ATTACHMENT(1)

REVIEW AUG 30 1984

# TECHNICAL SPECIFICATION

# FOR

# PARTICULATE PLATEOUT TESTING IN EFFLUENT

# RADIATION MONITOR AND POST ACCIDENT SAMPLE LINES

# FOR THE

# ARIZONA PUBLIC SERVICE COMPANY

# PALO VERDE NUCLEAR GENERATING STATION

UNITS 1, 2 AND 3

[illegible] specification requirements during the plateout test [illegible]

SPECIFICATION NUMBER 13-NM-997B

JOB NUMBER 10407
BECHTEL POWER CORPORATION
NORWALK, CALIFORNIA

| REV. NO. | DATE | REVISIONS |
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PF-875 (10407) 1/77

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# TECHNICAL SPECIFICATION

## 1.0 SCOPE

### 1.1 General

1.1.1 The work includes all necessary design, materials, equipment, and services required for and incidental to, sampling, analysis, and reporting of analytical results in accordance with this specification.

### 1.2 Work Included

1.2.1 The Supplier will be responsible for all work outlined in this specification, including but not limited to the following:

a. Particulate size and mass distribution measurements in the ducts near the isokinetic probes for the radiation monitors and in the post accident sampling lines identified in attachments 1 and 2, respectively.

b. Particulate size and mass distribution measurements in the sample line for the radiation monitors identified in attachment 1, as near to the monitor particulate sampler as possible.

c. Particulate plateout calculations for the radiation monitors and post accident sample lines identified in attachments 1 and 2, respectively.

d. Measurements to determine the degree of mixing of the various discharges to the duct prior to the flow mixture reaching the isokinetic sample probe for the radiation monitors identified in attachment 1.

e. Flow traverses in the duct for the radiation monitors identified in attachment 1. Test to be run under normal and accident flow conditions to determine isokinetic velocities. Record relative humidity and temperature. Provide technical estimates for differences in results based on different humidity and temperatures.

f. Preparation of a report on the testing program detailing the procedures, test equipment, test results, and verification of instrument calibration.

### 1.3 Work Not Included

The Purchaser will provide the following:

a. Access to the jobsite as subject to access restrictions. Supplier to coordinate required access with the Purchaser.

b. Modifications to Purchaser sample lines and ducts to accommodate Supplier test equipment.

## 2.0 CODES AND STANDARDS

Design, materials, manufacture, examination, testing, inspection, and certification and documentation shall conform to the latest revision of the applicable portions of the following standards:

a. Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities, American National Standards Institute, Inc., ANSI N13.1-1969.

## 3.0 TESTING

### 3.1 Special Equipment for Plateout Testing

#### 3.1.1 Aerosol Counter

3.1.1.1 An aerosol counter shall be used for the measurement of the total number of particles in various size ranges from 0.12 micrometers to 6 micrometers and greater in at least 12 size ranges. Accuracy shall be within the stated accuracy of the test equipment in each size range. Hard copy printout indicating the time sampling was completed, sampling duration, and sample results shall be provided.

#### 3.1.2 Mass Flow Meter

3.1.2.1 A portable mass flow calibrator shall be used to measure sample line flow rates over a range from 0 to 40 SLPM (25C, 1 atm). Accuracy shall be at least ±5 percent of full scale.

#### 3.1.3 Sample Probes

3.1.3.1 Special sample probes for use within Purchaser equipment and ducts to meet testing requirements of sections 3.1.1 and 3.1.2 shall be provided by Supplier. Isokinetic probe nozzles shall be ground to knife-edge sharpness and properly sized for their intended use. Any equipment needed to connect the Supplier isokinetic probes to the Supplier test equipment shall be provided by the Supplier. Appropriate detailed drawings shall be provided by the Supplier to assist the Purchaser in designing interfaces to the Supplier test equipment (see appendix A).

3.2 Particulate plateout testing shall be conducted for a minimum interval of 1 hour during each fixed (constant) duct flow rate. Testing will be performed for normal range radiation monitors at normal flow rates, and high range radiation monitors at accident flow rates.

### 3.3 Traverse Flow Testing

3.3.1 The objective of these measurements is to determine if the sample being taken is isokinetic. By taking velocity profiles in the ducts, the total flow velocity in the duct can be measured and compared with the flow measured in the sample lines. If the velocities do not match, provide an appropriate correction factor. Test to be performed for both accident and normal flow conditions.

3.4 Verification of Representative Sampling and Uniform Mixing

3.4.1 The objective of these measurements is to determine if adequate mixing exists in the duct upstream of the sample probes to ensure a representative sample. If the measurements are not uniform, then determine an appropriate correction factor.

3.4.2 Uniform mixing is determined by releasing a predetermined mixture into one or more of the inlets into the plant vent duct and then measuring the mixture concentration at various locations. The release point shall be upstream of the last bend in the plant vent duct prior to the radiation monitor isokinetic probe. One specific measurement location must be upstream and close to the plant vent monitor sample probe. Test to be performed for both accident and normal flow conditions.

