EVALUATION RESEARCH CORPORATION

COMANCHE PEAK RESPONSE TEAM

QUALITY INSTRUCTION FOR ISSUE-SPECIFIC ACTION PLAN NO. VII.c

INSTRUCTION: QI-043

REVISION: 2

ISSUE DATE: 02/20/86

REINSPECTION OF CONCRETE PLACEMENT

PREPARED BY: [signature] DATE: 2-12-86

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QA/QC REVIEW TEAM LEADER

1.0 PURPOSE

This instruction provides the methods and accept/reject criteria for the performance of reinspection of concrete placement.

2.0 APPLICABILITY

This instruction applies to the performance of an independent reinspection of a sample of concrete construction activities. It applies to the sample selected from the concrete pours population which is described in the Population Description for Concrete Placement.

3.0 REFERENCES

3.1 Memo QA/QC-RT-487 to A. Patterson from R. H. Brown delineating documentation used in development of procedure, including specific sources for attributes and exclusions.

3.2 CPP-009, "Performance of Reinspection and Documentation Reviews."

4.0 GENERAL

Reinspections are performed and documented in accordance with established CPRT instructions. This instruction established the attributes and accept/reject criteria for the reinspection of accessible concrete construction attributes.

4.1 Responsibilities

4.1.1 QA/QC Inspectors

QA/QC Inspectors perform reinspections in accordance with established project procedures and instructions. Reference 3.3 addresses the method used to perform reinspections and to document and process the results.

4.1.2 QA/QC Discipline Engineers

The QA/QC Discipline Engineers prepare the Quality Instruction delineating reinspection requirements and attributes.

5.0 INSTRUCTION

For each placement consisting of separate structural elements (walls, slabs, etc.), a separate checklist shall be included for each of these elements. Tolerances indicated are ± unless noted otherwise.

The following attributes are to be inspected per Attachment 6.1.

All measurements shall be done with a steel tape or wood ruler as required, in increments of 1/8 inch.

Notations made by the inspector per requirements in this instruction for plate numbers, attribute deviations, etc. should generally be made on the applicable drawing included in the verification package and identified in the remarks column of the checklist. When additional space is required for remarks on the checklist, use Attachment 6.2.

1. Location of:

   A. Walls, columns, piers, pedestals, curbs,pads:

      Determine the location of walls and curbs by measuring two opposite terminal points on one face, relative to an adjacent column line. Determine location of tunnel walls in terms relative to the center lines of tunnel Determine the location of columns, piers, pedestals, and pads by measuring two adjacent mid point faces relative to a pair of orthogonal column lines.

      For elements in the Containment Building, locations shall be determined relative to a radial column line and the center of the Containment Building or to a defined rectangular grid system.

      Verify that, for the points indicated, locations are within the following tolerance of the locations required by the design drawings:

         For columns, piers, pedestals and pads less than 24" (any face); 1".

         For columns, piers, pedestals and pads 24" and greater (any face); 2".

         Walls and curbs; 2".

   B. Slabs:

      Determine the elevation for the top of the slab at any one point. Mark location on the design drawing and verify that the elevation is within 2" of that shown on the applicable design drawing. Concrete topping is not included in the definition of slab thickness.

5.0 INSTRUCTION (Cont'd)

1. Location of: (Cont'd)

C. Beams:

Determine the location of the beam as per the instruction for Attribute 1.A, for walls.

When the depth of the beam is the same as the slab thickness, it shall be so noted on the checklist and beam location cannot be verified.

Verify that, at the points measured, the elevation of the top of the beam is within 2" of the elevation required by the design drawing. Verify that, at the points measured, the beam location is within the following tolerance of the location required by the design drawing:

For beams framing into piles and columns; 3/8".

For Beams framing into walls; 1/2".

2. Size of:

A. Walls, curbs, slabs:

Measure opposite surfaces through any two openings to determine thickness of the element. When only one opening exists, measure through single opening. Where openings are not available, measure location of opposite surfaces for the element in accordance with Attribute 1 to determine element thickness.

