8

Attachments for in-house review only

INSERT 20-A: Tank Farm Investigation
List of Figures:
Interim Report 6

SUBJECT: MCAR 24 (issued 9/7/78)

Comments from NCC 3/17 phone. on to JR Richard.

Settlement of the Diesel Generator Foundations and Building (Insufficient Compaction in Plant Area Fill Related to Seismic Category I Structures and Facilities)

INTERIM REPORT 7

DATE: August 17, 1979

PROJECT: Consumers Power Company
Midland Plant Units 1 & 2
Bechtel Job 7220

PLEASE RETURN TO ME WITH YOUR COMMENTS, NO LATER THAN AUG. 13, 1979, 2.00PM. Thanks.

AMI
X-9557
5D5

Introduction

This report summarizes activities related to Seismic Category I structures and utilities founded on plant area fill. It also includes modifications of planned remedial actions for portions of the auxiliary building, feedwater isolation valve pits, and diesel generator building and foundations reported in Interim Report 6 of MCAR 24. Results of soil investigations made in the above-mentioned areas have been reported in previous interim reports of MCAR 24.

Description of Deficiency

A) Diesel Generator Building and Foundations

This has been described in detail in previous Interim Reports 1, 2, 3, 4, and 5 of MCAR 24.

B) Auxiliary Building Electrical Penetration Areas and Feedwater Isolation Valve Pits

The extent of inadequacy of fill material under the auxiliary building electrical penetration areas and feedwater isolation valve pits has been described in Interim Report 6 of MCAR 24.

C) Auxiliary Building Railroad Bay

Interim Report 6 of MCAR 24 stated that, based on boring records, the upper 18 feet of sand backfill may have liquefaction potential. However, further evaluation of soil investigation indicates liquefaction potential is unlikely in the railroad bay area. ~~Settlement of sand due to ground movement during an earthquake~~ is being reviewed by the soil consultants.

D) Service Water Pump Structure

The deficiency in this area has been reported in Interim Report 6 of MCAR 24.

Corrective Action

A) General Plant Area

1) Reason for choosing permanent plant area dewatering

A permanent exterior dewatering system capable of lowering the water level to an approximate elevation of 600 feet will be installed which will enclose the Q-listed area of the plant site. The option of permanent area dewatering has the advantage of being a positive solution to the liquefaction problem in any part of the fill within the perimeter enclosed by the dewatering system. Furthermore, permanent area dewatering can be simply and effectively monitored, primarily through the use of piezometers. One of the greatest advantages, according to soil consultant R. Peck, is the margin of safety inherent in the time lag that would be required for recharge of the dewatered zone if the pumps fail. Pumping system failure as the result of an earthquake would, therefore, not destroy the protection achieved by the dewatering.

In addition to being a positive solution to the liquefaction problem, wherever such a problem exists in the dewatered area of the plant site, the drainage will substantially ~~reduce settlement~~ that might

be induced by compaction of the sands during an earthquake. The dewatering system will essentially eliminate potential problems of seismic shakedown.

2) Description of permanent dewatering

The present concept is to enclose the ~~affected area~~ with a permanent exterior dewatering system. The dewatering system would consist of submersible deepwells that would extend to the original clay till. Approximately 200 to 300 deepwells would be installed. The number required to maintain the groundwater at the desired level would be operated ~~and the remainder would be redundant~~. There would be sufficient redundancy to provide for interruption of parts of the system. In addition, 100% standby diesel generators would be provided.

The pumps would be wired electrically ~~such that they are~~ staggered and sectioned so that one interruption does not affect a continuous length of the dewatering system.

The permanent interior dewatering system would be used to remove groundwater remaining within the area enclosed by the perimeter dewatering system. The wells would be pumped as required to remove groundwater that collects within the exterior

perimeter system because of the recharge from rain, shutdown, etc.

The groundwater removed would be monitored to ensure that no fines are being removed from the soil.

After an initial pumping period of approximately 6 months, ~~the dewatered basin should be large enough~~ that the permanent dewatering system could be shut down completely from 1 to 2 weeks before a significant rise in the water level within the dewatered area would occur. The principal source of recharge is the cooling pond and the rate the groundwater flows through the soil from the pond is low.

Piezometers would be located at key points to monitor the groundwater level and alert the plant when the groundwater has risen above a predetermined elevation.

R. Loughney, Bechtel consultant, is currently preparing a preliminary plant dewatering scheme. It should be available for review by August 20, 1979.

B) Diesel Generator Building and Foundations

As mentioned in Interim Report 6, the soil investigations at the diesel generator building showed the presence of zones of sand,

including some portions with loose sand. This finding indicated a potential for liquefaction under severe earthquakes, and possibility of settlement originating in the sand due to shakedown under seismic conditions. Interim Report 6 included a suggestion to chemically grout the sand having liquefaction potential. Grouting, using proper chemicals, would be feasible. Nevertheless, it would be difficult to ensure that all injected materials had been successfully treated, or that all loose sand zones had actually been injected. Thus, it would be difficult to positively state whether all significant zones with liquefaction potential had been identified and treated.

General permanent dewatering of a large portion of the plant site has been selected as the alternative to grouting. Reasons for selecting permanent area dewatering have been described under corrective action for the general plant area.

C) Auxiliary Building Penetration Areas and Feedwater Isolation Valve Pits

Plans for corrective actions for the auxiliary building electrical penetration areas and the feedwater isolation valve pits, as described in Interim Report 6 of MCAR 24, have been modified. Unsuitable fill material beneath the feedwater isolation valve pits will be excavated and replaced by lean concrete. However, fill beneath the auxiliary building electrical penetration areas will not be removed,

except for excavation necessary to construct the caissons underneath the cantilever ends of the electrical penetration areas. These caissons, which will be founded on undisturbed till, will provide permanent and positive support for the electrical penetration areas ~~and will lead to satisfactory results irrespective of the nature of fill beneath the structure~~.

Phases of the modified corrective actions for the auxiliary building electrical penetration areas and the feedwater isolation valve pits are as follows.

1) Preparatory work

a) Temporary external supports

Prior to underpinning operations, a temporary support for the feedwater isolation valve pits will be provided as described in Interim Report 6 of MCAR 24. For the auxiliary building electrical penetration areas, results of a static structural analysis indicated that no other external support is needed in addition to the support to be provided by underpinning.

Caissons consisting of concrete-filled steel pipes will be used to underpin the auxiliary building electrical penetration areas. For each of the electrical penetration areas, caissons will provide permanent support having a vertical resistance capacity sufficient to produce a moment equal to or greater than 325,000 foot kips at Column Rows 5.3 for Unit 1 and 7.8 for Unit 2, respectively. The approximate installed caisson capacity is 4,000 kips for each of the electrical penetration areas. Caissons will extend at least 4.0 feet into the till or natural dense sand strata.

Piles or caissons consisting of concrete-filled steel pipes will be used to underpin the turbine building along the K line adjacent to the valve pit structure. These permanent underpinning supports for the turbine building will be capable of safely resisting column loads plus half the base slab pressure within the zone of influence, as defined in Figures 91 and 92. Design of the permanent underpinning support for the turbine building will take into account the reaction from the temporary external support of the valve pit structure.

Caissons and piles to be used as permanent underpinning support for the auxiliary building penetration areas and the turbine building will be load tested for a minimum of 1.5 times the design load. Caissons selected for testing will be representative of the majority of caissons to be installed. For every group of caissons which constitute 500 design tons of underpinning resistance, one caisson will be load tested.

All permanent underpinning supports to be provided under the auxiliary and turbine buildings will be encased in lean concrete.

Soldier piles, caissons, or concrete piers with nondeteriorating lagging material will be used to secure the soil under the turbine building. This lateral support will prevent soil movement under the adjacent turbine and control buildings during underpinning operations. The lateral support will be designed for a hydrostatic head from elevation 627' to the bottom of mass excavation under the structures. The lateral support will also be designed for earth pressure loads from soil beneath these buildings. The depth of the initial excavation where the earth is not supported will not exceed 4 feet if it is within 6 feet of the K line (Figures 91 and 92). Otherwise, a maximum depth of 7 feet will be used. After the initial excavation, lagging will be installed and back-packed. The lagging along the K line located below elevation 600' will be grouted.

The existing unsuitable backfill material under the feedwater isolation valve pits will be excavated and removed down to the till if required. The extent of backfill removal will be determined on the basis of soil tests of the exposed fill material and available boring information. Manual or mechanical means will be used to excavate and remove unsuitable material. Conventional tools, such as rock splitters and demolition tools, will be used to dislocate and/or remove hardened material during excavation. Excavation will not proceed to a depth

greater than 3 feet below the previously grouted lagging. Proper precautionary measures will be taken to prevent movement of foundation material outside the excavation area.

