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RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards final updated response to Item 2b of IE Bulletin 80-11 re masonry wall design.

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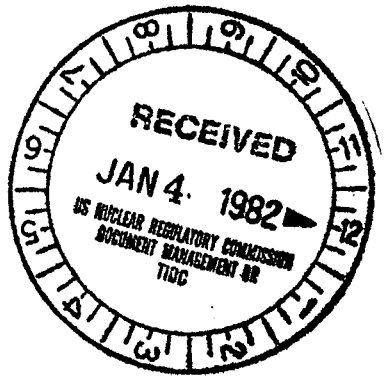
WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

December 29, 1981



Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. J. F. Stolz, Chief
Operating Reactors Branch No. 4

Re: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
IE Bulletin 80-11

Dear Sir:

Please find attached the final updated response for Item 2(b) of the subject bulletin. This information completes Duke Power Company's response to IE Bulletin 80-11 concerning masonry walls. This information supplements my letter of July 13, 1981.

Very truly yours,

William O. Parker, Jr.

JLJ/php
Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

A001
S11

DUKE POWER COMPANY
OCONEE NUCLEAR STATION
UNITS 1, 2, AND 3

USNRC IE BULLETIN 80-11
MASONRY WALL DESIGN

Updated Response to Item 2b

DUKE POWER COMPANY
OCONEE NUCLEAR STATION

USNRC IE BULLETIN 80-11
MASONRY WALL DESIGN

Updated Response to Item 2b

2b. Submit a written report upon completion of the re-evaluation program. The report shall include the following information.

(i) Describe, in detail, the function of the masonry walls, the configurations of these walls, the type and strengths of the materials of which they are constructed (mortar, grout, concrete and steel), and the reinforcement details (horizontal steel, vertical steel, and masonry ties for multiple wythe construction). A wythe is considered to be (as defined by ACI Standard 531-1979) "each continuous vertical section of a wall, one masonry unit or grouted space in thickness and 2 in. minimum in thickness."

Response

The initial reply to this Item was submitted with the required 180 day response by Mr. W. O. Parker's letter of November 4, 1980. In this response, details of the function, configuration and materials of the masonry walls at Oconee Nuclear Station were described. In a letter from Mr. J. F. Stolz dated June 1, 1981, the Structural Engineering Branch requested detailed drawings of all masonry walls and additional information concerning configuration and function. This was provided in Mr. W. O. Parker's letter of July 13, 1981. Attachment 1 lists those drawings which were a part of the July 13 submittal. Attachment 2 presents a tabulation of data on masonry wall configuration, material and function which was also included in the July 13 response.

(ii) Describe the construction practices employed in the construction of these walls and, in particular, their adequacy in preventing significant voids or other weaknesses in any mortar, grout, or concrete fill.

Response

The initial reply to this Item was submitted with the required 180 day response. Additional information on construction practices was provided with the July 13, 1981 submittal.

In order to more fully document the in-place properties of masonry construction at Oconee, Duke independently undertook a program of material tests on samples removed from existing conrete block walls at the station. The results of these tests indicate that the chosen values for individual block unit strength, prism strength and wall weights are conservative in all cases. By correlating masonry unit strengths and prism strength, it can also be demonstrated that the chosen properties for in place mortar are also conservative in all cases.

(iii) The re-evaluation report should include detailed justification for the criteria used. References to existing codes or test data may be used if applicable for the plant conditions. The re-evaluation should specifically address the following:

(a) All postulated loads and load combinations should be evaluated against the corresponding re-evaluation acceptance criteria. The re-evaluation should consider the loads from safety and non-safety related attachments, differential floor displacement and thermal effects (or detailed justification that these can be considered self limiting and cannot induce brittle failures), and the effects of any potential cracking under dynamic loads. Describe in detail the methods used to account for these factors in the re-evaluation and the adequacy of the acceptance criteria for both in-plane and out-of-plane loads.

