136	6.54E-2	3.96E-2		0.910

(a) TEST AB6 RESULT FOR NaOx = $1.25E1 \pm 3.12E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.35E-2 \pm 2.0E-2$ g

(c) 3.5E1 MEANS 3.5×10^1

TABLE J12
LEAKED MASS AT 7200 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.8 E1 ^(c)	3.67E1	1.29	2.679	7.4 E-2	5.19E-2	1.31	1.193
HAA-4	RI/ESG	2.78E1	2.64E1	0.929	1.927	6.3 E-2	4.0 E-2	1.01	0.920
HAARM-3	HEDL	3.22E1	3.10E1	1.09	2.263	8.00E-2	4.32E-2	1.09	0.993
SOFIA	W-AESD								
QUICK M	BCL	2.39E1	2.38E1	0.837	1.737	4.49E-2	3.15E-2	0.793	0.724
MAEROS	HEDL								
CONTAIN	SNL		2.42E1	0.852	1.766		3.19E-2	0.804	0.733
AVERAGE		3.05E1	2.84E1		2.073	6.55E-2	3.97E-2		0.913

(a) TEST AB6 RESULT FOR NaOx = $1.37E1 \pm 3.42E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.35E-2 \pm 2.0E-2$ g

(c) 3.8E1 MEANS 3.8×10^1

TABLE J13
LEAKED MASS AT 10000 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.8 E1 ^(c)	3.69E1	1.27	2.599	7.4 E-2	5.19E-2	1.31	1.193
HAA-4	RI/ESG	2.86E1	2.72E1	0.939	1.915	6.3 E-2	4.0 E-2	1.01	0.920
HAARM-3	HEDL	3.25E1	3.16E1	1.09	2.225	8.00E-2	4.33E-2	1.09	0.995
SOFIA	W-AESD								
QUICK M	BCL	2.46E1	2.44E1	0.842	1.718	4.48E-2	3.15E-2	0.793	0.724
MAEROS	HEDL								
CONTAIN	SNL		2.48E1	0.856	1.746		3.19E-2	0.803	0.733
AVERAGE		3.09E1	2.90E1		2.042	6.55E-2	3.97E-2		0.913

(a) TEST AB6 RESULT FOR NaOx = $1.42E1 \pm 3.55E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.35E-2 \pm 2.0E-2$ g

(c) 3.8E1 MEANS 3.8×10^1

TABLE J14
LEAKED MASS AT 30000 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.8 E1 ^(c)	3.71E1	1.26	2.457	7.4 E-2	5.20E-2	1.31	1.195
HAA-4	RI/ESG	2.92E1	2.78E1	0.942	1.841	6.3 E-2	4.0 E-2	1.01	0.920
HAARM-3	HEDL	3.26E1	3.18E1	1.08	2.106	8.00E-2	4.34E-2	1.09	0.998
SOFIA	W-AESD								
QUICK M	BCL	2.54E1	2.53E1	0.857	1.675	4.49E-2	3.15E-2	0.793	0.724
MAEROS	HEDL								
CONTAIN	SNL		2.56E1	0.867	1.695		3.19E-2	0.803	0.733
AVERAGE		3.13E1	2.95E1		1.954	6.55E-2	3.97E-2		0.913

(a) TEST AB6 RESULT FOR NaOx = $1.51E1 \pm 3.78E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.35E-2 \pm 2.0E-2$ g

(c) 3.8E1 MEANS 3.8×10^1

TABLE J15
LEAKED MASS AT 100000 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.8 E1 ^(c)	3.71E1	1.25	2.409	7.4 E-2	5.20E-2	1.31	1.195
HAA-4	RI/ESG	2.93E1	2.79E1	0.946	1.812	6.3 E-2	4.0 E-2	1.01	0.920
HAARM-3	HEDL	3.26E1	3.18E1	1.07	2.065	8.00E-2	4.35E-2	1.09	1.000
SOFIA	W-AESD								
QUICK M	BCL	2.58E1	2.57E1	0.866	1.669	4.49E-2	3.15E-2	0.793	0.724
MAEROS	HEDL								
CONTAIN	SNL		2.59E1	0.873	1.682		3.19E-2	0.803	0.733
AVERAGE		3.14E1	2.97E1		1.929	6.55E-2	3.97E-2		0.913

(a) TEST AB6 RESULT FOR NaOx = $1.54E1 \pm 6.16E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.35E-2 \pm 2.0E-2$ g

(c) 3.8E1 MEANS 3.8×10^1

A P P E N D I X K

CODE COMPARISONS OF SETTLED MASS

TABLE K1
SETTLED MASS AT 600 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
HAA-3	HEDL						2.81E-2	0.222	
HAA-4	RI/ESG					2.7 E-1 ^(b)	1.4 E-1	1.105	
HAARM-3	HEDL					4.3 E-2	1.81E-1	1.428	
SOFIA	W-AESD								
QUICK M	BCL					1.89E-1	9.91E-2	0.782	
MAEROS	HEDL					3.36E-1	2.26E-1	1.784	
CONTAIN	SNL					1.78E-1	8.61E-2	0.679	
AVERAGE						2.03E-1	1.27E-1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.7 E-1 MEANS 2.7×10^{-1}

TABLE K2
SETTLED MASS AT 900 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.41E1 ^(b)	6.15E0	0.062			6.89E-2	0.068	
HAA-4	RI/ESG	3.8 E2	4.0 E2	4.046		5.0 E0	3.9 E0	3.85	
HAARM-3	HEDL	6.8 E0	5.85E1	0.592		1.3 E-1	5.72E-1	0.564	
SOFIA	W-AESD								
QUICK M	BCL	4.45E1	3.57E1	0.361		7.91E-1	4.19E-1	0.413	
MAEROS	HEDL	7.68E1	6.22E1	0.629		1.22E0	7.71E-1	0.760	
CONTAIN	SNL	3.15E0	3.06E1	0.310		5.90E-1	3.54E-1	0.349	
AVERAGE		9.09E1	9.89E1			1.55E0	1.01E0		

(a) TEST AB6 RESULT NOT MEASURED

(b) 3.41 E1 MEANS 3.41×10^1

TABLE K3
SETTLED MASS AT 1500 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(b) 1.44E4	6.08E2	0.031			1.43E0	0.020	
HAA-4	RI/ESG	1.0 E4	1.5 E4	0.772		5.1 E1	5.1 E1	0.704	
HAARM-3	HEDL	3.0 E2	1.57E4	0.808		1.4 E0	4.70E1	0.649	
SOFIA	W-AESD								
QUICK M	BCL	3.05E4	2.92E4	1.502		1.80E2	1.20E2	1.657	
MAEROS	HEDL	2.90E4	2.81E4	1.446		1.59E2	1.08E2	1.492	
CONTAIN	SNL	2.48E4	2.80E4	1.441		1.35E2	1.07E2	1.478	
AVERAGE		1.82E4	1.94E4			1.05E2	7.24E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 1.44 E4 MEANS 1.44×10^4