After removal of all inadequate fill material, the excavated area will be backfilled with lean concrete having a minimum strength of 2,000 psi. Concrete will be poured in lift thicknesses of 5 feet maximum, except the first lift, which will be no more than 2 feet thick. Successive lifts will be doweled into the preceding lift. The topmost lift will be within 6 inches of the bottom of the existing slab. The remaining void between the lean concrete backfill and the foundation slab will be either dry-packed or pressure-grouted. A 2-inch gap will be provided between the lean concrete backfill and the adjacent structures (the containment and turbine buildings) by using ethafoam or similar joint separation materials.

D) Auxiliary Building Railroad Bay

The permanent dewatering for the general plant discussed earlier in this report, will eliminate the possibility of liquefaction in this area. No other corrective action is required in this area.

E) Service Water Pump Structure

Corrective action for the service water pump structure has been reported in Interim Report 6 of MCAR 24.

Activities Related to Plant Fill and Settlement

A) Diesel Generator Building and Foundations

1) Building settlement and preload operation

Figures 13, 14-1, 43, and 44 have been revised to show the settlement data for the diesel generator building and foundations as of August 3, 1979.

The results of the preload operation are being reviewed by the consultants. The observed pore water pressures were small and dissipated very rapidly. Currently, the water levels in the piezometers in the the diesel generator building area are relatively stable. This observation suggests that the primary consolidation was accomplished quickly and the plotted data of the settlement as a function of the logarithm of time became linear shortly after completion of the ~~surcharge~~ preload.

Therefore, it is possible to forecast the future secondary compression by simple extrapolation, assuming the ~~surcharge~~ preload

will remain in place. Although even this amount of settlement would be acceptable, the projected settlement determined on this basis is an upper bound because the ~~surcharge~~ preload will be removed and the real settlement will certainly be smaller.

To predict more precise furture secondary compression based on the linear portion of the settlement curve, the existing borros anchors were modified to enable more accurate settlement measurement. In addition, four deep borros anchors, with tip elevations at 535 feet, were installed. When read using the modified system of measurement, these deep borros anchors will provide the magnitude of absolute building settlement. Refer to Figure 88 for the locations of deep borros anchors.

The modification of the borros anchors passing through the mezzanine floor with the five settlement rods on each of the diesel generator pedestals consisted of reducing the stickup rod lengths above the flow as necessary, attaching a flat metal reference surface to the floor beside each rod, and attaching a reference surface on each rod. A portable mechanical-dial indicator height gage has been used to determine the elevation difference between each pair of reference surfaces. Similarly, the reference brackets were attached to the building wall and pedestal floor at each deep borros anchor. With this modification, measurement accuracy is expected to be approximatey 0.01 inch.

Together with modifying the borros anchors, settlement readings of the borros anchors using optical survey technique has continued as before. Settlement observations under the 20-foot uniform surcharge are in progress. Evaluation of current settlement data and a future settlement forecast are underway. When an accurate and acceptable forecast of building settlements is produced, the ~~surcharge load~~ preload will be removed and rebound measurements during and after surcharge removal will be taken. It is anticipated that the preload will be removed by August 1979.

Spelling?

Five Sondex systems were installed at the location shown in Figure 88 to monitor the rebound during and after surcharge removal. The Sondex systems consist of a corrugated plastic tube with wire detector rings attached to the outside at approximately 5-foot intervals. The five tubes were installed in borings drilled to elevation 535'. A probe containing an electrical coil will be lowered down the tube on the end of a survey tape, with an electrical cable connecting the coil to a power source and indicator at the surface. Through the principle of induction, the probe will detect the location of the metal rings; the indicator will peak whenever the probe is centered in the cross axis of a detector ring. Measurement accuracy will be ~~maximized~~ improved by using a winding mechanism and dial indicator at the surface, referenced either to a bracket on the outside of the building or to the mezzanine floor.

(?? Settlement due to ground movement during an earthquake ??)

2) Seismic analysis

The seismic analysis, as discussed in Interim Report 5 of MCAR 24, is complete. An evaluation of the impact on systems, components, and the structure is in progress. Preliminary review indicates that the impact may be minimal. Upon completion of the preload program, field tests will be conducted to verify that actual soil parameters are within the range of the analysis.

B) Auxiliary Building Electrical Penetration Areas, Control Tower, and Feedwater Isolation Valve Pits

1) Settlement monitoring

Figure 2 has been revised to include settlements for the auxiliary building and the feedwater isolation valve pits as of August 3, 1979.

2) Crack mapping

Crack maps for these areas are shown in Figures 85 through 87.

3) Seismic analysis

The remedial action for the electrical penetration areas and the feedwater isolation valve pits will modify the existing mathematical model used for seismic analysis. A seismic analysis will be performed to evaluate the degree of change. Upon completion of the analysis, the impact on systems, components, and the structure will be evaluated.

4) Structural (stress) analysis

The cantilever model for the auxiliary building electrical penetration areas described in Interim Report 6 of MCAR 24 will be revised and reanalyzed to take into account that the free ends of the auxilairy building electrical penetration areas will be supported by caissons and soil beneath the structure will not be removed. The permanent condition of the auxiliary building electrical penetration areas will be simulated by providing springs at the free ends of the cantilever model. Vertical and horizontal seismic effect, pipe break, and live load will be included. Bechtel Stress Analysis Program (BSAP - Post) will be used to combine the results.

5) Local dewatering

Loughney Dewatering Inc. was awarded a contract for local construction dewatering on July 13, 1979. The eductor wells will be installed to elevation 580' or to the top of the lower clay, whichever is higher. The wells will be placed around the proposed underpinning excavations for Units 1 and 2. Educator wells will be placed through the turbine building floor at elevation 614' to complete the system. To date, the subcontractor has mobilized this equipment and jetted in these wells on the east side of the Unit 2 auxiliary building. Work has been stopped pending submittal of the subcontractor's procedures for Bechtel approval.

See Quality 6 page 5

C) Auxiliary Building Railroad Bay

1) Settlement monitoring

Figure 2 has been revised to include settlemnets in this area as of August 3, 1979.

2) Crack mapping

Crack maps for the railroad bay are shown in Figures 84 and 86.

3) Structural analysis

The auxiliary building railroad bay will be analyzed for differential settlement.

D) Service Water Pump Structure

1) Shear-wave velocity measurements

To accurately determine the dynamic vertical stiffness of piles which will be used to support the portion of the structure on fill, three sets of cross-hole shear-wave velocity measurements have been made at the locations shown in Figure 67. These locations correspond to the proposed pile locations. When measurement results have been obtained, the dynamic vertical stiffness of the piles will be used for modeling soil-structure interaction for seismic analysis.

2) Settlement monitoring

Figure 2 has been revised to include settlment data for this structure as of August 3, 1979. There has been no detectable settlment for this structure to date.

3) Structural (stress) analysis

A new analysis will be made for the service water pump structure using conventional techniques and considering walls and slabs with piling that will be used to support the portion of the structure on top of fill.

4) Seismic analysis

A modified seismic analysis is in progress. The seismic analysis technique and criteria, and the mathematical model are discussed in Interim Report 6 of MCAR 24. The mathematical model is shown in Figure 93. Upon completion of the analysis, the impact on systems, components, and the structure will be evaluated. Preliminary results indicate that the impact may be minimal.

E) Borated Water Storage Tanks and Tank Farm Area

1) Settlement monitoring

As reported in Interim Report 6 of MCAR 24, the borated water storage tanks will be constructed, filled with water, and monitored for settlement.

(??Any comments regarding startup and hydrostatic testing??)

2) Tank farm investigation for air line leak

SEE INSERT 20A

~~(To be provided by Geotech)~~

3) Crack mapping

Crack maps for this area are shown in Figure 87.

F) Emergency Diesel Fuel Oil Storage Tanks

The diesel fuel oil storage tanks are buried structures that have already been subjected to a full-scale loading by filling with water. Settlements under these test conditions were minimal. Actual settlment of the tanks will be associated primarily with settlment of the underlying and surrounding fill under its own weight. Because the tanks will be settling with the fill, the differential movements between the tanks and the surrounding soil and piping will be minimal, and the connections can be expected to settle approximately equally with the tanks. Details providing reasonable flexibility will be developed to satisfy all requirements.

G) Underground Utilities

1) Piping in fill

For the borated water lines, service water lines, and condensate lines, profiling and stress analysis have been discussed in Revision 2 of the response to Question 17 and in the response to Question 19 of the NRC 10 CFR 50.54(f) request. Figure 60-1 ~~It~~ Goldberg, Zeino, and Dunnicliff shows the pipe profiles done by ~~GZD~~, in addition to the profiles given in Figure 60 of Interim Report 5 of MCAR 24.

2) Duct banks and conduit in fill

Monitoring programs for the Seismic Category I duct banks and conduit in fill have been discussed in the response to the NRC's Question regarding 10 CFR 50.54(f), Revision 1. Stress analysis has been discussed in the response to the NRC's Question 13 of the 10 CFR 50.54(f) request.

3) Future settlment

(To be provided by Geotech)

Quality Assurance and Quality Control Work Related to Plant Area Fill

A) Resumption of Q-Listed Backfill Operation

Prerequisites for the resumption of Q-listed backfill operations have been met. These prerequisites were described in the summary report of the July 18, 1979, presentation to the NRC (Presentation to NRC: 10 CFR 50.55(e) report, ??date??). Q-listed backfill work resumed the week of August 6, 1979, in the tank farm area inside the ring foundation of the primary makeup water storage tanks.