Verify that the thickness of the element is not less than that required by the design drawing by more than the following tolerance:

Thickness less than 24": -3/8".
Thickness 24" or more: -1/2".

For elements with one surface inaccessible because it is backfilled or cast against earth, it shall be so noted on the checklist and size need not be determined.

B. Columns, piers, pedestals, pads:

Determine the width of each face of the element by measuring across the face at any convenient elevation. When this is not possible, determine the location of both adjacent faces according to the instructions for Attribute 1; using these locations and applicable building dimensions, determine the width of the element.

5.0 INSTRUCTION (Cont'd)

2. Size (Cont'd)

Verify the width of the element is not less than that required by the design drawing by more than the following tolerance:

Thickness less than 24": -3/8".
Thickness 24" or more: -1/2".

For pads, verify that the thickness is within the following tolerances of that shown on the design drawing:

Design pad height less than 6": -1/4", + 2".
Design pad height 6" to 12": -1/2", + 2".
Design pad height over 12": -3/4", + 2".

C. Beams:

Determine the depth of the element according to Attribute 2.A.

Determine the width of the element according to Attribute 2.B.

For beams whose depth is the same as the depth of the slab, element width cannot be determined. This shall be so noted on the checklist.

Verify that the depth and width of the element are not less than that required by the design drawing by more that the following tolerance:

Required dimension less than 24": -3/8".
Required dimension 24" or more: -1/2".

3. Surface Inspection

A. Walls, curbs, columns, piers, pedestals, pads:

Inspect all accessible surfaces for honeycombing and voids. (Inaccessible surfaces are those cast against earth, backfilled, or coated.) If any formwork must be removed to perform the surface inspection, note this information in the Remarks column.

Verify that honeycombing, abandoned drilled holes, and voids which are visible, do not expose any reinforcing steel, or exceeds the rebar concrete cover in the design drawings.

5.0 INSTRUCTION (Cont'd)

3. Surface Inspection (Cont'd)

When not shown in the design drawings use the following values for minimum rebar concrete cover:

	Minimum Cover (in.)
1. Containment Structure	
Exposed to weather	
No. 6 through No. 18 bars	2
No. 5 bars, and smaller	1 1/2
Not exposed to weather	
Principal reinforcement, ties and stirrups	1 1/2
Other reinforcement	1
2. All other structures	
Exposed to weather	
No. 6 or larger	2
No. 5 and smaller	1 1/2
Interior surfaces	
Beams, Girders, and columns	1 1/2
Slabs, Walls, and Joists	
No. 11 and smaller	3/4
No. 14 and No. 18	1 1/2

An observation of foreign material in the pour which could constitute a void in the concrete matrix exposing the reinforcing steel or exceeding the rebar concrete cover, shall be considered a deviation to this attribute.

B. Slabs, Beams:

Inspect the underside of slabs and exposed faces of beams for honeycombing and voids per Attribute 3.A. In addition, verify that there are no unauthorized cold joints.

4. Cored Holes

Inspect the entire accessible surface to identify cored holes.

For each identified cored hole, verify that the hole is approved per design drawings (including DCA's). The location of the hole shall be within 2" in any direction of the specified location.

5.0 INSTRUCTION (Cont'd)

5. Cracks

For beams and slabs, if in the inspector's judgement questionable cracks are evident, request an evaluation by the Level III inspector. Otherwise, accept this attribute. For any such questionable cracks, the Level III inspector will, when requested, determine the acceptability of these cracks. If the Level III believes the crack requires further engineering evaluation, then reject the attribute, and write a deviation report. Otherwise, the Level III will accept the attribute.

6. Patches

Verify that major patches (concrete repairs that have resulted from NCR's) are sound by tapping with a 16 oz. hammer on the area of the patch, and comparing the resulting sound with the sound that results when tapping the adjacent concrete.