(b) The mechanism for load transfer into the masonry walls and postulated failure modes should be reviewed. For multiple wythe walls in which composite behavior is relied upon, describe the methods and acceptance criteria used to assure that these walls will behave as composite walls, especially with regard to shear and tension transfer at the wythe interfaces. With regard to local loadings such as piping and equipment support reactions, the acceptance criteria should assure that the loads are adequately transferrred into the wall, such that any assumptions regarding the behavior of the walls are appropriate. Include the potential for block pullout and the necessity for tensile stress transfer through bond at the wythe interfaces.

Response

In the November 4, 1980 submittal, Duke Power Company provided its Criteria for Evaluation of Masonry Walls. Detailed questions concerning this criteria were answered in the July 13, 1981 submittal. Prior to finalization of this criteria, an extensive review of existing concrete masonry codes was made. This review resulted in the selection of the ACI 531-79 code as the basis for re-evaluation. Duke believes that the use of this nationally recognized masonry code will result in consistently safe design. Based upon the general factor of safety of 3 included in the code, the allowable seismic increase of 67% stated in Duke's criteria for extreme environmental loads will insure that adequate strength is available for such conditions. Additional safety margins are present since the as-built properties of the masonry construction at Oconee have been shown to exceed those used in the re-evaluation.

As stated in the submitted criteria, design loadings for masonry walls at Oconee are those specified in the Oconee Final Safety Analysis Report, Section 5.7. The only thermal effects which the masonry walls experience are those which are present during normal operation and these are not considered to be a significant design consideration.

The effects of potential cracking under dynamic loads are considered in accordance with Section 6.1.3 of the submitted criteria.

Loads from all significant attachments to masonry walls are considered in assessing the structural integrity of the wall. In assessing the transfer of load to the

masonry wall, the most severe condition occurs when the connection remains intact. Loads are applied to the wall consistent with the method of attachment. Details of such analyses were provided with Duke's July 13, 1981 submittal and are outlined below.

Where required for structural adequacy, collar joint shear stresses are limited to 12 psi as calculated by the relationship VQ/Ib.

The sequence and methodology of analysis of masonry walls is as follows:

a. Wall geometry, construction and attachments are established by research of construction drawings and as-built survey information. The wall is analyzed as a flexible attachment to the primary structure. Appropriate boundary conditions are chosen dependent upon the wall configuration.

b. The natural frequency of the wall is determined by considering the wall to be in either one-way or two-way flexure. In accordance with Section 6.1.3 of the criteria previously submitted, appropriate consideration is given to parameters which could affect frequency. The mass of attachments to the wall is also considered in calculation of wall frequency.

c. Based upon the wall's natural frequency, inertial loading due to the seismic response of the primary structure is calculated. The input spectrum for the analysis is considered to be at least as great as the average of the floor and ceiling response spectra for the primary structure. Inertial loading is idealized as a uniform pressure over the total wall area since sample calculations have shown a definite predominance of first mode response.

d. Attachment loads are calculated with due consideration to seismic excitation.

e. Seismic inertial and attachment loads are applied transverse to the wall and the resulting distribution of shear and bending moment is calculated. Stresses at critical sections are compared to the allowable stresses established in the criteria. Stresses due to in-plane loads are checked only near openings in the wall and locally around concentrated attachment loads.

   Should the critical stresses exceed the allowable stresses established in the criteria, a stability analysis is performed in accordance with Section 5.1.7 of the criteria. The methodology and examples of such analyses were described in the July 13, 1981 submittal.

f. In consideration of the local effects of attachments, each connection is considered to act upon a single block or an appropriate area of a concrete brick wall. Transverse loads are considered to be resisted by the shear stresses around the single block or brick area. Because of the low transverse load level of masonry wall attachments and the generally low level of transverse shear stresses in the masonry wall, local and global shear stresses are not superposed. In-plane loads are considered to be

taken by bearing of the attachment area on adjacent masonry. Concentrated moments are likewise considered to be taken in bearing on opposite faces. Since unreinforced walls are governed by tensile stresses in the masonry, it is unnecessary to superpose local and global compressive stresses.

g. The in-plane effects of interstory drift are evaluated in accordance with Section 6.1.5 of our criteria by applying the maximum seismic displacements of the primary structures. Because of the small displacements of the primary structures at Oconee and the fact that no continuous vertical reinforcing is provided to induce fixity at floor and ceiling, it is not felt that out-of-plane drift is a significant design consideration.

h. Tensile stesses in the masonry due to eccentric attachment loads during normal operation are evaluated. These stresses are compared to the normal allowable tensile stresses established in the criteria.