B) Quality Assurance Program Related to Remedial Work in the Plant Area Fill

Development of the quality assurance (QA) program for all remedial work (i.e., permanent plant area dewatering; local dewatering required for underpinning; underpinning, piling and grouting works) in the plant fill area is in progress.

QA requirements for the excavation, underpinning, and concrete backfill ~~was~~ work for the auxiliary building electrical penetration areas and feedwater isolation valve pits have been developed. The following operations will be controlled by the QA program.

1) The design, materials, installation, testing, concreting, grouting, and other incidentals for the permanent underpinning (with caissons) of the auxiliary building penetration areas

2) The excavation, mass concreting, and grouting under the feedwater isolation valve pit structures

Effect on Project Schedule

(To be provided by cost and scheduling)

Submitted by: _____

Reviewed by: _____

Approved by: _____

Concurrence by: _____

8/10/3

INSERT 20A (Sheet 1 of 3) 8-13-79 Revised comments

2) TANK FARM INVESTIGATION

The purpose of this investigation is two fold:

a) 1. To further investigate soil conditions of the Tank Farm area.

b) ~~2.~~ To investigate concerns over air bubbles observed ~~in areas~~ in the southern part of the Tank Farm, or that ~~were~~ generated by a leaking construction air line, ~~that~~ appeared to be ~~leaking~~.

Order of Events

i I. NRC inspector has concern ~~over~~ about May 16, 1979 ~~over~~ air bubbles observed during inspection.

ii 2. Project manager and superintendent ~~visably~~ visually observed this condition and concurrred with NRC inspector that a problem may have occured.

iii 3. May 19, 1979 Geotech and survey identified air leak locations on survey sketch. See attached sketch and explanation.

iv 4. Air line has been disconnected. when?

v 5. Week of May 21, 1979 Geotech again visually checked area and ~~visually~~ could see no damage to site as result of air bubbles. Didn't inspect the ring Fill
subsidence - ?

vi 6. Test pit 1A shown on sketch attached was started 5-21-79 and completed 5-23-79.

vii 7. Plate load test #1 was started 6-27-79 and completed 6-28-79.

viii 8. Plate load test #2 was started 7-3-79 and completed 7-4-79.

Tests & borings are yet to be furnished by Geotech (all)

9. And inspection pit was dug on July 13, 1979. See attached sketch.

10. Dr. Peck's presentation July 18, 1979 to the NRC also addressed these concerns.

xi 11. Five additional borings were at locations shown on the attached sketch, borings are also attached from July 19 through July 23, 1979.

xii 12. All material inside ring walls was removed to elevation 629.0 and will be replaced and recompacted.

INSERT 20 A (Sheet 2 of 5)

Item 3, Tank Farm Investigation

Location of Air Bubbles

May 19th 1979

Located by Field Survey and

Inspected by Geotech See ~~Sketch 92~~ Figure 94

*

△1 is a small water-filled depression with a lesser amount of exiting bubbles.

△2 is an observation well with water bubbling out.

△3 is a small water-filled depression with sufficient bubble activity to agitate sand in the water.

△4 is an excavated area 4' ± in depth exhibiting the most intensive bubble activity.

△5 is an area of standing water with several streams of bubbles appearing; no sand agitation.

△6 is an observation well with slight bubbling water in the casing.

△7 is a cluster of 3 water-filled depressions with a lesser amount of exiting bubbles.

[* Nos in △ correspond to locations of air bubbles shown in fig 94]

INSERT 20A (Att. 3 of 5)

ix
Item 2, Tank Farm Investigation

On July 13, 1979, J. O. Wanzeck of Bechtel/Geotech along with M. Peterson of Bechtel/Field and D. Sibbald of Consumers Power witnessed an inspection pit at S 4628 to S 4641 and East 251 to East 273 in the tank farm area. The pit was excavated from Elevation 628.0± 6" to Elevation 616.0± 6". The top 4.0' was wet and disturbed material and all soil of this type will be removed before any fill can be replaced. The next 2.0' will be inspected carefully and replaced if necessary. From Elevation 622.0 to 616.0, the material was compacted gray and brown clay with some sand and sand pockets. There was no evidence of any undermining from air bubbles. Four borings also will be started July 16, 1979 to investigate other areas of concern.

Are the measures necessary? AMI

INSERT 2-A (Page 4-15)

Item 10, Tank Farm INvestigation

From Dr. Peck's presentation to NRC on July 18, 1979

~~One such area is the location of the~~ Borated Water Tanks. Beneath ~~these tanks~~ the investigations have indicated better and more consistent subsurface conditions than beneath the Diesel Generator Building. It is proposed to fill the tanks with water as a test load. The filling will constitute full-scale proof tests with respect to the bearing capacity of the subsoil. It is anticipated that the tanks will settle under the tests load, and this settlement will increase the bearing capacity. Furthermore, by making settlement observations at various depths in the subsoil during and after the test loading and by combining this information with stress calculations and theory, it will be possible to make reasonable settlement predictions that take into account the actual subsurface conditions under realistic loadings.

I realize that this is part of Dr Peck's presentation, but do we need to make the comparison?

Item 11, Tank Farm Investigation

Boring Logs t-22, T-23, T-24, T-25 and T-26 attached.

INSERT 20 A (Sheet 5 of 5)

Proposed Remedial Action

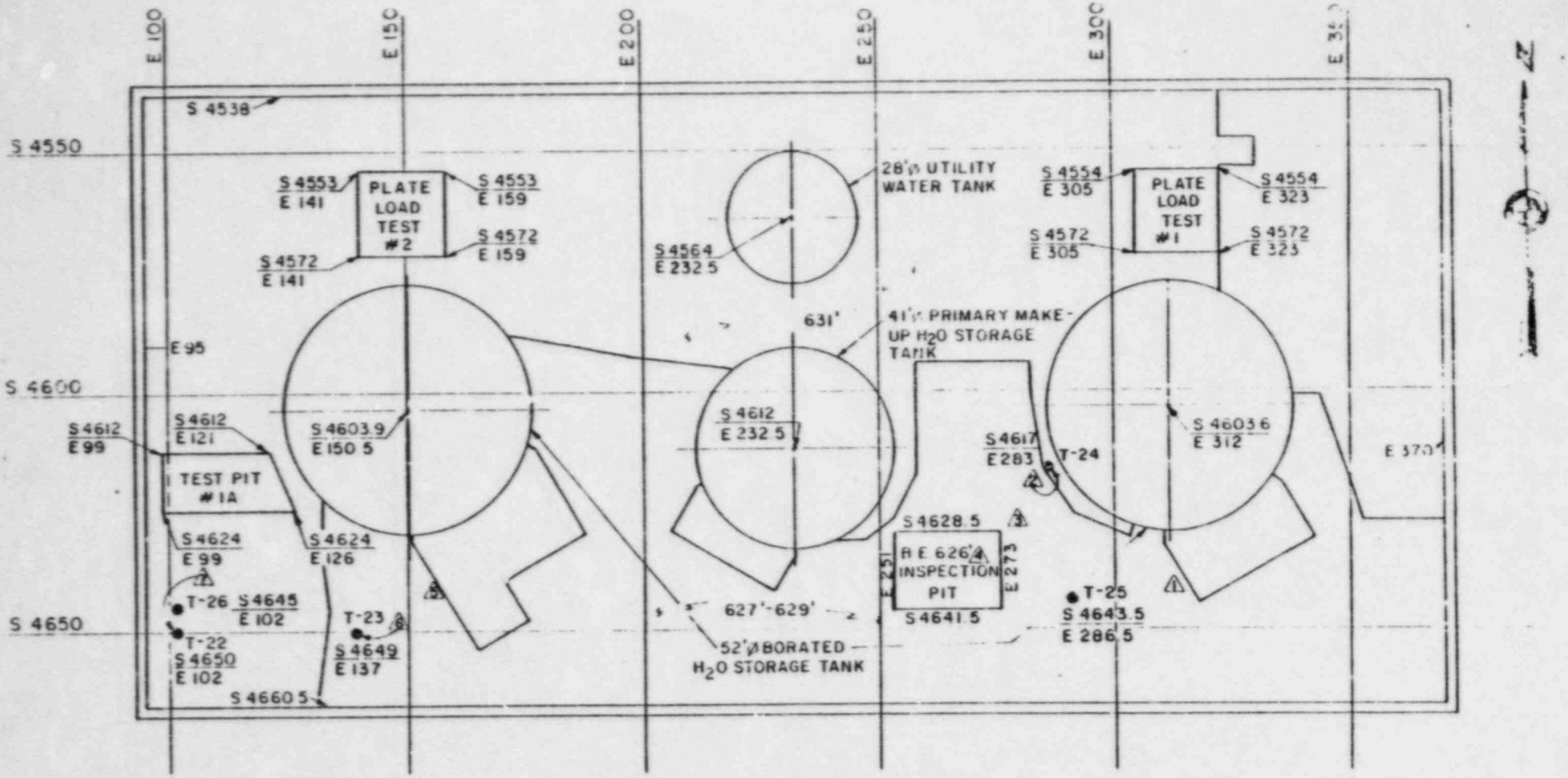
Conclusions and Recommendations

After review of available data it was concluded that the air bubbles caused no problems. The soil conditions within the Tank Farm as shown by plate load tests, test pits and borings show consistently better conditions than under the Diesel Generator Building.

do we want to keep making the comparison?