TABLE K4
SETTLED MASS AT 2400 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	7.79E4 ^(b)	6.21E4	0.720			1.38E2	0.629	
HAA-4	RI/ESG	7.0 E4	9.1 E4	1.05		2.6 E2	2.3 E2	1.048	
HAARM-3	HEDL	5.8 E4	7.58E4	0.878		1.9 E2	1.79E2	0.815	
SOFIA	W-AESD								
QUICK M	BCL	1.01E5	9.91E4	1.15		3.86E2	2.64E2	1.203	
MAEROS	HEDL	9.57E4	9.62E4	1.14		3.67E2	2.56E2	1.166	
CONTAIN	SNL	9.09E4	9.36E4	1.08		3.52E2	2.50E2	1.139	
AVERAGE		8.23E4	8.63E4			3.11E2	2.19E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 7.79 E4 MEANS 7.79×10^4

TABLE K5
SETTLED MASS AT 3000 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
HAA-3	HEDL	1.26E5 ^(b)	1.06E5	0.801			2.25E2	0.738	
HAA-4	RI/ESG	1.1 E5	1.4 E5	1.058		3.7 E2	3.2 E2	1.050	
HAARM-3	HEDL	1.0 E5	1.20E5	0.907		3.1 E2	2.66E2	0.873	
SOFIA	W-AESD								
QUICK M	BCL	1.48E5	1.46E5	1.103		5.09E2	3.48E2	1.142	
MAEROS	HEDL	1.41E5	1.43E5	1.081		4.86E2	3.38E2	1.109	
CONTAIN	SNL	1.36E5	1.39E5	1.050		4.69E2	3.32E2	1.089	
AVERAGE		1.27E5	1.32E5			4.29E2	3.05E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 1.26 E5 MEANS 1.26×10^5

TABLE K6
SETTLED MASS AT 3250 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	1.41E5 ^(b)	1.24E5	0.820			2.55E2	0.758	
HAA-4	RI/ESG	1.3 E5	1.6 E5	1.057		4.2 E2	3.5 E2	1.040	
HAARM-3	HEDL	1.2 E5	1.38E5	0.912		3.4 E2	2.96E2	0.880	
SOFIA	W-AESD								
QUICK M	BCL	1.67E5	1.66E5	1.007		5.59E2	3.82E2	1.135	
MAEROS	HEDL	1.60E5	1.62E5	1.070		5.33E2	3.71E2	1.103	
CONTAIN	SNL	1.54E5	1.58E5	1.044		5.15E2	3.05E2	1.085	
AVERAGE		1.45E5	1.51E5			4.73E2	3.37E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 1.41 E5 MEANS 1.41×10^5

TABLE K7
SETTLED MASS AT 3555 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	1.61E5 ^(b)	1.46E5	0.841			2.83E2	0.777	
HAA-4	RI/ESG	1.5 E5	1.8 E5	1.036		4.6 E2	3.8 E2	1.044	
HAARM-3	HEDL	1.4 E5	1.61E5	0.927		3.8 E2	3.21E2	0.882	
SOFIA	W-AESD								
QUICK M	BCL	1.91E5	1.89E5	1.088		5.99E2	4.10E2	1.126	
MAEROS	HEDL	1.83E5	1.85E5	1.065		5.71E2	3.98E2	1.093	
CONTAIN	SNL	1.77E5	1.81E5	1.042		5.55E2	3.92E2	1.077	
AVERAGE		1.67E5	1.74E5			4.13E2	3.64E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 1.61 E5 MEANS 1.61×10^5

TABLE K8
SETTLED MASS AT 4160 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	2.04E5 ^(b)	1.91E5	0.867			3.15E2	0.820	
HAA-4	RI/ESG	2.0 E5	2.3 E5	1.044		4.9 E2	4.0 E2	1.041	
HAARM-3	HEDL	1.8 E5	2.06E5	0.935		4.1 E2	3.50E2	0.911	
SOFIA	W-AESD								
QUICK M	BCL	2.39E5	2.37E5	1.076		6.15E2	4.22E2	1.098	
MAEROS	HEDL	2.29E5	2.32E5	1.053		5.91E2	4.11E2	1.070	
CONTAIN	SNL	2.22E5	2.26E5	1.026		5.79E2	4.07E2	1.059	
AVERAGE		2.12E5	2.20E5			5.37E2	3.84E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.04 E5 MEANS 2.04×10^5

TABLE K9
SETTLED MASS AT 4760 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	2.49E5 ^(b)	2.35E5	0.887			3.32E2	0.852	
HAA-4	RI/ESG	2.4 E5	2.7 E5	1.02		5.0 E2	4.0 E2	1.03	
HAARM-3	HEDL	2.3 E5	2.49E5	0.940		4.3 E2	3.63E2	0.932	
SOFIA	W-AESD								
QUICK M	BCL	2.86E5	2.84E5	1.07		6.15E2	4.22E2	1.08	
MAEROS	HEDL	2.75E5	2.79E5	1.05		5.92E2	4.12E2	1.06	
CONTAIN	SNL	2.66E5	2.72E5	1.03		5.81E2	4.08E2	1.05	
AVERAGE		2.58E5	2.65E5			5.44E2	3.90E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.49 E5 MEANS 2.49×10^5

TABLE K10
SETTLED MASS AT 5400 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	2.96E5 ^(b)	2.82E5	0.900			3.40E2	0.868	
HAA-4	RI/ESG	2.9 E5	3.2 E5	1.021		5.0 E2	4.0 E2	1.021	
HAARM-3	HEDL	2.7 E5	2.97E5	0.947		4.4 E2	3.69E2	0.942	
SOFIA	W-AESD								
QUICK M	BCL	3.36E5	3.34E5	1.005		6.15E2	4.22E2	1.077	
MAEROS	HEDL	3.23E5	3.28E5	1.046		5.92E2	4.12E2	1.052	
CONTAIN	SNL	3.14E5	3.20E5	1.021		5.81E2	4.08E2	1.041	
AVERAGE		3.05E5	3.14E5			5.46E2	3.92E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.96 E5 MEANS 2.96×10^5