A sample calculation was provided in the July 15, 1981 submittal.

As a result of the re-analysis effort, a program of repairs has been initiated on selected walls at Oconee Nuclear Station. The walls chosen are generally taller than the typical walls at the station and/or are located in areas anticipated to experience greater seismic accelerations. Analysis has not shown these walls to be unsafe in their existing configuration, but an added margin of safety will be provided by the upgrades.

The design of masonry upgrades has taken several forms to date:

a. Addition of structural steel stiffeners to the existing wall. Stiffeners are fastened to the primary structure on each end and positively connected to the masonry throughout their length. In order to insure that masonry stresses remain within allowable in both vertical and horizontal bending, deflection limitations for the stiffening member are established based upon stresses which these deflections induce in the masonry units. Alternately, the individual wall panels may be analyzed in two-way bending with the added stiffeners.

b. Relocation of safety related equipment. Where such may prove to be the most cost effective solution, equipment may be moved out of the proximity of a masonry wall.

c. Erection of a protective shield to prevent damage to safety related equipment

d. Removal of attached loads. Alternate methods of supporting attached equipment are provided.

e. Modification of wall proximity zone. Structures are erected to alter the proximity zone of the masonry wall such that safety related equipment is no longer within the proximity zone of the wall.

f. Replacement of existing walls. The existing wall is removed and a new horizontally reinforced wall is constructed between new vertical structural wide flange and channel shapes.

Upgrades have been designed and issued for 83 masonry walls included in the scope of bulletin work. Two additional upgrades have been required for walls in the proximity of safety equipment installed since the original field survey.

Duke's commitment for completion of required hardware modifications is contained in Mr. W. O. Parker's letter of September 30, 1981.

ATTACHMENT 1

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IE BULLETIN 80-11 MASONRY WALL REVIEW
DRAWINGS SHOWING MASONRY WALLS

Drawing No.	Arch. Drawing No.	Drawing No.	Arch. Drawing No.
80-11-01	0-13	80-11-21	0-1013
80-11-02	0-15	80-11-22	0-1015
80-11-03	0-15A	80-11-23	0-1015A
80-11-04	0-15B	80-11-24	0-2015
80-11-05	0-18A	80-11-25	0-2015A
80-11-06	0-303G	80-11-26	0-2018
80-11-07	0-304A	80-11-27	0-2303B
80-11-08	0-304B	80-11-28	0-2304A
80-11-09	0-305A	80-11-29	0-2304B
80-11-10	0-305B	80-11-30	0-2305A
80-11-11	0-306A	80-11-31	0-2305B
80-11-12	0-306B	80-11-32	0-2306A
80-11-13	0-307A	80-11-33	0-2306B
80-11-14	0-307B	80-11-34	0-2307A
80-11-15	0-308A	80-11-35	0-2308A
80-11-16	0-308B	80-11-36	0-2308B
80-11-17	0-308C	80-11-37	0-2308C
80-11-18	0-364	80-11-38	K-300A
80-11-19	0-384	80-11-39	K-301A
80-11-20	0-460		

ATTACHMENT 2

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
0-13	1165	128	158	8		x	yes	x			yes
	1166	128	128	8		x	yes	x			no
	1167	128	159	8		x	yes	x			no
	1168	128	144	8		x	no	x			no
0-15	0005	131	64	8		x	no			x	no
	0006	123	240	8		x	no			x	no
	0007	176	240	8		x	no			x	no
	0013	124	236	8		x	yes			x	no
	0014	141	138	8		x	no			x	no
	0017	321	88	8		x	yes			x	no
	0023	157	99	8		x	no			x	no
	0024	168	236	8		x	yes			x	no
0-15A	1172	321	88	8		x	yes			x	no
	1178	128	87	8		x	yes			x	no
	1179	122	232	8		x	no			x	no
	1180	122	232	8		x	no			x	no
	1186	127	228	8		x	yes			x	no
0-15B	1604	125	233	8		x	no			x	no
	1608	125	216	8		x	yes			x	no
	1609	125	232	8		x	no			x	no
	1611	131	240	8		x	no			x	no
	1612	113	240	8		x	no			x	no
	1613	127	64	8		x	no			x	no
0-18A	1165	81	230	18		x	yes		x		yes
	1166	138	108	24		x	no		x		yes