A careful clean up of the Tank Farm area will remove any questionable material. This will vary in depth from 0.5' to approximately 5.0'. The structure sand within the ring walls of the tanks has been removed or will be removed and recompacted to 85% relative density. The tanks upon completion will then be filled with water and tested for settlement.

We feel that ~~with~~ the work that has been done and that which will be done should insure that this area will meet all requirements.



NOTE:

Fill elevation varies throughout Tank Farm. Limits of fill removal will vary from 0.5' to 5.0' at time of removal with the Geotech Engineer determining what fill is to be removed.

⚠—FOR EXPLANATION SEE TABLE ATTACHED

where ? AS

BECHTEL

MIDLAND PLANT

TANK FARM INVESTIGATION

92

RL Dirkers comments 8-13-79

EFFECT ON PROJECT SCHEDULE

The remedial actions addressed in this report are not anticipated to cause a delay in the fuel load or operation of either Unit. Those actions which directly restrain the completion of system installations have been scheduled to include appropriate work-around or changes in the testing sequence so that no delay in the pre-operational testing and startup activity is necessary.

The milestone schedule for major remedial actions is as follows:

Diesel Generator Building and Foundations

Aug. 15, 1979	Start surcharge removal
Oct. 01, 1979	Start structural completion and system installation
June 01, 1980	Complete Unit 2 Diesel-Generator Systems
Aug. 01, 1980	Complete Unit 1 Diesel-Generator Systems

Auxiliary Building Penetration Area and Feedwater Isolation Valve Pits

Oct. 01, 1979	Start temporary dewatering & underpinning access shafts
Apr. 01, 1980	Complete installation of bearing cassions
June 15, 1980	Complete removal of temporary dewatering system

Service Water Pump Structure

Oct. 01, 1979	Start piling testing program
Dec. 01, 1979	Start installation of permanent piles
Mar. 01, 1980	Complete tie-in of piles to building

Seismic Category 1 Tanks (BWST)

Dec. 15, 1979	Start pre-op testing using Unit 2 BWST
Dec. 1979 thru June 1980	Perform preloading of the Unit 1 BWST
Sep. 01, 1980	Start pre-op testing using Unit 1 BWST
Sep. 1980 thru Mar. 1981	Perform preloading of the Unit 2 BWST
May 1981	Return the Unit 2 BWST for plant startup

Permanent Plant Dewatering System

Oct. 15, 1979	Finalize design criteria
Dec. 15, 1979	Issue specification and drawings
Mar. 15, 1980	Award subcontract for installation
Oct. 01, 1980	Begin dewatering
Apr. 01, 1981	Start recharge rate testing
June 01, 1981	Place system in permanent operation

DRAWING SUMMARY

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BECHTEL ASSOC. PROFESS[illegible]

SUPPLIER DOCUMENT [illegible]

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4. ☐ REVISE AND RESUBMIT. WORK MAY NOT PROCEED.
5. ☐ REVIEW NOT REQUIRED. WORK MAY PROCEED.

REVIEWED:	A	C	E	J	M	N	P	Q

By BK Mayfield Date 2/1/80

CONTROLLED

TRAINING & QUALIFICATION OF INSPECTION TEST & AUDIT PERSONNEL

UNITED STATES TESTING COMPANY, INC. Field Operations Service

CHANGE NOTICE Controlled Copy No. 10

1. The following document is changed as described below. DOCUMENT TITLE: 7220-C-208-TQ-1-CN-1 TRAINING AND QUALIFICATION OF INSPECTION TEST AND AUDIT PERSONNEL	DOCUMENT NO. UST-TQ-1	CHANGE NOTICE NO. 1
	DOCUMENT REVISION NO. 9	2. CHANGE NOTICE STATUS FA-I

3. This change notice is applicable to the following project (s):

ALL PROJECTS

4. Sign and return Transmittal to acknowledge your receipt of this Change Notice. Also attach this Change Notice on top of the cover sheet of your copy (copies) of the referenced documents.

PAGE NO.	PAR. NO.	5. DESCRIPTION OF CHANGE
--	---	Form USTF-TQ-1.4, "Document Of Qualification", revised as follows: DELETED: Date: _____ INSERTED: Effective Period of Certification: / / Thru / / REVISED FORM NUMBER TO READ: Form USTF-TQ-1.4 (11/79)

6. Description of change is continued on 1 attached sheets.

Prepared: H. Hinde Reviewed: H. Rankin Approved: D. Edler Date: 11/20/79

WITHDRAWAL APPROVAL: Date:

7. I have received and read this Change Notice and fully understand its requirements as it pertains to my responsibilities (sign only when copy is issued to you)

SIGNATURE: _____ DATE _____

7220 - C-208- TQ-1-CN-1

United States Testing Company, Inc.

DOCUMENT OF QUALIFICATION

(ANSI N45 - 2.6)

This is to certify that _____

has been and is qualified to perform inspection and testing services in the following areas:

His capability in these areas is Level _____

Basis for Certification:

Formal Education _____

Related Training _____

_____

Related Experience _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Effective Period of Certification: ____/____/____ Thru ____/____/____

By: _____

Designated Representative
United States Testing Company, Inc.

UNITED STATES TESTING COMPANY, INC.

POWER GENERATION SERVICES

Controlled Copy No. 18M

TITLE	PROCEDURE NO.
TRAINING AND QUALIFICATION OF INSPECTION, TEST AND AUDIT PERSONNEL 7220-C208-1-41 F7220-C208-UST-TQ-1-9	UST-TQ-1
	REVISION NO. 9 / REVISION STATUS FA-I

SCOPE OF REVISIONS:

Revision No.9

INCORPORATED CHANGE NOTICE NO.2, WHICH IS WITHDRAWN
INCORPORATED CHANGE NOTICE NO.3, WHICH IS WITHDRAWN
INCORPORATED PERMANENT CHANGE NOTICE NO.1, (WHICH HAD BEEN APPLICABLE TO THE CLINTON SITE ONLY)

Page 1, Section II Scope: added last 2 sentances concerning certification of NDE Testing Personnel.
Page 1, Section III Requirements: 2nd and 3rd sentances deleted.
Page 3, Section IV: paragraph 2.4.2 added.
Replaced Form USTF-TQ-1.1 Rev. 8 with Form USTF-TQ-1.1 Rev.9, this Revision of the Form was made by Change Notice No.2.

RECEIVED
JUN 14 1979
BECHTEL POWER CORP.
JOB 7220

BECHTEL ASSOC. PROFESSIONAL CORP. | JOB NO. TE 8-031

SUPPLIER DOCUMENT STAMP

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☐ FOR INFORMATION ONLY.

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.

REVIEWED	A	C	E	J	M	N	P	QE

4-30-79

I HAVE READ THIS PROCEDURE AND FULLY UNDERSTAND ITS REQUIREMENTS AS IT PERTAINS TO MY RESPONSIBILITIES. (Only sign when copy is issued to you)

By L. Dart Date 3/4/79
Signature & Date

APR 11 1979

REVISION NO.	9			
NO. OF SHEETS	34			
PREPARED BY	J. Bashian			
REVIEWED BY	Hans Gieb			
APPROVED BY	[signature]			
DATE OF ISSUE	March 23, 1979			

1. STATUS CODES: FA - FOR APPROVAL; A - APPROVED; H - HOLD. DO NOT IMPLEMENT. I - IMPLEMENT

UNITED STATES TESTING COMPANY, INC.

POWER GENERATION SERVICES

Controlled Copy No. 8 M

TITLE	PROCEDURE NO.	
TRAINING AND QUALIFICATION OF INSPECTION, TEST AND AUDIT PERSONNEL	UST-TQ-1	
F7220-C208-UST-TQ-1-9	REVISION NO. 9	REVISION STATUS FA-I

SCOPE OF REVISIONS:

Revision No.9

INCORPORATED CHANGE NOTICE NO.2, WHICH IS WITHDRAWN
INCORPORATED CHANGE NOTICE NO.3, WHICH IS WITHDRAWN
INCORPORATED PERMANENT CHANGE NOTICE NO.1, (WHICH HAD BEEN APPLICABLE TO THE CLINTON SITE ONLY)

Page 1, Section II Scope: added last 2 sentences concerning certification of NDE Testing Personnel.
Page 1, Section III Requirements: 2nd and 3rd sentences deleted.
Page 3, Section IV: paragraph 2.4.2 added.
Replaced Form USTF-TQ-1.1 Rev. 8 with Form USTF-TQ-1.1 Rev.9, this Revision of the Form was made by Change Notice No.2.