TABLE K11
SETTLED MASS AT 5600 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
HAA-3	HEDL	3.25E5 ^(b)	3.07E5	0.925			3.43E2	0.874	
HAA-4	RI/ESG	3.0 E5	3.4 E5	1.024		5.0 E2	4.0 E2	1.019	
HAARM-3	HEDL	3.0 E5	3.17E5	0.955		4.4 E2	3.70E2	0.943	
SOFIA	W-AESD								
QUICK M	BCL	3.51E5	3.49E5	1.051		6.15E2	4.22E2	1.075	
MAEROS	HEDL	3.37E5	3.42E5	1.030		5.92E2	4.12E2	1.050	
CONTAIN	SNL	3.32E5	3.37E5	1.015		5.81E2	4.08E2	1.039	
AVERAGE		3.24E5	3.32E5			5.46E2	3.93E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 3.25 E5 MEANS 3.25×10^5

TABLE K12
SETTLED MASS AT 7200 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(b) 3.55E5	3.48E5	0.969			3.49E2	0.882	
HAA-4	RI/ESG	3.2 E5	3.6 E5	1.003		5.1 E2	4.1 E2	1.036	
HAARM-3	HEDL	3.4 E5	3.49E5	0.972		4.5 E2	3.74E2	0.945	
SOFIA	W-AESD								
QUICK M	BCL	3.74E5	3.72E5	1.036		6.15E2	4.22E2	1.066	
MAEROS	HEDL	3.60E5	3.65E5	1.017		5.92E2	4.12E2	1.041	
CONTAIN	SNL	3.54E5	3.60E5	1.003		5.81E2	4.08E2	1.031	
AVERAGE		3.51E5	3.59E5			5.46E2	3.96E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 3.55 E5 MEANS 3.55×10^5

TABLE K13
SETTLED MASS AT 10000 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.57E5 ^(b)	3.50E5	0.968			3.49E2	0.881	
HAA-4	RI/ESG	3.3 E5	3.6 E5	0.996		5.1 E2	4.1 E2	1.035	
HAARM-3	HEDL	3.4 E5	3.56E5	0.985		4.5 E2	3.76E2	0.949	
SOFIA	W-AESD								
QUICK M	BCL	3.77E5	3.74E5	1.035		6.15E2	4.22E2	1.065	
MAEROS	HEDL	3.63E5	3.67E5	1.015		5.92E2	4.12E2	1.040	
CONTAIN	SNL	3.56E5	3.62E5	1.001		5.81E2	4.08E2	1.030	
AVERAGE		3.54E5	3.62E5			5.48E2	3.96E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 3.57 E5 MEANS 3.57×10^5

TABLE K14
SETTLED MASS AT 30000 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.57E5 ^(b)	3.50E5	0.969			3.49E2	0.881	
HAA-4	RI/ESG	3.3 E5	3.6 E5	0.994		5.1 E2	4.1 E2	1.035	
HAARM-3	HEDL	3.4 E5	3.56E5	0.983		4.5 E2	3.76E2	0.949	
SOFIA	W-AESD								
QUICK M	BCL	3.78E5	3.75E5	1.036		6.15E2	4.22E2	1.065	
MAEROS	HEDL	3.64E5	3.68E5	1.017		5.92E2	4.12E2	1.040	
CONTAIN	SNL	3.58E5	3.63E5	1.002		5.81E2	4.08E2	1.030	
AVERAGE		3.55E5	3.62E5			5.46E2	3.96E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 3.57 E5 MEANS 3.57×10^5

TABLE K15
SETTLED MASS AT 100000 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.57E5 ^(b)	3.50E5	0.966			3.49E2	0.881	
HAA-4	RI/ESG	3.3 E5	3.6 E5	0.994		5.1 E2	4.1 E2	1.035	
HAARM-3	HEDL	3.4 E5	3.56E5	0.983		4.5 E2	3.76E2	0.949	
SOFIA	W-AESD								
QUICK M	BCL	3.78E5	3.76E5	1.038		6.15E2	4.22E2	1.065	
MAEROS	HEDL	3.64E5	3.68E5	1.016		5.92E2	4.12E2	1.040	
CONTAIN	SNL	3.58E5	3.63E5	1.002		5.81E2	4.08E2	1.030	
AVERAGE		3.55E5	3.62E5			5.46E2	3.96E2		

(a) TEST AB6 RESULT NOT MEASURED

(b) 3.57 E5 MEANS 3.57×10^5

TABLE K16
SETTLED MASS AT 400000 SECONDS

CODE	USER	NaOx				NaI			
		SETTLED MASS (GRAMS)		RATIO		SETTLED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(c) 3.57E5	3.50E5	0.97	1.04		3.49E2	0.88	0.948
HAA-4	RI/ES6	3.3 E5	3.6 E5	1.00	1.08	5.1 E2	4.1 E2	1.03	1.114
HAARM-3	HEDL	3.4 E5	3.56E5	0.99	1.06	4.5 E2	3.76E2	0.94	1.022
SOFIA	W-AESD		(d) 3.47E5	0.96	1.04		(d) 4.14E2	1.04	1.13
QUICK M	BCL	3.78E5	3.76E5	1.04	1.12	6.15E2	4.22E2	1.06	1.147
MAEROS	HEDL	3.64E5	3.68E5	1.02	1.10	5.92E2	4.12E2	1.03	1.120
CONTAIN	SNL	3.58E5	3.63E5	1.01	1.08	5.81E2	4.08E2	1.02	1.109
AVERAGE		3.55E5	3.60E5		1.075	5.46E2	3.99E2		1.084

(a) TEST AB6 RESULT FOR NaOx = $3.35E5 \pm 3.4E4$ g

(b) TEST AB6 RESULT FOR NaI = $3.68E2 \pm 3.7E1$ g

(c) 3.57 E5 MEANS 3.57×10^5

(d) DATA SUBMITTED LATE

TABLE J18
LEAKED MASS AT 400000 SECONDS

CODE	USER	NaOx				NaI			
		LEAKED MASS (GRAMS)		RATIO		LEAKED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	3.8 E1 ^(c)	3.71E1	1.22	2.409	7.4 E-2	5.20E-2	1.25	1.195
HAA-4	RI/ES6	2.93E1	2.79E1	0.917	1.812	6.3 E-2	4.0 E-2	0.96	0.920
HAARM-3	HEDL	3.28E1	3.18E1	1.04	2.065	8.00E-2	4.35E-2	1.04	1.000
SOFIA	W-AESD	3.45E1 ^(d)	3.4 E1 ^(d)	1.12	2.208		5.1 E-2 ^(e)	1.22	1.17
QUICK M	BCL	2.59E1	2.58E1	0.848	1.075	4.49E-2	3.15E-2	0.76	0.724
MAEROS	HEDL								
CONTAIN	SNL		2.00E1	0.854	1.088		9.19E-2	0.77	0.733
AVERAGE		3.36E1	3.04E1		1.974	6.55E-2	4.17E-2		0.959