ATTACHMENT 2

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-303G	1444	96	172	6		x	no			x	yes
	1447	96	240	6		x	yes			x	yes
	1448	96	240	6		x	no			x	no
	1449	96	272	6		x	yes			x	no
	1450	96	272	6		x	yes			x	yes
	1451	96	172	6		x	no			x	no
	1458	96	206	6		x	yes			x	no
O-304A	0402	123	129	8		x	yes	x			no
	0404	128	121	8		x	no	x			no
	0406	117	241	8		x	yes	x			no
	0407	121	209	8		x	yes	x			yes
	0411	117	36	6		x	no			x	no
	0414	134	225	8		x	yes			x	no
	0415	117	125	8		x	yes			x	no
	0416	146	234	8		x	no	x			yes
	0418	121	247	14		x	yes	x			no
	0419	121	246	14		x	yes	x			yes
	0420	134	163	8		x	yes			x	no
	0421	135	100	8		x	yes			x	no
	0422	145	117	8		x	yes	x			yes
	0423	145	250	8		x	yes	x			yes
	0424	144	247	8		x	yes	x			yes
	0425	134	84	8		x	yes			x	no
	0426	135	46	8		x	yes			x	no
	0427	135	64	4		x	no			x	no
	0431	146	280	8		x	yes			x	no
	0454	104	283	8		x	yes			x	no
	0455	104	54	8		x	no			x	no

ATTACHMENT 2

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-304A	0456	134	64	8		x	yes			x	no
	0457	134	184	8		x	no			x	no
	0458	103	214	8		x	no	x			no
	0459	120	91	8		x	yes	x			no
	0460	101	239	8		x	no	x			yes
	0461	121	244	14		x	yes	x			yes
	0462	120.5	243.5	14		x	yes	x			yes
	0463	121	210	8		x	yes	x			yes
	0464	111	246	8		x	no	x			yes
	0472	121	196	8		x	no	x			yes
	0481	145	251	8		x	yes	x			yes
	0482	145	250	8		x	yes	x			no
	0483	134	69	8		x	yes			x	no
	0484	145	119	8		x	yes	x			yes
	0487	134	178	8		x	yes			x	no
	0502	145	84	6		x	yes			x	no
	0505	134	38	8		x	yes			x	no
	0507	134	83	6		x	yes			x	no
	0509	105	252	8		x	yes			x	no
	0511	96	57	8		x	yes			x	no
	0515	134	38	6		x	yes			x	no
	0516	134	77	8		x	yes			x	no
O-304B	0005	180	216	8		x	yes	x			yes
	0006	180	216	8		x	yes	x			yes
	0007	120	216	8		x	yes	x			yes
	0019	120	216	32		x	no	x	x		yes
	0020	120	216	32		x	no	x	x		yes
	0041	134	62	8		x	no			x	no

ATTACHMENT 2

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
0-304B	0042	134	90	8		x	no			x	no
	0044	135	145	8		x	yes			x	no
	0049	133	250	8		x	yes			x	no
	0050	117	238	8		x	yes			x	no
	0052	122	201	8		x	no	x			yes
	0053	122	216	8		x	yes	x			yes
	0056	122	216	8		x	no	x			yes
	0062	180	217	8		x	yes	x			yes
	0063	180	216	8		x	yes	x			yes
	0064	180	218	8		x	no	x			yes
	0065	180	78	8		x	no	x			no
	0079	180	261	8		x	yes	x			no
	0080	135	252	8		x	yes			x	no
	0081	135	240	8		x	yes			x	no
	0090	135	143	8		x	yes			x	no
	0091	135	72	8		x	no			x	no
	0093	135	54	8		x	no			x	no
	0094	135	30	8		x	no			x	no
	0104	196	102	8		x	yes			x	no
	0108	196	130	8		x	no			x	yes
	0123	133	34	8		x	no			x	no
0-305A	1000	123	193	8		x	yes	x			yes
	1001	120	209	8		x	yes	x			yes
	1002	114	249	8		x	yes	x			yes
	1003	114	249	8		x	yes	x			yes
	1004	114	249	8		x	yes	x			yes
	1005	114	249	8		x	yes	x			yes
	1006	120	210	8		x	yes	x			yes