I HAVE READ THIS PROCEDURE AND FULLY UNDERSTAND ITS REQUIREMENTS AS IT PERTAINS TO MY RESPONSIBILITIES. (Only sign when copy is issued to you) _____ Signature & Date

REVISION NO.	9			
NO. OF SHEETS	34			
PREPARED BY	J. Bashian			
REVIEWED BY	[signature]			
APPROVED BY	[signature]			
DATE OF ISSUE	March 23, 1979			

1. STATUS CODES: FA - FOR APPROVAL. A-APPROVED H-HOLD. DO NOT IMPLEMENT. I-IMPLEMENT

UNITED STATES TESTING COMPANY, INC.

POWER GENERATION SERVICES

Controlled Copy No.

TITLE	PROCEDURE NO.	
Training and Qualification of Inspection, Test and Audit Personnel	UST-TQ-1	
F7220.C208-UST-TQ-1-9	REVISION NO. 8	REVISION STATUS

SCOPE OF REVISIONS:

Revision 3 Table of Contents. Removed Qualification Records Summary Form No. USTF-TQ-1.8 and added new paragraphs.
Page 1. Para. III Changed documentation requirements for NDT Personnel and training record maintenance requirements.
Page 2. Para. IV.2.1 Removed reference to Qualification Records Summary and revised Project Manager responsibilities.
Para. I.V.1.4 Revised Manager's Certification responsibilities.
Page 3. Para. IV.2.4.1 Provided an alternate method of maintaining group training documentation and revised record retention requirements.
Para. IV.2.2.3 and IV.2.4.2 Deleted (Qualification Records Summary)
Para. IV.2.3 Deleted Operations Managers Responsibilities
Page 3A. Para. IV.2.4.3 Deleted (Qualification Records Summary)
Added Para. IV.2.4.5 and 2.4.6 pertaining to the transfer and retention of records.
Page 4. Para. IV.2.4.4 Deleted (Qualification Records Summary)
Para. IV.2.5.2 Removed reference to Qualification Records Summary and Training Records. Para. IV.2.5.3 Deleted (Transfer of Records)
Page 5. Para. 1.4 Revised training record requirements.
Para. 1.4.3 Title of Form USTF TQ-1.7 corrected.
CHANGE NOTICE NO. 1 WITHDRAWN.
Page 9. Para. V.4.1 Clarified to include testing work area.
Page 11. Para. 6.2.3 Deleted (Training Records)
Page 11 & 11A - Added paragraphs 1.V.6.3 and I.V.6.4 concerning certification records.
Page 11B. Para. V.7.0 Revised to clarify the recertification process.
Page 11C. Added para. V.8.0 which defines how increased capabilities are to be documented.

(Continued next page)

I HAVE READ THIS PROCEDURE AND FULLY UNDERSTAND ITS REQUIREMENTS AS IT PERTAINS TO MY RESPONSIBILITIES. (Only sign when copy is issued to you) _____ Signature & Date

REVISION NO.	8	—	—	—
NO. OF SHEETS	33	—	—	—
PREPARED BY	F Eggert	—	—	—
REVIEWED BY	S/Tadlock	—	—	—
APPROVED BY	C/Tadlock	—	—	—
DATE OF ISSUE	5/16/77	—	—	—

1. STATUS CODES: FA - FOR APPROVAL, A-APPROVED, H-HOLD, DO NOT IMPLEMENT, I-IMPLEMENT

UNITED STATES TESTING COMPANY, INC.

POWER GENERATION SERVICES

Controlled Copy No.

TITLE	PROCEDURE NO.	
Training and Qualification of Inspection Test and Audit Personnel	UST-TQ-1	
FM220-C208.UST-TQ-1-9	REVISION NO. —	REVISION STATUS —

SCOPE OF REVISIONS:

Rev. 8 continued

Page 13 - Para. 3.1.2 changed "ore" to "or"
Page 15 - Para. 4.1 added "ANSI"
Page 16 - Deleted redundant para. VI.6.3
Form USTF-TQ-1.1 Rev. 6 replaced by Form USTF-TQ-1.1 Rev. 8
CHANGE NOTICE NO. 2 WITHDRAWN
Removed Form USTF-TQ-1.3 "Qualification Records Summary".

I HAVE READ THIS PROCEDURE AND FULLY UNDERSTAND ITS REQUIREMENTS AS IT PERTAINS TO MY RESPONSIBILITIES. (Only sign when copy is issued to you) _____ Signature & Date

REVISION NO.	—	—	—	—
NO. OF SHEETS	—	—	—	—
PREPARED BY	—	—	—	—
REVIEWED BY	—	—	—	—
APPROVED BY	—	—	—	—
DATE OF ISSUE	—	—	—	—

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UNITED STATES TESTING COMPANY, INC.

POWER GENERATION SERVICES

Controlled Copy No.

TITLE	PROCEDURE NO.	
Training and Qualification of Inspection, Test and Audit Personnel	UST-TQ-1	
	REVISION NO.	REVISION STATUS
FP220-C208-UST-TQ-1-9	—	—

SCOPE OF REVISIONS:

Revision No. 4:

Section IV Para. 2.4.2 changed to state "Form USTF-UST-TQ-1.8"

Revision No. 5.

Revised Section IV, para. 2.0 and 2.2.2
Revised Section V, para. 7.1(1) and added para. 7.3
Revised Section VI, para. 6.2
Revised Section VII

Revision No. 6:

Revised Section IV, para. 2.4.1
Revised Section VI, para. 6.2
Revised Proficiency Evaluation Record Form USTF-TQ-1.1

Revision No. 7:

Editorial changes throughout procedure
Revised Section V, para. 2.2 (3)

I HAVE READ THIS PROCEDURE AND FULLY UNDERSTAND ITS REQUIREMENTS AS IT PERTAINS TO MY RESPONSIBILITIES. (Only sign when copy is issued to you) _____ Signature & Date

REVISION NO.	4	5	6	7
NO. OF SHEETS	28	29	30	30
PREPARED BY	L. Hudgins	H.M. Carl	E.J. Tadros	E.J. Tadros
REVIEWED BY	E.J. Tadros	E.J. Tadros	E.J. Tadros	Hugh Ruane
APPROVED BY	E.J. Tadros	E.J. Tadros	E.J. Tadros	E.J. Tadros
DATE OF ISSUE	11/14/75	4/1/76	4/23/76	7/24/76

POWER GENERATION SERVICES

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TITLE	PROCEDURE NO.	
Training and Qualification of Inspection, Test and Audit Personnel	UST-TQ-1	
	REVISION NO.	REVISION STATUS
FP220-C208-UST-TQ-1-9	—	—

SCOPE OF REVISIONS:

Revision No. 1:

Added Table of Contents.

Changed and added responsibilities in Section IV. Relocated responsibilities from other sections to this section.

Modified training and training record requirements.

Revised forms USTF-TQ-1.2 and 1.3 and added forms UST-TQ-1.6, 1.7 and 1.8.

Revision No. 2:

Redefined responsibilities in Section IV.

Revision No. 3:

Added additional requirements to section V item 4.4 and inserted section VI item 3.4.

I HAVE READ THIS PROCEDURE AND FULLY UNDERSTAND ITS REQUIREMENTS _____
(Only sign when copy is issued to you) Signature & Date

REVISION NO.	ORIGINAL	1	2	3
NO. OF SHEETS ATTACHED	N.A.	26	26	25
PREPARED BY	A Walcott	E J Todra	E J Todra	J. Hendrick
REVIEWED BY	N.A.	T. Hoffman	-	E J Todra
APPROVED BY	G. Basile	G Basile	-	G Basile
DATE OF ISSUE	9/24/74	6/20/75	8/22/75	10/20/75

F7220-C208-UST-TQ-1-9

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Forms Attached	Form Number
Proficiency Evaluation Record	USTF-TQ-1.1
Physical Examination Record	USTF-TQ-1.2
Training Record - Individual Instruction	USTF-TQ-1.3
Document of Qualification	USTF-TQ-1.4
Record of Lead Auditor Qualification	USTF-TQ-1.5
Training Record-Group Instruction	USTF-TQ-1.6
Training Record-Group Self Instruction	USTF-TQ.1.7

F1220-C208 UST-TQ-1-9

I. PURPOSE

This procedure was written to provide assurance that United States Testing Company personnel assigned to perform inspections, tests, and audits are fully trained and qualified as required for their work on each project.