(a) TEST AB6 RESULT FOR NaOx = $1.54E1 \pm 6.16E0$ g

(b) TEST AB6 RESULT FOR NaI = $4.35E-2 \pm 2.0E-2$ g

(c) 3.8E1 MEANS 3.8×10^1

(d) COMBINED AEROSOL, NaOx + NaI

(e) DATA SUBMITTED LATE

A P P E N D I X L

CODE COMPARISONS OF PLATED MASS

TABLE L1
PLATED MASS AT 600 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
HAA-3	HEDL					^(b) 2.1 E-1	1.61E1	2.71	
HAA-4	RI/ESG					1.1 E-2	8.4 E-2	0.014	
HAARM-3	HEDL						1.87E1	3.15	
SOFIA	W-AESD								
QUICK M	BCL					2.03E-2	1.11E-2	0.002	
MAEROS	HEDL					9.25E-1	6.25E-1	0.105	
CONTAIN	SNL					1.89E-1	1.04E-1	0.018	
AVERAGE						2.71E-1	5.94E0		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.1 E-1 MEANS 2.1×10^{-1}

TABLE L2
PLATED MASS AT 900 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	^(b) 1.4 E3	1.26E3	2.70		4.6 E1	2.94E1	2.69	
HAA-4	RI/ESG	4.7 E2	9.9 E1	0.212		5.0 E0	9.3 E-1	0.085	
HAARM-3	HEDL	9.3 E2	1.05E3	2.25			3.09E1	2.82	
SOFIA	W-AESD								
QUICK M	BCL	7.77E-1	1.51E2	0.323		3.02E-2	1.23E0	0.112	
MAEROS	HEDL	5.76E1	5.28E1	0.113		1.76E0	1.22E0	0.111	
CONTAIN	SNL	2.24E2	1.88E2	0.403		3.17E0	2.01E0	0.184	
AVERAGE		5.14E2	4.67E2				1.09E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 1.4 E3 MEANS 1.4×10^3

TABLE L3
PLATED MASS AT 1500 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
HAA-3	HEDL	7.3 E3 ^(b)	6.77E3	3.19		7.5 E1	4.88E1	2.90	
HAA-4	RI/ESG	5.3 E3	8.9 E2	0.042		2.9 E1	3.8 E0	0.226	
HAARM-3	HEDL	2.39E3	2.38E3	1.121			3.59E1	2.14	
SOFIA	W-AESD								
QUICK M	BCL	3.12E0	1.04E3	0.490		3.89E-2	4.00E0	0.238	
MAEROS	HEDL	4.71E2	4.28E2	0.202		4.20E0	2.79E0	0.166	
CONTAIN	SNL	1.44E3	1.23E3	0.579		9.03E0	5.57E0	0.331	
AVERAGE		2.82E3	2.12E3			2.35E1	1.68E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 7.3 E3 MEANS 7.3×10^3

TABLE L4
PLATED MASS AT 2400 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	1.1 E4 ^(b)	1.01E4	2.72		8.7 E1	5.67E1	2.80	
HAA-4	RI/ESG	1.4 E4	2.1 E3	0.567		6.2 E1	6.8 E0	0.336	
HAARM-3	HEDL	3.68E3	3.64E3	0.982			3.87E1	1.91	
SOFIA	W-AESD								
QUICK M	BCL	6.59E0	2.45E3	0.661		4.81E-2	6.64E0	0.328	
MAEROS	HEDL	1.08E3	1.03E3	0.278		5.75E0	3.84E0	0.190	
CONTAIN	SNL	3.30E3	2.92E3	0.788		1.42E1	8.84E0	0.436	
AVERAGE		5.79E3	3.71E3			3.38E1	2.03E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 1.1 E4 MEANS 1.1×10^4

TABLE L5
PLATED MASS AT 3000 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	1.3 E4 ^(b)	1.23E4	2.57		9.3 E1	6.10E1	2.73	
HAA-4	RI/ESG	2.1 E4	3.0 E3	0.626		8.0 E1	8.4 E0	0.376	
HAARM-3	HEDL	4.55E3	4.49E3	0.937			4.04E1	1.81	
SOFIA	W-AESD								
QUICK M	BCL	8.91E0	3.42E3	0.713		5.41E-2	8.40E0	0.379	
MAEROS	HEDL	1.51E3	1.47E3	0.307		6.87E0	4.62E0	0.207	
CONTAIN	SNL	4.54E3	4.08E3	0.852		1.75E1	1.10E1	0.493	
AVERAGE		7.43E3	4.79E3			3.95E1	2.23E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 1.3 E4 MEANS 1.3×10^4

TABLE L8
PLATED MASS AT 3250 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	1.4 E4 ^(b)	1.32E4	2.52		9.5 E1	6.25E1	2.72	
HAA-4	RI/ESG	2.3 E4	3.3 E3	0.629		8.6 E1	9.0 E0	0.392	
HAARM-3	HEDL	4.91E3	4.85E3	0.924			4.09E1	1.78	
SOFIA	W-AESD								
QUICK M	BCL	9.88E0	3.91E3	0.745		5.54E-2	8.93E0	0.389	
MAEROS	HEDL	1.69E3	1.65E3	0.314		7.23E0	4.87E0	0.212	
CONTAIN	SNL	5.05E3	4.57E3	0.871		1.84E1	1.10E1	0.505	
AVERAGE		8.11E3	5.25E3			4.73E1	2.30E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 1.4 E4 MEANS 1.4×10^4

TABLE L7
PLATED MASS AT 3555 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	1.5 E4 ^(b)	1.43E4	2.48		9.7 E1	6.39E1	2.73	
HAA-4	RI/ESG	2.6 E4	3.7 E3	0.641		9.0 E1	9.3 E0	0.397	
HAARM-3	HEDL	5.38E3	5.29E3	0.916			4.14E1	1.77	
SOFIA	W-AESD								
QUICK M	BCL	1.11E1	4.34E3	0.751		5.57E-2	9.09E0	0.366	
MAEROS	HEDL	1.90E3	1.87E3	0.324		7.43E0	5.01E0	0.214	
CONTAIN	SNL	5.69E3	5.10E3	0.893		1.90E1	1.19E1	0.508	
AVERAGE		9.00E3	5.78E3			4.27E1	2.34E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 1.5 E4 MEANS 1.5×10^4

TABLE L8
PLATED MASS AT 4160 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	1.8 E4 ^(b)	1.66E4	2.41		9.9 E1	6.56E1	2.74	
HAA-4	RI/ESG	3.0 E4	4.5 E3	0.653		9.3 E1	9.7 E0	0.405	
HAARM-3	HEDL	6.34E3	6.17E3	0.896			4.20E1	1.75	
SOFIA	W-AESD								
QUICK M	BCL	1.34E1	5.35E3	0.777		5.58E-2	9.13E0	0.382	
MAEROS	HEDL	2.34E3	2.31E3	0.335		7.51E0	5.06E0	0.211	
CONTAIN	SNL	6.94E3	6.40E3	0.929		1.92E1	1.21E1	0.506	
AVERAGE		1.06E4	6.89E3			4.38E1	2.39E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 1.8 E4 MEANS 1.8×10^4