ATTACHMENT 2

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-305A	1007	123	194	8		x	yes	x			yes
	1008	88	95	8		x	yes	x			no
	1010	142	104	8		x	yes	x			no
	1012	142	150	8	x		no	x	x		no
	1013	124	104	8		x	yes			x	no
	1017	110	61	8		x	yes	x			no
	1018	98	237	8		x	yes	x			no
	1019	142	150	8		x	yes	x			yes
	1024	143	194	8	x		yes		x		yes
	1025	99	61	8	x		yes	x	x		no
	1026	142	104	8		x	yes	x			yes
	1028	128	137	8		x	yes			x	yes
	1029	121	79	8		x	no			x	yes
	1030	104	90	8		x	no	x			no
	1031	100	213	8		x	yes	x			no
	1032	120	138	8		x	no	x			yes
	1033	113	265	8		x	yes	x			yes
	1036	102	103	8		x	yes	x			yes
	1038	128	134	8		x	no			x	no
	1039	121	77	8		x	no			x	no
O-305B	1200	129	216	8		x	yes	x			no
	1201	129	216	8		x	yes			x	yes
	1202	129	216	8		x	yes			x	no
	1203	129	204	8		x	yes			x	no
	1205	129	225	8		x	yes	x			no
	1206	129	84	8		x	yes			x	no
	1207	129	252	8		x	yes			x	no
	1208	129	228	8		x	yes			x	no

ATTACHMENT 2

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-305B	1209	105	86	8		x	no			x	no
	1210	129	216	8	x		no		x		no
	1211	129	216	8	x		no	x	x		yes
	1212	129	216	8	x		yes		x		no
	1213	129	204	8	x		yes		x		no
	1214	129	204	8		x	yes	x			no
	1215	129	216	8		x	yes	x			no
	1216	129	216	8		x	yes	x			yes
	1217	129	216	8		x	yes	x			no
	1218	129	252	8		x	yes			x	no
	1219	116	75	8		x	yes	x			no
	1220	116	75	8		x	yes			x	no
	1222	142	193	8		x	yes	x			no
	1224	105	86	8		x	no			x	no
	1225	129	234	8		x	yes			x	no
	1226	128	204	8	x		yes		x		no
	1227	129	218	8	x		yes		x		no
	1228	129	216	8	x		yes		x		no
	1229	129	216	8	x		no			x	no
O-306A	1400	162	202	8		x	no	x			yes
	1402	162	252	8		x	yes	x			no
	1407	162	104	8		x	yes	x			no
	1408	162	96	8		x	no			x	no
	1410	162	54	8		x	yes			x	no
	1411	184	138	8		x	no			x	no
	1412	156	79	8		x	no			x	no
	1413	162	72	8		x	yes	x			yes
	1414	162	202	8		x	no	x			yes