II. SCOPE

This procedure is intended to meet the intent of ANSI N45.2.6, "Qualification of Inspection, Examination and Test Personnel for Nuclear Facilities and Equipment", and ANSI N45.2.23, "Qualification of Quality Assurance Audit Personnel" standards as applicable to the work performed. The procedure is therefore broken down into two main sections so the requirements of each standard may be completely covered. Nondestructive testing personnel will be trained and certified in accordance with UST-TC-1A. Training and Physical Examination documentation for NDT personnel shall, however, be in accordance with this procedure. 9

III. REQUIREMENTS

The United States Testing Company will assign only those personnel who are properly trained and qualified to perform the required service. Qualification records of United States Testing personnel will be maintained both in the Hoboken and site office when so specified in the Project's Q.A. Manual. Training records shall be maintained at the United States Testing location where the training was administered. Training and Qualification records of any personnel performing work for a client will be available to that client. 9

IV. RESPONSIBILITIES

1.0 Certification Responsibilities

1.1 Vice President of Power Generation Services

The Vice President or his designee shall certify the qualifications of Lead Auditors. The Vice President or his designee are also authorized to evaluate and certify all Level III Inspection and Test personnel, as well as Levels I & II Inspection and Test personnel.

1.2 Vice President of Nuclear Construction Inspection

The Vice President or his designee are authorized to evaluate and certify Level III, II and I Inspection and Test personnel in his area of responsibility.

F7220-C208-UST-TQ-1-9

IV Continued

1.3 Vice President of Nondestructive Testing

The Vice President is authorized to evaluate and certify Level III Inspection and Test personnel in his area of responsibility.

1.4 Managers

Project Managers, the Audit Manager and the Manager of Special Projects are authroized to evaluate and certify Lead Auditors and Level II and I personnel, other than Nondestructive Testing personnel, in their areas of responsibility.

1.5 Level III Personnel

Level III personnel are authorized to evaluate and certify Level II and I personnel.

1.6 Level II Personnel

Level II personnel are authorized to evaluate and certify Level I personnel.

2.0 Administrative Responsibilities

2.1 Project Managers

2.1.1 Project Managers shall assure that personnel assigned to perform work on their projects are certified and recertified in accordance with the requirements of this procedure. They shall also be responsible for establishing training requirements for their personnel.

2.1.2 They shall assure that records are current and that they are transmitted to the Personnel Records Controllers for retention.

2.1.3 They shall be responsible to the establishment and maintenance of the Hoboken personnel files for their projects and shall designate the Hoboken Personnel Records Controllers.

2.2 Site Project Supervisors

2.2.1 Site Project Supervisors shall assure that their personnel are certified and recertified in accordance with the requirements of this procedure.

IV Continued

2.2.2 Site Project Supervisors shall assign a person to serve as the Site Personnel Records Controller. 5

2.2.3 Deleted

2.3 Deleted

2.3.1 Deleted

2.4 Site Personnel Records Controllers

2.4.1 Site Records Controllers shall establish and maintain a central file which contains a personnel file for each employee requiring certification. Each personnel file will contain the certification records identified in Section V, paras. 6,7 & 8 and Section VI, para. 6, and the training records identified in Section V Par. 1.4 and Section VI para. 3.3.6 as applicable to the individual. Copies of qualification records shall be transmitted to the Hoboken Records Controller as they are developed and updated.

2.4.1.1 When Form USTF-TQ-1.6 "Training Record-Group Instruction" is used, a copy of this record shall be placed in the file of each individual who participated in the training. An alternate acceptable practice is to assign a unique number to each Training Record Group Instruction, reference this unique number on the Training Record Individual Instruction Form USTF-TQ-1.3 for each participant, and maintaining a file folder of the Training Record Group Instruction Form USTF-TQ-1.6.

2.4.1.2 When Form USTF-TQ-1.7 "Training Record-Group Self Instruction" is used, the same requirements as specified for Form USTF-TQ-1.6 above shall apply.

2.4.2 When so assigned by the Site Project Supervisor, the Site Personnel Records Controller shall be responsible to the Site Project Supervisor for establishing a method of timely notification for review and recertification of personnel, and review of training documentation. 9

IV Continued FN220-C208. UST-TQ-1-9

2.4.3 Deleted.

2.4.4 Deleted.

2.4.5 When personnel are transferred to other locations, the Site Records Controller shall transmit copies of the certification records identified in para. V.6.3 to the new location.

2.4.6 The personnel file of persons no longer stationed at the location shall be placed in an inactive section of the central file, and retained for the life of the project.

F1220-C208-UST-TQ-1-9

IV Continued

2.5 Hoboken Personnel Records Controller

2.5.1 The Hoboken Records Controller shall perform all of the duties specified in Par. 2.4 of this section for Hoboken and Branch Office personnel and for projects where there is no Site Records Controller.

2.5.2 The Hoboken Records Controller shall also maintain a central personnel file for all employees. This file shall contain the employees qualification records.

2.5.3 Deleted.

V. TRAINING AND QUALIFICATION OF INSPECTION AND TEST PERSONNEL

1.0 Training

1.1 Training programs, will be established for site projects. The exact format of this program will be established in a Project Q.C. Procedure.

1.2 The training requirements of office personnel will be established on a individual basis following an evaluation of their qualifications by the Project Manager. On the job training will be stressed and used whenever possible.

1.3 Personnel newly assigned to a project will receive orientation training. All information required by an individual to familiarize himself with the project will be provided.

FN220-C208-UST-TQ-1

V Continued

1.4 Training Records - All training whether it be orientation/indoctrination, group lectures, one-to-one training, self-instruction or on-the-job training, shall be recorded. When, however, the training results in the preparation of a Proficiency Evaluation Record, a training record is not necessary. Training records shall identify the person or persons undergoing training, the topic, the instructor's name (if self-taught, the person's own name), and the date the training was completed. The below forms may be used for this purpose or special forms may be developed.

1.4.1 Form USTF-TQ-1.3 "Training Record - Individual Instruction" is intended for recording specific training given to an individual by an instructor or self-instruction.

1.4.2 Form USTF-TQ-1.6 "Training Record - Group Instruction" is intended for recording training given to a group of people by an instructor.

1.4.3 Form USTF-TQ-1.7 "Training Record -Group Self Instruction" is intended for recording training given to a group of people by circulating written material for self-instruction.

2.0 Levels of Capability

2.1 There are three levels of capability (I,II and III) for quality personnel performing inspection and testing activities.

2.2 The duties and responsibilites for each level of capability shall be as follows:

1) Level I:

a) Performance of designated inspections and tests as specified in applicable standards, procedures and specifications.

b) Use of the necessary inspection, measuring and testing equipment required for performance of the designated inspections and tests referred to in (a) above.

c) Calibration of inspection, measuring and testing equipment as specified in procedures.

3.1.2 The education and experience requirements specified below shall not be treated as absolute when other factors provide reasonable assurance that a person can competently perform a particular task. Other factors may be demonstrated capability in a given job through previous performance or satisfactory completion of proficiency evaluation as specified in par. 4.0 below. 9

3.2 Level I Requirements

To be considered for certification, a candidate must (subject to the conditions of 3.1.2) satisfy one of the following requirements: 9

(1) Two years of related experience in equivalent testing, examination or inspection activities at power plants, heavy industrial facilities or other similar facilities, or

(2) High school graduate plus six months of related experience in equivalent testing, examination or inspection activities at power plants, heavy industrial facilities or other similar facilities, or

(3) Completion of college level work leading to an Associate Degree in a related discipline plus three months of related experience in equivalent testing, examination or inspection activities at power plants, heavy industrial facilities or other similar facilities.

3.3 Level II Requirements

To be considered for certification, a candidate must (subject to the conditions of 3.1.2) satisfy one of the following requirements:

(1) One year of satisfactory performance as Level I, or

(2) High school graduate plus three years of related experience in equivalent testing, examination or inspection activities at power plants, heavy industrial facilities or other similar facilities, or

(3) Completion of college level work leading to an Associates degree in a related discipline plus one year or related experience in equivalent testing examination or inspection activities at power plants, heavy industrial facilities or other similar facilities, or

(4) Four-year college degree plus six-months of related experience in equivalent testing, examination or inspection activities at power plants, heavy industrial facilities or other similar facilities.

3.4 Level III Requirements

To be considered for certification, a candidate must (subject to the conditions of 3.1.2) satisfy one of the following requirements:

(1) Six years of satisfactory performance as a Level II, or

(2) High school graduate plus ten years of related experience in equivalent testing, examination or inspection activities at power plants, heavy industrial facilities or other similar facilities, or high school graduate plus eight years experience in equivalent testing, examination or inspection activities at power plants, heavy industrial facilities or other similar facilities, with at least two years as Level II. At least two years of this experience should be associated with nuclear facilities; or if not, the individual shall have training sufficient to be acquainted thoroughly with the quality assurance aspects of a nuclear facility, or

(3) Associate Degree and seven years of related experience in equivalent testing, examination or inspection activities at power plants, heavy industrial facilities or other similar facilities. At least two years of this experience should be associated with nuclear facilities; or if not, the individual shall have training sufficient to be acquainted thoroughly with the quality assurance aspects of a nuclear facility, or

(4) Four-year college degree plus five years of related experience in equivalent testing, examination or inspection activities at power plants, heavy industrial facilities or other similar facilities.

4.0 Proficiency Evaluation

4.1 General Requirements

The qualifications of personnel to be certified in accordance with this procedure shall be determined by oral interview and practical demonstration to evaluate the candidate's proficiency for each level of qualification in each major area of inspection and/or testing which he is required to perform. The results of the oral interview and practical demonstrations shall be recorded on form number USTF-TQ-1.1.