TABLE L9
PLATED MASS AT 4760 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	2.0 E4 ^(b)	1.89E4	2.36		1.0 E2	6.64E1	2.75	
HAA-4	RI/ESG	3.4 E4	5.3 E3	0.863		9.4 E1	9.8 E0	0.406	
HAARM-3	HEDL	7.34E3	7.07E3	0.884			4.23E1	1.75	
SOFIA	W-AESD								
QUICK M	BCL	1.57E1	6.35E3	0.794		5.58E-2	9.13E0	0.378	
MAEROS	HEDL	2.77E3	2.74E3	0.343		7.51E0	5.06E0	0.210	
CONTAIN	SNL	8.18E3	7.62E3	0.953		1.92E1	1.21E1	0.501	
AVERAGE		1.20E4	8.00E3			4.42E1	2.41E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.0 E4 MEANS 2.0×10^4

TABLE L10
PLATED MASS AT 5400 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(b) 2.3 E4	2.13E4	2.32		1.0 E2	6.69E1	2.76	
HAA-4	RI/ESG	3.9 E4	6.2 E3	0.675		9.5 E1	9.8 E0	0.404	
HAARM-3	HEDL	8.33E3	8.04E3	0.877			4.24E1	1.75	
SOFIA	W-AESD								
QUICK M	BCL	1.82E1	7.42E3	0.808		5.58E-2	9.13E0	0.377	
MAEROS	HEDL	3.23E3	3.21E3	0.350		7.51E0	5.06E0	0.209	
CONTAIN	SNL	9.51E3	8.93E3	0.972		1.92E1	1.21E1	0.499	
AVERAGE		1.38E4	9.18E3			4.44E1	2.42E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.3 E4 MEANS 2.3×10^4

TABLE L11
PLATED MASS AT 5600 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	2.3 E4 ^(b)	2.16E4	2.31		1.0 E2	6.69E1	2.76	
HAA-4	RI/ESG	4.0 E4	6.4 E3	0.685		9.5 E1	9.8 E0	0.404	
HAARM-3	HEDL	8.45E3	8.13E3	0.870			4.24E1	1.75	
SOFIA	W-AESD								
QUICK M	BCL	1.87E1	7.58E3	0.811		5.58E-2	9.13E0	0.377	
MAEROS	HEDL	3.37E3	3.42E3	0.366		7.51E0	5.06E0	0.209	
CONTAIN	SNL	9.51E3	8.93E3	0.956		1.92E1	1.21E1	0.499	
AVERAGE		1.41E4	9.34E3			4.44E1	2.42E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.3 E4 MEANS 2.3×10^4

TABLE L12
PLATED MASS AT 7200 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	2.3 E4 ^(b)	2.18E4	2.30		1.0 E2	6.69E1	2.76	
HAA-4	RI/ESG	4.0 E4	6.6 E3	0.696		9.5 E1	9.8 E0	0.404	
HAARM-3	HEDL	8.60E3	8.28E3	0.873			4.24E1	1.75	
SOFIA	W-AESD								
QUICK M	BCL	1.94E1	7.67E3	0.809		5.58E-2	9.13E0	0.377	
MAEROS	HEDL	3.53E3	3.60E3	0.380		7.51E0	5.06E0	0.209	
CONTAIN	SNL	9.52E3	8.94E3	0.943		1.02E1	1.21E1	0.499	
AVERAGE		1.41E4	9.48E3			4.44E1	2.42E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.3 E4 MEANS 2.3×10^4

TABLE L13
PLATED MASS AT 10000 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	2.3 E4 ^(b)	2.18E4	2.29		1.0 E2	6.69E1	2.76	
HAA-4	RI/ESG	4.0 E4	6.6 E3	0.694		9.5 E1	9.8 E0	0.404	
HAARM-3	HEDL	8.63E3	8.34E3	0.877			4.24E1	1.75	
SOFIA	W-AESD								
QUICK M	BCL	1.98E1	7.67E3	0.807		5.58E-2	9.13E0	0.377	
MAEROS	HEDL	3.60E3	3.68E3	0.387		7.51E0	5.06E0	0.209	
CONTAIN	SNL	9.52E3	8.94E3	0.941		1.92E1	1.21E1	0.499	
AVERAGE		1.41E4	9.51E3			4.44E1	2.42E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.3 E4 MEANS 2.3×10^4

TABLE L14
PLATED MASS AT 30000 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(b) 2.3 E4	2.18E4	2.29		1.0 E2	6.69E1	2.76	
HAA-4	RI/ESG	4.0 E4	6.6 E3	0.693		9.5 E1	9.8 E0	0.404	
HAARM-3	HEDL	8.65E3	8.36E3	0.878			4.24E1	1.75	
SOFIA	W-AESD								
QUICK M	BCL	2.03E1	7.67E3	0.806		5.58E-2	9.13E0	0.377	
MAEROS	HEDL	3.67E3	3.75E3	0.394		7.51E0	5.06E0	0.209	
CONTAIN	SNL	9.52E3	8.94E3	0.939		1.92E1	1.21E1	0.499	
AVERAGE		1.41E4	9.52E3			4.44E1	2.42E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.3 E4 MEANS 2.3×10^4

TABLE L15
PLATED MASS AT 100000 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	2.3 E4 ^(b)	2.18E4	2.29		1.0 E2	6.69E1	2.76	
HAA-4	RI/ES6	4.0 E4	6.6 E3	0.693		9.5 E1	9.8 E0	0.404	
HAARM-3	HEDL	8.85E3	8.36E3	0.878			4.24E1	1.75	
SOFIA	W-AESD								
QUICK M	BCL	2.05E1	7.67E3	0.806		5.58E-2	9.13E0	0.377	
MAEROS	HEDL	3.86E3	3.75E3	0.394		7.51E0	5.06E0	0.209	
CONTAIN	SNL	9.52E3	8.94E3	0.939		1.92E1	1.21E1	0.499	
AVERAGE		1.41E4	9.52E3			4.44E1	2.42E1		

(a) TEST AB6 RESULT NOT MEASURED

(b) 2.3 E4 MEANS 2.3×10^4

A P P E N D I X M

CODE COMPARISONS OF INSTANTANEOUS REMOVAL RATE

TABLE M1
REMOVAL RATE AT 600 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	PRETEST	POST-TEST			(c) 6.33E-4	6.62E-4	2.669	
HAA-4	RI/ESG					8.4 E-6	1.0 E-5	0.040	
HAARM-3	HEDL					5.08E-4	7.99E-4	3.222	
SOFIA	W-AESD					3.6 E-6	3.6 E-6	0.015	
QUICK M	BCL						4.27E-6	0.017	
MAEROS	HEDL								
CONTAIN	SNL					9.72E-6	7.49E-6	0.030	
AVERAGE						2.33E-4	2.48E-4		