3.4.3 Instrumentation used for this measurement shall have an accuracy of ±5 percent of indicated range and be calibrated for the specific medium used in the test.

3.5 Sampling Program

Supplier's sampling program shall be submitted to Engineer for approval prior to starting work. Sampling shall be conducted on a statistically sound basis. Quality control shall be governed by appendix B.

4.0 TRANSMITTAL OF ANALYSES

Analysis results shall be promptly transmitted to both Purchaser and Engineer. The report format shall be logical. The report shall clearly state the sample identification, date and place of sampling, analysis results, method of analysis, date of analysis, and name of analyst. Each report is to be signed by the laboratory manager in the presence of a Notary Public. Supplier shall retain copies for 5 years.

Attachment 1

RADIATION MONITORING SYSTEM - TESTING TO BE PERFORMED

A. Plateout Testing

| | | |
|---|---|---|
| 1. | 1-J-SQB-RU-1 | Normal Flow |
| 2. | 1-J-SQN-RE-143 | Normal Flow |
| 3. | 1-J-SQN-RE-144 | Normal Flow |

B. Traverse Flow Testing

| | | |
|---|---|---|
| 1. | 1-J-SQN-RE-143/RE-144 | Normal Flow |
| 2. | 1-J-SQN-RE-145/RE-146 | Normal and Accident Flow |

C. Verification of Representative Sampling/Uniform Mixing

| | | |
|---|---|---|
| 1. | 1-J-SQN-RE-143 | Normal Flow |
| 2. | 1-J-SQN-RE-144 | Normal Flow |

Attachment 2

POST ACCIDENT SAMPLING SYSTEM - TESTING TO BE PERFORMED

(Sampling lines to be tested will be identified at a later date.)

[illegible] Flow

B. Traverse Flow Testing

# APPENDIX A

## DRAWING AND DATA REQUIREMENTS

### A.1 GENERAL REQUIREMENTS

The Supplier shall submit originals, reproductions, or prints of all drawings, data, procedures, and/or quality verification documents in accordance with the following requirements:

A.1.1 Correspondence with the Engineer shall be sent to:

Bechtel Power Corporation
P.O. Box 60860
Terminal Annex
Los Angeles, California 90060

Attention: W. G. Bingham
Project Engineer

### A.2 REVIEW OF SUPPLIER DRAWINGS

A.2.1 Drawings and documents, when submitted by the Supplier, will be processed by the Engineer within 30 calendar days after receipt and returned with status marked as follows:

Status 1 ☐ WORK MAY PROCEED.

Indicates that information delineated on the document has been reviewed by Bechtel without comment. Status 1 drawings must be free of notes or comments.

Status 2 ☐ REVISE AND RESUBMIT. WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES INDICATED.

Indicates that information delineated on the document is in basic accord with the specification. However, changes or comments have been noted; therefore, the Supplier must note the indicated changes and resubmit accordingly.

Documents which have hold areas, or which are marked substandard for microfilm quality, will also receive this status accompanied by a note requesting a resubmittal of the complete and corrected document or a document suitable to meet microfilming standards.

Status 3 ☐ REVISE AND RESUBMIT. WORK MAY NOT PROCEED.

Indicates that information delineated on the document is not acceptable to the project and therefore work may not proceed. All comments shall appear on the document or on a sheet attached to the document; the Supplier shall revise and resubmit this document.

Status 4 ☐ INFORMATION ONLY DISTRIBUTION REQUIRED? ☐ YES

A status 4 "INFORMATION ONLY" indicates the document is the type of design information which does not require approval and is not required for construction or plant operation (e.g., preliminary design information, examples of designs which a Supplier has used for other projects, etc.).

A.2.2 Supplier shall incorporate changes as required by comments on the document and resubmit the revised document within 30 calendar days. All changes which are made or requested by the Supplier after a document has been accepted shall be resubmitted. Resubmittals are not required on any Status 1 document unless revisions are made.

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A.2.3 Should the Supplier choose to reply to the Engineer's comments by letter, each letter should preferably cover only one document. However, if the Supplier covers more than one document per letter, each item must be clearly identified with the Engineer's log.

A.2.4 Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the Supplier, and does not relieve Supplier from full compliance with contractual obligations.

A.2.5 The Supplier shall not proceed with changes resulting from comments which affect cost or schedule without prior written approval from the Engineer that the specific cost and/or schedule impacts are acceptable.

## A.3 GENERAL DRAWING REQUIREMENTS

A.3.1 Use of standard drawings to satisfy a general type design presentation for equipment having slight deviations is acceptable if the information is specific and options are clearly noted or deleted. Each particular equipment type shall have its own drawing and each drawing shall have its own title and number. It is recognized that basically identical units of apparatus have many probabilities of duplication; however, it will be required that the basic intent of this paragraph be met.

A.3.2 Engineer will consider the Supplier's reasonable request for restriction of proprietary information. However, it may become necessary to make disclosure to the NRC, and other regulating government agencies or bonafide interveners.