4.2 Level I Requirements

a) The candidate for Level I certification shall be required to demonstrate his ability to satisfactorily perform the inspection or testing within the major area or speciality for which he is to be certified. The demonstration of ability shall be by oral interview and practical demonstration.,

b) The oral interview shall cover the following subjects for each inspection or test procedure used to evaluate the candidate's proficiency:

1) An understanding of the designated work activities and tasks.

2) The referenced inspection criteria.

3) The acceptance standards.

4) The recording of inspection or test results.

5) Treatment of nonconformances.

6) An understanding of the designated types of inspection, i.e., Hold Points, Review, Inspect and Test.

7) Technician's responsibilities.

8) Applicable Code requirements.

9) The use and calibration control requirements for inspection and testing tools and instruments.

V. Continued

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c) The practical demonstration shall be conducted in such a manner as to allow the examiner to evaluate the Level I candidates performance during the actual implementation of inspection or testing procedures. The check points described in 4.2b above shall be used to evaluate the candidate's proficiency during the practical demonstrations.

4.3 Level II Requirements

a) The proficiency of candidates for Level II certification shall be evaluated in the same manner as specified for Level I personnel except that the requirements for evaluation and reporting of inspection and test results shall be given greater emphasis than the requirements for methods of implementation.

b) Candidates for Level II cert[illegible]tion who are required to prepare inspection or test [illegible] procedures shall be required to demonstrate the [illegible]ficiency in this activity. The candidate for [illegible]fication shall be given the applicable engineerin[illegible]fications, drawings, ANSI Standards, and refer[illegible]odes necessary for preparation of inspection and testing procedures. Candidates for Level II certification shall also demonstrate proficiency in supervising of Level I personnel.

4.4 Level III Requirements

a) The proficiency of candidates for Level III certification shall be evaluated in the same manner as specified in 4.3b above for preparing inspection or testing procedures.

b) In addition to the requirement for demonstrating proficiency in the preparation of inspection plans or procedures, the Level III candidate shall be required to demonstrate a full understanding of the construction quality control program requirements contained in the applicable client project documents. A Level III person shall also be capable of reviewing and approving inspection, examination and testing procedures, evaluating the adequacy of activities to accomplish the inspection, examination and test objectives and organizing and reporting inspection and test results. This demonstration of proficiency shall be by oral examination.

V. Continued FN220-C208-UST-TQ-1-9

5.0 Physical Examinations

5.1 For Level III, II or I personnel, an eye examination for visual acuity and color vision shall be required as specified below. |7

5.2 Personnel shall be capable of reading with natural or corrected vision the J-I letters on a standard Jaeger's or equivalent type test chart for near distance vision. |7

5.3 The Concrete Reactor Vessel and Containment personnel qualified to ASME Section III, Division 2, shall have natural or corrected far distance vision of 20-40 by the Linear Snellen Scale. |1 |7

5.4 The personnel shall be capable of distinguishing the difference between the primary colors.

5.5 Results of these examinations shall be recorded on form No. USTF-TQ-1.2.

6.0 Certification

6.1 Certification records for Level III, II and I personnel shall be maintained on file both at the site where the person is employed and in Hoboken home office.

6.2 Level III, II and I certification records shall contain the following:

1) A Proficiency Evaluation Record Form No. USTF-TQ-1.1.

2) A Physical Examination Record, Form No. USTF-TQ-1.2. |

3) Deleted. |8 |7 |1

4) A completed Document of Qualifications, Form No. USTF-TQ-1.4.

6.3 Level III, II, and I certification records for personnel transferred from another site: |8

V. Continued

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6.3(Cont'd)

1) A new Proficiency Evaluation Form No. USTF-TQ-1.1. prepared by the new site.

2) An up to date Physical Examination Record Form No. USTF-TQ-1.2.

3) A completed Document of Qualification Form No. USTF-1.4, updated, if required by the previous site.
(Note: Past training records are not required since the results of past training is reflected in the Document of Qualification.)

6.4 Level III, II and I certification records for personnel temporarily assigned to the site:

1) A new Proficiency Evaluation Form No. USTF-TQ-1.1 prepared by the site he is temporarily assigned to or the Hoboken staff.

2) An up to date Physical Exmaniation Record Form No. USTF-TQ-1.2.

3) An up to date Completed Document of Qualification Form No. USTF-1.4.

(Note: Past training records are not required since the results of past training is reflected in the Document of Qualification.)

V. Continued

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7.0 Recertification

7.1 All Level III, II and I personnel shall be recertified every two years in accordance with one of the following criteria:

1) Recertification of continuing satisfactory performance in inspection and testing activities covered by the original Proficiency Evaluation or...

2) Re-evaluation in accordance with Par. V.4.0 Proficiency Evaluation.

7.2 The examination specified in Par.V.5.0 Physical Examination shall be repeated annually.

7.3 The Document of Qualifications Form No. UST-TQ-1.4 shall be updated every two years. New areas of inspection and test qualifications and additional experience obtained since the previous certification shall be added. The original Document of Qualifications Form shall be countersigned and dated beneath the original signature and date or a new Document of Qualifications Form shall be prepared, signed and dated.

7.4 Level III, II and I recertification records shall consist of the following:

1) A recertified or new Proficiency Evaluation Record, Form No. USTF-TQ-1.1.

a) The recertification of the original Proficiency Evluation Record, based upon continuing satisfactory performance, per para. V.7.1 (1), shall be documented on the bottom of this record.

b) The documentation of a re-evaluation per para. V.7.1 (2), for recertification shall be made on a new form. The new form shall be completed as specified in para. V.4.0.

2) A Physical Examination Record Form No. USTF-TQ-1.2.

3) An updated Document of Qualifications, Form No. USTF-TQ-1.4.

V. Continued FT220-C208-UST-TQ-1-9

8.0 Certification of Increased Capabilities

8.1 When personnel gain sufficient increased capabilities to qualify them to perform additional major areas of inspection or test, these new qualifications shall be certified in accordance with one of the following methods.

1) Recertify the person as specified in Par. V.7.0 (excluding physical examination) or...

2) Supplement the existing certification records by completing a new Proficiency Evaluation Record Form No. UST-TQ-1.1. This record shall identify the new areas of qualification.

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VI. TRAINING AND QUALIFICATION OF AUDIT PERSONNEL

1.0 Definitions

1.1 Auditor - Any individual who participates in an audit, including Lead Auditors, technical specialists and others such as management representatives and auditors-in-training.

1.2 Lead Auditor - An individual whose experience and training qualifies him to organize and direct an audit, report audit findings and evaluate corrective action.

1.3 Audit - A documented activity performed in accordance with written procedures or checklists to verify, by examination and evaluation of objective evidence, that applicable elements of the quality assurance program have been developed, documented and effectively implemented in accordance with specified requirements.

2.0 Qualification of Auditors

Auditors assigned by United States Testing Company to perform audits shall possess proficiency commensurate with the scope, complexity or special nature of the activities they will be auditing. The Lead Auditor is responsible for assuring that the audits are conducted by personnel who collectively have the skills necessary for the type of audit that is to be performed.

3.0 Qualification of Lead Auditors

All of the requirements of paragraph 3.1 through 3.4 shall be met prior to being considered a United States Testing Company Lead Auditor.

3.1 Education and Experience - The prospective Lead Auditor shall have verifiable evidence that a minimum of ten (10) points under the following scoring system have been accumulated.

3.1.1 Education (4 points maximum)

Associate degree from an accredited institution score one (1) point or if the degree is in engineering, physical sciences, mathematics, or quality assurance score two (2) points or,

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a bachelors degree from an accredited institution score two (2) points or if the degree is in engineering, physical sciences, mathematics, or quality assurance score three (3) points plus an additional one (1) point for a masters degree in engineering, physical sciences, business management or quality assurance from an accredited institution.

3.1.2 Experience (9 points maximum)

Technical experience in engineering, manufacturing, construction, operation, or maintenance, score one (1) point for each full year with a maximum of five (5) points for this aspect of experience.

If two (2) or more years of this experience were in the nuclear field score one (1) additional point, or,

if two (2) or more years of this experience were in quality assurance, score two (2) additional points, or,

if two (2) or more years of this experience were in auditing, score three (3) additional points, or,

if two (2) or more years of this experience were in nuclear quality assurance, score three (3) additional points, or,

if two (2) or more years of this experience were in nuclear quality assurance auditing, score four (4) additional points. | 8

3.1.3 Other Credentials of Professional Competence (2 points maximum)

Certification of competency in engineering, science or quality assurance specialties issued and approved by a State Agency, or National Professional Society, score two (2) points.

3.1.4 Rights of Management (2 points maximum)

The Lead Auditor's employer retains the prerogative to evaluate and validate other performance factors applicable to auditng which may not be explicitly called out in this standard.

Examples of these factors are leadership, sound judgement, maturity, analytical ability, tenacity, past performance, etc.