(a) TEST AB6 RESULT FOR NaOx = NOT APPLICABLE

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) 6.33E-4 MEANS 6.33 X 10⁻⁴

TABLE M2
REMOVAL RATE AT 900 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
		PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)	PRETEST	POST-TEST	POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	(d) (c) 4.0 E-4	(d) 3.93E-4	1.73	0.281				
HAA-4	RI/ESG	3.0 E-4	1.8 E-4	0.793	0.129	3.1 E-4	1.9 E-4	1.792	0.279
HAARM-3	HEDL	(d) 2.1 E-4	(d) 2.71E-4	1.19	0.194				
SOFIA	W-AESD	(d) 4.3 E-4	(d) 4.3 E-4	1.89	0.307				
QUICK M	BCL		1.88E-5	0.083	0.013		2.28E-5	0.215	0.034
MAEROS	HEDL								
CONTAIN	SNL	(d) 7.59E-5	(d) 7.10E-5	0.313	0.051				
AVERAGE		2.83E-4	2.27E-4		0.162		1.06E-4		0.156

(a) TEST AB6 RESULT FOR NaOx = $1.4 \text{ E-3} \pm 7.0 \text{ E-4 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = $6.8 \text{ E-4} \pm 3.4 \text{ E-4 S}^{-1}$

(c) 4.0 E-4 MEANS 4.0×10^{-4}

(d) COMBINED AEROSOL

TABLE M3
REMOVAL RATE AT 1500 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(d) (c) 1.9 E-4	(d) 2.76E-4	0.208	0.081				
HAA-4	RI/ESG	1.2 E-3	1.8 E-3	1.35	0.529	1.2 E-3	1.8 E-3	0.882	1.059
HAARM-3	HEDL	(d) 1.2 E-3	(d) 1.05E-3	0.789	0.309				
SOFIA	W-AESD	(d) 8.9 E-4	(d) 8.9 E-4	0.669	0.262				
QUICK M	BCL	1.85E-3	1.86E-3	1.40	0.547	2.50E-3	2.28E-3	1.118	1.341
MAEROS	HEDL								
CONTAIN	SNL	(d) 2.29E-3	(d) 2.08E-3	1.56	0.618				
AVERAGE		1.27E-3	1.33E-3		0.391		2.04E-3		1.200

(a) TEST AB6 RESULT FOR NaOx = $3.4 \text{ E-3} \pm 1.7 \text{ E-3 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = $1.7 \text{ E-3} \pm 8.5 \text{ E-4 S}^{-1}$

(c) 1.9 E-4 MEANS 1.9×10^{-4}

(d) COMBINED AEROSOL

TABLE M4
REMOVAL RATE AT 2400 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(d) (c) 1.1 E-3	(d) 1.15E-3	0.777	0.280				
HAA-4	RI/ESG	1.4 E-3	1.4 E-3	0.966	0.341	1.4 E-3	1.7 E-3	0.944	0.548
HAARM-3	HEDL	(d) 1.35E-3	(d) 1.32E-3	0.892	0.322				
SOFIA	W-AESD	(d) 1.2 E-3	(d) 1.2 E-3	0.811	0.293				
QUICK M	BCL	1.93E-3	1.93E-3	1.30	0.471	1.93E-3	1.90E-3	1.056	0.613
MAEROS	HEDL								
CONTAIN	SNL	(d) 1.75E-3	(d) 1.86E-3	1.26	0.454				
AVERAGE		1.46E-3	1.48E-3		0.361		1.8 E-3		0.581

(a) TEST AB6 RESULT FOR NaOx = $4.1 \text{ E-3} \pm 2.0 \text{ E-3 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = $3.1 \text{ E-3} \pm 1.5 \text{ E-3 S}^{-1}$

(c) 1.1 E-3 MEANS 1.1×10^{-3}

(d) COMBINED AEROSOL

TABLE M5
REMOVAL RATE AT 3000 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	(d) (c) 1.1 E-3	(d) 1.14E-3	0.750	0.308				
HAA-4	RI/ESG	1.4 E-3	1.7 E-3	1.12	0.459	1.4 E-3	1.6 E-3	0.914	0.432
HAARM-3	HEDL	(d) 1.35E-3	(d) 1.32E-3	0.868	0.357				
SOFIA	W-AESD	(d) 1.2 E-3	(d) 1.2 E-3	0.789	0.324				
QUICK M	BCL	1.93E-3	1.93E-3	1.27	0.522	1.93E-3	1.90E-3	1.088	0.514
MAEROS	HEDL								
CONTAIN	SNL	(d) 1.78E-3	(d) 1.85E-3	1.22	0.500				
AVERAGE		1.46E-3	1.52E-3		0.411		1.75E-3		0.473

(a) TEST AB6 RESULT FOR NaOx = $3.7 \text{ E-3} \pm 1.8 \text{ E-3 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = $3.7 \text{ E-3} \pm 1.8 \text{ E-3 S}^{-1}$

(c) 1.1 E-3 MEANS 1.1×10^{-3}

(d) COMBINED AEROSOL

TABLE M6
REMOVAL RATE AT 3250 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(d) (c) 1.1 E-3	(d) 1.14E-3	0.731	0.335				
HAA-4	RI/ESG	1.8 E-3	1.9 E-3	1.22	0.559	1.8 E-3	1.8 E-3	0.726	0.486
HAARM-3	HEDL	(d) 1.35E-3	(d) 1.32E-3	0.846	0.388				
SOFIA	W-AESD	(d) 1.2 E-3	(d) 1.2 E-3	0.769	0.353				
QUICK M	BCL	1.93E-3	1.93E-3	1.24	0.568	3.20E-3	3.16E-3	1.274	0.854
MAEROS	HEDL								
CONTAIN	SNL	(d) 1.75E-3	(d) 1.85E-3	1.19	0.544				
AVERAGE		1.52E-3	1.56E-3		0.459		2.48E-3		0.670

(a) TEST AB6 RESULT FOR NaOx = $3.4 \text{ E-3} \pm 1.7 \text{ E-3 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = $3.7 \text{ E-3} \pm 1.8 \text{ E-3 S}^{-1}$