ATTACHMENT 2

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
0-306A	1417	156	252	8		x	no	x			no
	1421	160	63	8		x	yes			x	no
	1422	182	72	8		x	no			x	no
	1423	165	16	6		x	no			x	no
	1424	164	94	8		x	yes			x	no
	1425	165	36	6		x	no			x	no
	1426	176	158	8		x	no			x	no
	1427	156	78	8		x	no			x	no
0-306B	1231	168	216	8		x	yes	x			no
	1233	168	202	8		x	yes	x			no
	1236	168	240	8		x	yes	x			no
	1237	168	249	8		x	yes			x	no
	1238	168	216	8	x		yes	x	x		no
	1239	168	240	8	x		yes	x	x		no
	1240	168	101	8		x	yes			x	no
	1241	164	86	8		x	no			x	no
	1242	168	201	8	x		yes	x	x		no
	1243	168	204	8		x	yes	x			no
	1244	168	240	8		x	yes	x			no
	1245	168	216	8		x	yes	x			no
	1247	164	86	8		x	no			x	no
	1248	168	252	8		x	yes			x	no
	1250	168	254	8		x	yes			x	no
	1253	168	204	8	x		yes	x	x		no
	1254	168	216	8	x		yes	x	x		no
	1255	168	216	8	x		yes	x	x		no
0-307A	0518	170	228	8		x	no	x			no

ATTACHMENT 2

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-307A	0519	216	204	8		x	no	x			yes
	0522	216	108	8		x	yes	x			no
	0523	216	22	16		x	no	x			no
	0525	235	32	6		x	no			x	no
	0527	216	216	8		x	yes	x			yes
	0528	235	260	8		x	yes			x	yes
	0529	206	135	8		x	yes			x	yes
	0530	212	256	8		x	yes	x			yes
	0531	212	256	8		x	no	x			yes
	0532	232	146	8		x	yes			x	no
	0533	208	122	8		x	yes			x	yes
	0534	211	80	8		x	no			x	no
	0535	209	145	8		x	yes			x	yes
	0536	200	212	8		x	yes			x	yes
	0537	224	276	8		x	yes			x	no
	0541	224	280	8		x	yes			x	yes
	0544	212	256	8		x	yes	x			yes
	0545	212	256	8		x	yes	x			yes
	0546	227	252	8		x	yes			x	yes
	0550	212	216	8		x	yes	x			no
	0557	206	135	8		x	yes			x	yes
	0558	216	204	8		x	no	x			no
	0559	90	252	8		x	no	x			no
	0563	216	92	8		x	yes			x	no
	0564	232	109	8		x	yes			x	no
	0566	227	95	8		x	yes			x	yes
	0571	227	214	8		x	yes			x	no
	0578	136	137	8		x	no			x	yes
	0579	232	147	8		x	yes			x	no

ATTACHMENT 2

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-307A	0580	210	80	8		x	no			x	no
	0581	210	143	8		x	yes			x	no
	0586	209	144	8		x	yes			x	yes
	0588	277	196	8		x	yes			x	yes
	0598	200	213	8		x	yes			x	yes
O-307B	1042	214	215	8	x		yes	x	x		no
	1043	214	205	8	x		yes	x	x		no
	1044	229	95	8	x		yes	x	x		no
	1045	229	134	8	x		no	x	x		no
	1046	214	205	8	x		yes	x	x		no
	1047	214	215	8	x		yes	x	x		no
	1048	229	95	8	x		yes	x	x		no
	1049	229	134	8	x		no	x	x		no
O-308A	1258	117	118	8		x	yes			x	yes
	1261	118	174	8		x	yes			x	yes
	1267	28	78	8		x	no	x			no
	1269	111	82	8		x	no	x			no
	1270	130	211	6		x	no	x			no
	1277	117	184	8		x	no			x	no
	1278	130	208	8		x	yes	x			no
	1279	139	96	8		x	no			x	no
	1280	118	162	8		x	yes			x	no
	1281	117	168	8		x	no			x	no
	1282	118	158	8		x	yes			x	no
	1289	117	174	8		x	yes			x	no
	1290	117	168	8		x	no			x	no
	1291	118	165	8		x	yes			x	no