3.2 Communications Skill

The prospective Lead Auditors shall have the capability to communicate effectively in the English language, both written and oral. These skills shall be demonstrated by participation in audit conferences and audit report writing.

3.3 Training

Prospective Lead Auditors shall have training to the extent necessary to assure their competence in auditing skills required for assigned tasks. Training in the following areas shall be given based upon the particular needs of each prospective Lead Auditor.

3.3.1 Knowledge and understanding of nuclear-related codes, standards, regulations and regulatory guides.

3.3.2 General structure of quality assurance programs as a whole and applicable elements such as organization; design control; procurement document control; instructions, procedures and drawings; document control; control of purchase material equipment and services; identification and control of materials, parts and components; control of special processes; inspection; test control: control of measuring and test equipment; handling, storage and shipping; inspection, test, and operating status; nonconforming materials, parts, or components; corrective action; quality assurance records; audits; cost of quality; and quality information feedback.

3.3.3 Auditing techniques of examining, questioning, evaluating and reporting; methods of identifying and following up on corrective action items; and closing out audit findings.

3.3.4 Audit planning in the quality-related functions for the following activities: design, purchasing, fabrication, handling, shipping, storage, cleaning, erection, installation, inspection, testing, statistics, nondestructive examination, maintenance, repair, operation, modification of nuclear power plants or associated components and safety aspects of the nuclear facility.

3.3.5 On-the-job training to include the elements of audit activity as described in N45.2.12.

3.3.6 A record of all training received shall be recorded on Form No's. USTF-TQ-1.3, USTF-TQ-1.6 and USTF-TQ-1.7.

3.4 Audit Participation

The prospective Lead Auditor shall have participated in nuclear quality assurance audits within a period of time not to exceed three (3) years prior to the date of qualification, one audit of which has to be within the year prior to his qualification. 3

4.0 Evaluation of a Lead Auditors Qualifications

4.1 Prospective Lead Auditors shall be qualified by testing or evaluation of their proficiency. Qualification testing shall be performed in accordance with ANSI N45.2.23. 1 S

4.2 United States Testing Company may accept, as Lead Auditor, new personnel on the basis of their prior experience. Documentation attesting to this action shall be established and it shall list those qualifications that were accepted.

5.0 Maintenance of Qualifications

5.1 Lead Auditors shall maintain their proficiency through regular and active participation in the auditing process, including the performance of audits, review and study of codes, standards, procedures, instructions and other documents related to quality assurance programs and program auditing. Based on management annual assessment, management may extend the qualification, require retraining, or require requalification. These evaluations shall be documented.

5.2 Any Lead Auditor who fails to participate in the quality assurance auditing process for a period of two years or more shall require requalification. Requalification shall include retraining in accordance with the requirements of Paragraph 3.3 and participation as an auditor in at least one quality assurance audit.

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VI Continued

6.0 Qualification Records

6.1 The "Record of Lead Auditors Qualifications", Form No. USTF-TQ-1.5, shall be used to record the required personnel data, evaluations, certification and annual evaluations.

6.2 In lieu of recording details of the required personnel data on Form No. USTF-TQ-1.5, the individual's United States Testing Company Professional Record may be referenced on the form and included in the personnel file.

6.3 Deleted.

VII. AUDITS

Conformance to this procedure shall be established by Audit. Audits will be conducted at the interval specified in, and in accordance with, the requirements of the Project Q.A. Manual.

PROFICIENCY EVALUATION RECORD

Name _____
(Last) (First) (Initial)

Evaluated For Level _____ Date _____ Location _____

Inspection and Test Activity _____

QC Procedure or Test Standard _____

CHECK POINTS F7220-C208 · UST-TQ-1-9	RESULTS* Oral Interview	Practical
1. Work Activities/Tasks		
2. Inspection/Test Criteria		
3. Acceptance Standards		
4. Recording of Inspection/Test Results		
5. Nonconformances		
6. Designated Types of Inspections		
7. Technician Responsibilities		
8. ASME Codes, ASTM Stds, etc., Requirements as Applicable		
9. Use and Calibration Control of Inspection, Examination and Testing Equipment		
10. Evaluation of Inspection Test Results		
11. Proficiency in Supervision of Lower Level Personnel		
12. Preparation of Inspection and Test Procedures		
13. Understanding of Construction Quality Control Program Requirements		
14. Capability for Reviewing and Approving Inspection, Examination and Testing Procedures		
15. Capability for Evaluating the Adequacy of Activities to Accomplish the Inspection, Examination and Test Objectives		

* Use "S" for Satisfactory, "U" for Unsatisfactory, "NA" for Not Applicable.
Check Points Applicable For Each Level:
Level I: 1 thru 9; Level II: 1 thru 11 (12 is optional); Level III: 1 thru 15

REMARKS _____

Signature _____ Level _____ Examiner

Biennial Recertification | Signature _____
| Date _____

Form USTF-TQ-1.1, Rev. 9

PHYSICAL EXAMINATION RECORD
ANSI N45.2.6

Name _____ Employee No. _____
(Last) (First) (Initial)

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How do you rate your general health?

Excellent _____
Good _____
Fair _____

Do you feel that you are physically capable of performing your assigned inspection activities? _____

Use this space for explanation of "No" answer. _____

I certify that the above statements are true and complete to the best of my knowledge.

_____ _____
(Date) (Signature)

VISION

	Requirements	Right	Left
1. Snellen Far Distance Vision (Concrete Reactor Vessels and Containment Inspectors Only)	20-40		
a) Uncorrected		_____	_____
b) Corrected		_____	_____
2. Jaeger Near Distance Vision	J-1 Ltrs.		
a) Uncorrected		_____	_____
b) Corrected		_____	_____
3. Distinguish Primary Colors		_____	_____

_____ _____
(Date) (Signature Eye Examiner

Form USTF-TQ-1.2 Rev. 1

TRAINING RECORD
INDIVIDUAL INSTRUCTION

NAME _____ Project or Location _____

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No.	Training Description	Instructor	Date

Form USTF-TQ-1.3 Rev. 1

DOCUMENT OF QUALIFICATION
(ANSI N45-2.6)

This is to certify that _____
has been and is qualified to perform inspection and testing services in the following areas:

His capability in these areas is Level _____.

Basis for Certification:

Formal Education FD220-C208-UST-TQ-1-9

Related Training _____

_____

Related Experience _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Date: _____

By: _____
Designated Representative
United States Testing Co.

Form USTF-TQ-1.4

RECORD OF LEAD AUDITOR QUALIFICATIONS UNITED STATES TESTING COMPANY, INC.	NAME	DATE

A. QUALIFICATION REQUIREMENTS		POINTS
B EDUCATION – University/Degree/Date –	– 4 Pts. Max.	
1. Undergraduate Level 2. Graduate Level		
C EXPERIENCE – Company/Dates	– 9 Pts. Max.	
Industry (5pts. max.) and Nuclear Industry (NI), or Quality Assurance (QA), or Auditing (AU), or Combined NI, QA, AU		
D PROFESSIONAL ACCOMPLISHMENT – Certificate/Date	– 2 Pts. Max.	
1. P.E. 2. Society		
E. MANAGEMENT – Justification/Evaluation/Date	– 2 Pts. Max.	
Explain: Evaluated by: (Name & Title)	Date	
	Total Points	
F. AUDIT COMMUNICATION SKILLS		
Evaluated by: (Name & Title)	Date	
G. AUDIT TRAINING COURSES		
Course Title or Topic 1. 2.	Date	
H. AUDIT PARTICIPATION		
Location / Audit 1. 2. 3. 4. 5.	Date	
I EXAMINATION	Passed	
AUDITOR QUALIFICATION CERTIFIED BY *(signature and Title)*	Date Certified	Date

ANNUAL EVALUATION *(Signature and Date)*					

EN220-C208-UST-TQ-1-9

Form USTF-TQ-1.5

TRAINING RECORD
GROUP INSTRUCTION

Project or Location _____

Instructor _____ Date _____

Subject _____

Description of Training:

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Attendees:

Form USTF-TQ-1.6

TRAINING RECORD
GROUP SELF INSTRUCTION

From: _____ Project or Location _____

To: Names Checked Off Below

Subject: Procedure & Revision No. _____

Other _____

_____

1. The subject document is: ☐ Attached ☐ Available in our files
2. See back of this sheet for instructions.
3. Route to only those whose name is checked below.

Name	Read for Training	Read for Awareness	Signature	Date
	FI220-620B-UST-TQ-1-9			

4. Return this record to _____ for filing.
5. Return the attached document to _____ for filing.

Form USTF-TQ-1.7

INSTRUCTIONS

FN220-C208-UST-TQ-1-9

1. If a check appears next to your name in the READ FOR TRAINING column, you are required to read and understand this document for the performance of your present or future work. If you do not understand something in the document, obtain clarification from your supervisor. Indicate satisfactory completion of this training by signing and dating next to your name.

2. If a check appears next to your name in the READ FOR AWARENESS column, you are required to review the document to the extent that you will be aware of the existence of the document and its general content. Indicate your completion of this review by signing and dating next to your name.