(c) 1.1 E-3 MEANS 1.1×10^{-3}

(d) COMBINED AEROSOL

TABLE M7
REMOVAL RATE AT 3555 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(d) (c) 1.1 E-3	(d) 1.14E-3	0.897	0.345				
HAA-4	RI/ESG	2.0 E-3	1.9 E-3	1.22	0.576	2.0 E-3	1.9 E-3	0.556	0.514
HAARM-3	HEDL	(d) 1.15E-3	(d) 1.32E-3	0.846	0.400				
SOFIA	W-AESD	(d) 1.2 E-3	(d) 1.2 E-3	0.769	0.364				
QUICK M	BCL	1.93E-3	1.93E-3	1.24	0.585	4.93E-3	4.93E-3	1.442	1.332
MAEROS	HEDL								
CONTAIN	SNL	(d) 1.75E-3	(d) 1.85E-3	1.19	0.545				
AVERAGE		1.52E-3	1.56E-3		0.473		3.42E-3		0.924

(a) TEST AB6 RESULT FOR NaOx = $3.3 \text{ E-3} \pm 1.6 \text{ E-3 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = $3.7 \text{ E-3} \pm 1.8 \text{ E-3 S}^{-1}$

(c) 1.1 E-3 MEANS 1.1×10^{-3}

(d) COMBINED AEROSOL

TABLE M8
REMOVAL RATE AT 4160 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(d) (c) 1.1 E-3	(d) 1.13E-3	0.739	0.348				
HAA-4	RI/ESG	1.8 E-3	1.8 E-3	1.18	0.554	1.9 E-3	1.8 E-3	0.392	1.636
HAARM-3	HEDL	(d) 1.23E-3	(d) 1.28E-3	0.837	0.394				
SOFIA	W-AESD	(d) 1.2 E-3	(d) 1.2 E-3	0.784	0.369				
QUICK M	BCL	1.93E-3	1.93E-3	1.26	0.594	7.33E-3	7.38E-3	1.008	6.709
MAEROS	HEDL								
CONTAIN	SNL	(d) 1.75E-3	(d) 1.82E-3	1.19	0.560				
AVERAGE		1.50E-3	1.53E-3		0.471		4.59E-3		4.173

(a) TEST AB6 RESULT FOR NaOx = $3.25E-3 \pm 1.6 E-3 S^{-1}$

(b) TEST AB6 RESULT FOR NaI = $1.1 E-3 \pm 5.5 E-4 S^{-1}$

(c) 1.1 E-3 MEANS 1.1×10^{-3}

(d) COMBINED AEROSOL

TABLE M9
REMOVAL RATE AT 4760 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(d) (c) 1.1 E-3	(d) 1.13E-3	0.742	0.348				
HAA-4	RI/ESG	1.8 E-3	1.8 E-3	1.18	0.554	1.9 E-3	1.8 E-3	0.344	2.687
HAARM-3	HEDL	(d) 1.23E-3	(d) 1.27E-3	0.834	0.391				
SOFIA	W-AESD	(d) 1.2 E-3	(d) 1.2 E-3	0.788	0.369				
QUICK M	BCL	1.93E-3	1.93E-3	1.27	0.594	8.60E-3	8.67E-3	1.65	12.94
MAEROS	HEDL								
CONTAIN	SNL	(d) 1.75E-3	(d) 1.81E-3	1.19	0.557				
AVERAGE		1.50E-3	1.52E-3		0.468		5.24E-3		7.820

(a) TEST AB6 RESULT FOR NaOx = $3.25E-3 \pm 1.6 E-3 S^{-1}$

(b) TEST AB6 RESULT FOR NaI = $6.7 E-4 \pm 3.3 E-4 S^{-1}$

(c) 1.1 E-3 MEANS 1.1×10^{-3}

(d) COMBINED AEROSOL

TABLE M10
REMOVAL RATE AT 5400 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(d) (c) 1.1 E-3	(d) 1.13E-3	0.724	0.348				
HAA-4	RI/ESG	1.8 E-3	1.8 E-3	1.15	0.554	1.8 E-3	1.7 E-3	0.306	3.091
HAARM-3	HEDL	(d) 1.23E-3	(d) 1.51E-3	0.967	0.465				
SOFIA	W-AESD	(d) 1.2 E-3	(d) 1.2 E-3	0.768	0.369				
QUICK M	BCL	1.93E-3	1.93E-3	1.24	0.594	9.32E-3	9.40E-3	1.094	17.09
MAEROS	HEDL								
CONTAIN	SNL	(d) 1.75E-3	(d) 1.80E-3	1.15	0.554				
AVERAGE		1.50E-3	1.56E-3		0.480		5.55E-3		10.09

(a) TEST AB6 RESULT FOR NaOx = $3.25E-3 \pm 1.6 E-3 S^{-1}$

(b) TEST AB6 RESULT FOR NaI = $5.5 E-4 \pm 2.8 E-4 S^{-1}$

(c) 1.1 E-3 MEANS 1.1×10^{-3}

(d) COMBINED AEROSOL

TABLE M11
REMOVAL RATE AT 5600 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	(d) (c) 2.8 E-3	(d) 3.01E-3	1.19	1.31				
HAA-4	RI/ESG	1.7 E-3	1.8 E-3	0.714	0.783	1.8 E-3	1.8 E-3	0.353	1.385
HAARM-3	HEDL	(d) 3.51E-3	(d) 2.01E-3	0.798	0.874				
SOFIA	W-AESD	(d) 3.3 E-3	(d) 3.3 E-3	1.31	1.43				
QUICK M	BCL	2.41E-3	2.41E-3	0.956	1.05	8.34E-3	8.40E-3	1.647	6.462
MAEROS	HEDL								
CONTAIN	SNL	(d) 2.63E-3	(d) 2.57E-3	1.02	1.12				
AVERAGE		2.73E-3	2.52E-3		1.10		5.1 E-3		3.923

(a) TEST AB6 RESULT FOR NaOx = $2.3 \text{ E-3} \pm 1.2 \text{ E-4 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = $1.3 \text{ E-3} \pm 6.5 \text{ E-4 S}^{-1}$

(c) 2.8 E-3 MEANS 2.8×10^{-3}

(d) COMBINED AEROSOL

TABLE M12
REMOVAL RATE AT 7200 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(d) (c) 1.0 E-3	(d) 8.78E-4	1.05	1.46				
HAA-4	RI/ESG	7.4 E-3	7.1 E-4	0.852	1.18	7.5 E-3	7.1 E-4	0.703	0.888
HAARM-3	HEDL	(d) 1.05E-3	(d) 1.48E-3	1.78	2.47				
SOFIA	W-AESD	(d) 6.9 E-4	(d) 6.9 E-4	0.828	1.15				
QUICK M	BCL	0.27E-4	0.25E-4	0.750	1.04	1.31E-3	1.31E-3	1.297	1.638
MAEROS	HEDL								
CONTAIN	SNL	(d) 0.15E-4	(d) 0.17E-4	0.741	1.03				
AVERAGE		7.87E-4	8.33E-4		1.39		1.01E-3		1.250