7. Anchor Bolts

A. Verify that anchor bolts cast in concrete, for all equipment components and structures, have been installed as shown on the design drawings.

B. Verify bolt size by measuring diameter. Verify that the bolt projection is within +½" tolerance of that shown in the design drawings. Reject all unauthorized cut anchor bolts.

C. Verify that the bolt distance to the edge of the concrete is within -1/4" tolerance of that shown in the design drawings.

8. Embedded Plates and Structural Shapes

Verify that the mark number of all embedded plates/structural shapes match those shown on the design drawing.

If all of the embedded plates/structural shapes mark numbers match those shown on the design drawings, accept the attribute.

If no mark numbers are visible, verify that the plate dimensions agree with those shown on the design drawings. Record on the design drawings the status (i.e.: Mark Number not verifiable, accept, reject) of each inspected embedded plate/structural shape.

5.0 INSTRUCTION (Cont'd)

8. Embedded Plates and Structural Shapes (Cont'd)

If any visible mark numbers (entire number) match those shown on the design drawings, and there are no incorrect mark numbers, the attribute is accepted. Enter the number of "Not Verifiable" mark numbers in the design drawings.

If one or more mark numbers do not match those shown on the design drawings, the attribute is rejected.

If an embedded plate/structural shape is shown on the design drawing but has not been installed in the field, do not write a deviation report and enter the number of such embedments in the design drawings.

If an embedded plate/structural shape is installed in the field but not shown on the design drawing, mark the attribute "reject" and write a deviation describing the as-built configuration, location, mark number (if visible) and whether or not an attachment to the embedment has been made.

If an embedded plate/structural shape is located within 8 inches from the edge of concrete, provide the as-built location in the design drawing. Also take note of any attachment to the embedment.

If any plate is shown as a single plate on the design drawing, but has been installed in two or more pieces, reject the attribute and write a deviation report describing the as-built configuration, location and mark number (if visible).

Record all plate mark numbers on the design drawings.

6.0 ATTACHMENTS

6.1 Checklist
6.2 Supplemental Remarks

COMANCHE PEAK RESPONSE TEAM
CHECKLIST

POPULATION DESC CONCRETE PLACEMENT	VERIFICATION PKG NO.	PAGE 1 OF 2
QUALITY INSTRUCTION QI-043	[X] REINSPECTION	[ ] UNIT 1
EQUIPMENT MARK/TAG NO.	[ ] DOCUMENTATION REVIEW	[ ] UNIT 2 [ ] COMMON

ATTRIBUTE	VERIFICATION			REMARKS
	ACCEPT	REJECT	DATE	
1. Location				
A. Walls, Columns, Piers, Pedestals, Curbs, Pads				
B. Slabs				
C. Beams				
2. Size				
A. Walls, Curbs, Slabs				
B. Columns, Piers, Pedestals				
C. Beams				
3. Surface Inspection				
A. Walls, Curbs, Columns, Piers, Pedestals, Pads				
B. Slabs, Beams				

PREPARED BY: DISCIPLINE ENGR. DATE	APPROVED BY: LEAD DISCIPLINE ENGR. DATE
INSPECTED BY: INSPECTOR DATE	APPROVED BY: LEAD INSPECTOR DATE

COMANCHE PEAK RESPONSE TEAM CHECKLIST				
POPULATION DESC CONCRETE PLACEMENT	VERIFICATION PKG NO.			PAGE 2 OF 2
ATTRIBUTE	VERIFICATION			REMARKS
	ACCEPT	REJECT	DATE	
4. Cored Holes				
5. Cracks				
6. Patches				
7. Anchor Bolts A.				
B.				
C.				
8. Embedded Plates and Structural Shapes				

SUPPLEMENTAL REMARKS

VERIFICATION PACKAGE NO. I-S-CONC-_____

ATTRIBUTE (NO./DESCRIPTION)	REMARKS

_____ _____

Inspector Date