ATTACHMENT 2

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-308A	1292	134	99	8		x	no			x	yes
O-308B	1296	123	129	8	x		no	x	x		yes
	1297	123	176	8	x		no	x	x		yes
	1298	111	80	8		x	yes	x			no
	1302	117	80	8		x	yes	x			no
	1303	149	210	8		x	yes	x			no
	1305	83	183	8		x	no	x			no
	1306	149	206	8		x	yes	x			yes
	1307	122	96	8	x		no	x	x		no
	1308	122	162	8	x		no	x	x		no
	1309	122	167	8	x		no	x	x		no
	1310	123	156	8	x		no	x	x		yes
	1312	123	173	8	x		no	x	x		yes
	1313	123	168	8	x		no	x	x		no
	1314	123	165	8	x		no	x	x		no
	1315	159	94	8	x		no	x	x		no
	1317F	161	96	8	x		no	x	x		no
	1318F	150	162	8	x		no	x	x		no
	1319F	150	167	8	x		no	x	x		no
	1320F	150	156	8	x		no	x	x		no
	1321F	172	94	8	x		no	x	x		no
	1322F	150	165	8	x		no	x	x		no
	1323F	150	168	8	x		no	x	x		no
	1324F	150	173	8	x		no	x	x		no
	1327F	150	183	8	x		yes	x	x		no
	1328F	36	181	8	x		no	x	x		no
	1335F	108	129	8	x		no	x	x		yes
	1336F	108	176	8	x		no	x	x		no

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OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
0-308C	1324	208	135	8	x		no	x	x		no
	1325	208	177	8	x		no	x	x		no
	1326	136	181	8	x		no	x	x		no
	1327	222	97	8	x		no	x	x		no
	1328	208	161	8	x		no	x	x		no
	1329	208	168	8	x		yes	x	x		no
	1331	208	156	8	x		yes	x	x		no
	1332	208	173	8	x		yes	x	x		no
	1333	208	164	8	x		yes	x	x		no
	1335	208	165	8	x		no	x	x		no
	1336	224	98	8	x		yes	x	x		no
0-364	0001F	349	152	12		x	yes	x			no
	0002F	349	155	12		x	yes	x			yes
	0003F	349	148	12		x	yes	x			no
0-384	0001F	120	169	8		x	no			x	yes
	0002F	136	133	8		x	yes			x	yes
	0003F	120	169	8		x	no			x	yes
	0004F	136	133	8		x	no			x	no
0-460	0001F	740	41	17		x	no			x	no
	0002F	740	41	17		x	no			x	no
0-1013	1167	129	128	8		x	yes	x			yes
	1170	129	141	8		x	yes	x			no
0-1015	1652	174	212	8		x	yes			x	no
	1654	167	232	8		x	yes			x	no

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OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
0-1015	1668	120	32	8		x	no			x	no
	1671	175	160	8		x	no			x	no
0-1015A	1066	128	32	8		x	no			x	no
	1067	128	48	8		x	no			x	no
0-2015	1684	120	84	8		x	no			x	no
	1728	176	168	8		x	yes			x	yes
0-2015A	1076	128	256	8		x	no			x	no
0-2018	1463	116	189	18		x	yes		x		yes
0-2303B	1162	114	222	8		x	no			x	no
0-2304A	0200	117	235	14		x	yes	x			yes
	0201	117	237	14		x	yes	x			yes
	0202	117	237	14		x	yes	x			yes
	0203	116	209	8		x	yes	x			yes
	0204	122	192	8		x	no	x			yes
	0205	146	283	8		x	yes			x	no
	0206	117	168	8		x	yes			x	no
	0207	112	268	8		x	yes	x			yes
	0223	134	317	8		x	yes			x	yes
	0224	174	293	8		x	yes			x	no
	0227	150	268	8		x	yes	x			no
	0228	150	268	8		x	yes	x			yes
	0229	145	238	8		x	yes	x			no
	0230	129	66	8		x	yes			x	no