(a) TEST AB6 RESULT FOR NaOx = $6.0 \text{ E-4} \pm 3.0 \text{ E-4 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = $8.0 \text{ E-4} \pm 4.0 \text{ E-4 S}^{-1}$

(c) 1.0 E-3 MEANS 1.0×10^{-3}

(d) COMBINED AEROSOL

TABLE M13
REMOVAL RATE AT 10000 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(d) (c) 4.2 E-4	(d) 3.82E-4	1.16	1.59				
HAA-4	RI/ESG	3.7 E-4	3.5 E-4	1.07	1.46	3.5 E-4	3.5 E-4	0.829	0.972
HAARM-3	HEDL	(d) 4.89E-4	(d) 5.21E-4	1.59	2.17				
SOFIA	W-AESD	(d) 1.9 E-4	(d) 1.9 E-4	0.579	0.792				
QUICK M	BCL	2.63E-4	2.63E-4	0.802	1.10	4.92E-4	4.93E-4	1.108	1.309
MAEROS	HEDL								
CONTAIN	SNL	(d) 2.60E-4	(d) 2.6 E-4	0.793	1.08				
AVERAGE		3.32E-4	3.28E-4		1.37		4.22E-4		1.172

(a) TEST AB6 RESULT FOR NaOx = $2.4 \text{ E-4} \pm 9.0 \text{ E-5 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = $3.6 \text{ E-4} \pm 1.8 \text{ E-4 S}^{-1}$

(c) 4.2 E-4 MEANS 4.2×10^{-4}

(d) COMBINED AEROSOL

TABLE M14
REMOVAL RATE AT 30000 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL	(d) (c) 1.4 E-4	(d) 1.41E-4	1.55	2.31				
HAA-4	RI/ESG	1.1 E-4	1.1 E-4	1.21	1.80	1.1 E-4	1.1 E-4	1.028	0.917
HAARM-3	HEDL	(d) 1.2 E-4	(d) 1.36E-4	1.50	2.23				
SOFIA	W-AESD	(d) 3.8 E-5	(d) 3.8 E-5	0.418	0.623				
QUICK M	BCL	6.05E-5	6.03E-5	0.663	0.988	1.03E-4	1.03E-4	0.963	0.858
MAEROS	HEDL								
CONTAIN	SNL	(d) 6.04E-5	(d) 6.03E-5	0.663	0.988				
AVERAGE		8.82E-5	9.09E-5		1.490		1.07E-4		0.892

(a) TEST AB6 RESULT FOR NaOx = $6.1 \text{ E-5} \pm 2.0 \text{ E-5 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = $1.2 \text{ E-4} \pm 6.0 \text{ E-5 S}^{-1}$

(c) 1.4 E-4 MEANS 1.4×10^{-4}

(d) COMBINED AEROSOL

TABLE M15
REMOVAL RATE AT 100000 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL								
HAA-4	RI/ESG	5.1 E-5 ^(c)	5.2 E-5	1.42	1.68	5.2 E-5	5.2 E-5	1.128	
HAARM-3	HEDL	6.94E-5 ^(d)	7.14E-5 ^(d)	1.96	2.30				
SOFIA	W-AESD	1.5 E-5 ^(d)	1.5 E-5 ^(d)	0.411	0.484				
QUICK M	BCL	2.19E-5	2.18E-5	0.597	0.703	4.01E-5	4.01E-5	0.870	
MAEROS	HEDL								
CONTAIN	SNL	2.22E-5 ^(d)	2.22E-5 ^(d)	0.608	0.716				
AVERAGE		3.59E-5	3.65E-5		1.177		4.61E-5		

(a) TEST AB6 RESULT FOR NaOx = $3.1 \text{ E-5} \pm 1.0 \text{ E-5 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) 5.1 E-5 MEANS 5.1×10^{-5}

(d) COMBINED AEROSOL

TABLE L16
PLATED MASS AT 400000 SECONDS

CODE	USER	NaOx				NaI			
		PLATED MASS (GRAMS)		RATIO		PLATED MASS (GRAMS)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
HAA-3	HEDL	2.3 E4 ^(c)	2.18E4	1.75	0.583	1.0 E2	6.69E1	2.46	1.388
HAA-4	RI/ESG	4.0 E4	6.6 E3	0.53	0.176	9.5 E1	9.9 E0	0.36	0.205
HAARM-3	HEDL	8.65E3	8.36E3	0.67	0.224		4.24E1	1.56	0.880
SOFIA	W-AESD		3.00E4 ^(d)	2.41	0.802		4.5 E1 ^(d)	1.65	0.934
QUICK M	BCL	2.06E1	7.67E3	0.62	0.205	5.58E-2	9.13E0	0.34	0.189
MAEROS	HEDL	3.86E3	3.75E3	0.30	0.100	7.51E0	5.06E0	0.19	0.105
CONTAIN	SNL	9.52E3	8.94E3	0.72	0.239	1.92E1	1.21E1	0.44	0.251
AVERAGE		1.41E4	1.24E4		0.332	4.44E1	2.72E1		0.564

(a) TEST AB6 RESULT FOR NaOx = $3.74E4 \pm 7.5E3$ g

(b) TEST AB6 RESULT FOR NaI = $4.82E1 \pm 9.6E0$ g

(c) 2.3E4 MEANS 2.3×10^4

(d) DATA SUBMITTED LATE

TABLE M16
REMOVAL RATE AT 400000 SECONDS

CODE	USER	NaOx				NaI			
		REMOVAL RATE (S ⁻¹)		RATIO		REMOVAL RATE (S ⁻¹)		RATIO	
				POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (a)			POST-TEST CODE TO AVERAGE	POST-TEST CODE TO TEST (b)
		PRETEST	POST-TEST			PRETEST	POST-TEST		
HAA-3	HEDL								
HAA-4	RI/ESG	^(c) 2.5 E-5	2.6 E-5	2.11	3.56	2.5 E-5	2.6 E-5	1.135	
HAARM-3	HEDL								
SOFIA	W-AESD	^(d) 5.6 E-6	^(d) 5.6 E-6	0.455	0.767				
QUICK M	BCL	7.63E-6	7.61E-6	0.619	1.04	2.01E-5	1.99E-5	0.869	
MAEROS	HEDL								
CONTAIN	SNL	^(d) 9.81E-6	^(d) 9.93E-6	0.807	1.36				
AVERAGE		1.20E-5	1.23E-5		1.68		2.29E-5		

(a) TEST AB6 RESULT FOR NaOx = $7.3 \text{ E-6} \pm 2.2 \text{ E-6 S}^{-1}$

(b) TEST AB6 RESULT FOR NaI = NOT MEASURED

(c) 2.5 E-5 MEANS 2.5×10^{-5}

(d) COMBINED AEROSOL