A.3.3. When a drawing is revised, revision numbers must be clearly legible, easily distinguishable from the drawing number, and should be in or as close as possible to the title box. A short description of the revision must be included and affected areas on drawing shall be circled and identified with the revision number.

On resubmittals, any revised drawing or document shall contain the Engineer's Log Number which was placed on the drawing or document during the initial review.

## A.4 TYPE OF DRAWING SUBMITTALS

A.4.1 The Engineer has standardized drawing reproduction techniques that use 35mm microfilm aperture cards for all in-house and field distribution. All submitted drawings or data must be of sufficiently high quality drafting to permit microfilming by the Engineer. It is preferable that originals be submitted when possible. If reproductions of the originals are submitted, they must be full size, rolled, direct-reading prints. Folded drawings cannot be accepted. The reproduction must be of original quality having sharp, clean, well-defined lines with a line density equal to or better than the original. The lettering must be large and of an open style permitting reductions up to 30X and blowback at 14.5X and remain open with no plugging or loss of legibility. The reproduction must maintain an evenly high contrast between image and background over the surface of the drawing. Reproductions with low contrast or heavy background density with thin, weak lines and lettering are not acceptable, and will be returned to the Supplier for correction and resubmittal 7 days after receipt of the unacceptable drawing(s). Drawings drafted to the National Micrographics Association Drafting Standards, Information Monograph No. 3, "Modern Drafting Techniques for Quality Microreproductions," generally meet the requirements and are nationally accepted. Copies of this standard are available from the National Micrographics Association, 8728 Colesville Road, Silver Springs, Maryland 20910.

A.4.2 NMA Standards are referenced as minimums; upgrading of these or use of standards specifying heavier line weights or larger letter sizes are acceptable. As an assist in planning, minimum NMA standards are considered to be as follows:

### A.4.2.1 Lettering

All lettering must be upper case only, open style.

| | |
|---|---|
| General lettering minimum | - 5/32 inch (4mm) |
| Title lettering minimum | - 1/4 inch (6 mm) |
| Fractions minimum | - 1/4 inch (6 mm) |
| Space between characters, minimum | - 1/16 inch (1.6mm) |

### A.4.2.2 Line Work

All lines must be sharp, solid, and dense to meet microfilm standards. Line work should be limited to spacing and three widths as follows:

a. Dimension lines, leader lines, or background - thin = 0.01 inch minimum.

b. Primary Object lines - medium = 0.02 inch.

c. Diagrammatic, such as reinforcing steel - thick = 0.03 inch (1/32).

d. Minimum spacing between lines must be 1/16 inch (1.6mm).

A.4.2.2.1 The quality of the Supplier generated drawings or submitted reproductions of these drawings must be such that every line and character on the exposed and processed microfilm has sufficient clarity to permit reproducibility through three successive microfilm reproductions. The third microfilm generation must be capable of producing paper prints using any enlargement ratio in the range of 14X through 16X. The three successive microfilm reproductions are defined as: (a) original silver microfilm shot from submitted Supplier drawing, (b) first generation diazo duplicate made from original silver microfilm, and (c) second generation diazo duplicate produced from first generation diazo duplicate.

A.4.2.3 Reproduction Requirements

Originals or reproductions of drawings submitted must be rolled and when reproductions of the originals are submitted, one of the following reproduction methods must be used. They are listed in order of preference.

a. Contact Repro Positive paper or Single WT Contact Matte paper, Kodagraph KP-5 (right reading). A bromide negative or paper negative must be made first for contact printing the above reproductions.

b. Contact Printed paper, Auto Positive (right reading).

c. Teledyne Post #208 PEM Vapo Tuf-Tex, black image, 5 mil polyester base.

d. Diazo Black Line print.

A.4.3 Drawings submitted and not conforming to these standards will not be accepted, and will be returned to the Supplier for upgrading or redrafting at the Supplier's expense, and will be returned to the Supplier for correction and resubmittal 7 days after receipt of the unacceptable drawing(s).

# APPENDIX B

## SUPPLIER'S QUALITY PROGRAM

B.1 Supplier shall have a quality program in effect that ensures the accuracy of all results, and is in accordance with this specification.

B.1.1 Supplier's Quality Organization

The Supplier's quality organization shall have qualified quality personnel performing these functions:

- Review and approve Quality Assurance and Quality Control documents
- Issuing "stop work orders" for procedures which are not in compliance with QA/QC requirements of this plan
- Maintaining records on all analytical data, calibration data, and radioactive material inventory
- Provide Purchaser with Quality Control data and Quality Assurance reports

B.2 All laboratory and field instrumentation shall be calibrated and maintained in accordance with industry standards and in compliance with manufacturer's instructions.

B.3 Chain of Custody

Supplier shall keep precise records of each sample taken. All information, including sample location, type, time, date, sample collector's name, as well as names and dates of subsequent handlers shall be kept as a permanent record of the chain of custody of the sample. Records of work performed under this specification shall be retained for 5 years subsequent to the last analysis.