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OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-2304A	0231	134	106	8		x	no			x	no
	0232	133	214	8		x	yes			x	no
	0239	145	177	8		x	yes			x	no
	0242	144	120	6		x	yes			x	no
	0243	144	80	6		x	yes			x	no
	0245	144	192	6		x	no			x	no
	0249	144	84	6		x	no			x	no
	0264	133	184	8		x	yes			x	no
	0267	105	40	8		x	yes			x	no
	0268	134	56	8		x	yes			x	no
	0269	133	184	8		x	yes			x	no
	0270	104	99	6		x	no			x	no
	0273	121	280	6		x	no			x	no
O-2304B	1100	120	202	8		x	no	x			yes
	1101	120	216	8		x	no	x			yes
	1107	120	216	8		x	no	x			yes
	1111	174	215	8		x	yes	x			yes
	1112	174	216	8		x	no	x			yes
	1113	174	116	8		x	no	x			no
	1142	133	64	8		x	no			x	no
	1143	133	90	8		x	no			x	no
	1146	96	144	8		x	yes			x	no
	1147	123	103	8		x	yes			x	no
	1159	128	241	8		x	yes			x	no
O-2305A	0600	110	235	8		x	yes	x			yes
	0601	110	235	8		x	yes	x			yes
	0602	110	235	8		x	yes	x			yes

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OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-2305A	0603	121	210	8		x	yes	x			no
	0604	121	194	8		x	yes	x			no
	0605	108	265	8		x	yes	x			no
	0606	127	151	8		x	yes	x			no
	0608	120	11	8		x	no			x	no
	0609	121	237	8		x	yes	x			no
	0611	120	193	8		x	yes			x	no
	0612	110	61	8		x	yes	x			yes
	0613	121	48	8		x	yes			x	yes
	0614	142	255	8		x	yes			x	no
	0615	114	177	8		x	yes			x	yes
	0616	123	87	8		x	no			x	no
	0617	102	66	8		x	no			x	no
	0618	123	135	8		x	no			x	no
	0619	122	111	8		x	yes	x			no
	0620	143	92	8		x	no	x			no
	0621	120	138	8		x	yes			x	no
	0622	102	93	8		x	no			x	no
	0623	123	81	8		x	no			x	no
	0726	98	36	8		x	no			x	no
	0727F	94	61	8		x	yes			x	no
	0728F	120	11	8		x	no			x	no
	0729F	120	41	8		x	yes			x	no
O-2305B	0624	123	202	8		x	yes	x			no
	0625	123	215	8		x	yes	x			yes
	0626	123	215	8		x	yes	x			yes
	0627	123	216	8		x	no	x			no
	0628	143	236	8		x	yes			x	no

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OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-2305B	0629	143	224	8		x	yes	x			no
	0630	121	247	8		x	yes			x	no
	0631	123	203	8	x		yes	x	x		no
	0632	123	213	8	x		yes	x	x		no
	0633	121	215	8	x		yes	x	x		yes
	0634	121	214	8	x		no	x	x		no
	0636	66	206	8		x	no	x			no
	0637	117	248	8		x	no			x	no
	0638	107	87	8		x	yes			x	no
	0639	117	79	8		x	no			x	no
	0725	117	76	8		x	yes	x			no
O-2306A	0808	156	103	8		x	no			x	no
	0809	161	202	8		x	yes	x			yes
	0810	160	252	8		x	no	x			no
	0811	160	236	8		x	yes	x			no
	0814	158	93	8		x	yes			x	no
	0816	185	209	8		x	yes			x	no
	0817	158	18	6		x	yes			x	yes
	0818	158	30	6		x	yes			x	no
	0823	184	137	8		x	yes			x	no
	0825	184	79	8		x	no			x	no
	0826	107	86 5/8	8		x	no			x	no
	0828	172	143	8		x	no			x	no
	0830	172	24	8		x	yes			x	no
	0833	172	42	8		x	yes			x	no
O-2306B	0834	168	202	8		x	yes	x			no
	0835	168	216	8		x	yes	x			no

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OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-2306B	0836	168	216	8		x	yes	x			no
	0838	168	254	8		x	yes			x	no
	0839	164	86	8		x	yes			x	no
	0840	161	203	8	x		yes	x	x		no
	0842	156	216	8	x		yes	x	x		no
	0843	161	215	8	x		yes	x	x		yes
	0846	156	251	8		x	yes			x	no
	0848F	162	32	8	x		no		x		no
O-2307A	0640	209	243	8		x	yes	x			yes
	0641	210	244	8		x	yes	x			yes
	0642	210	240	8		x	no	x			no
	0643	210	216	8		x	yes	x			no
	0644	212	202	8		x	no	x			no
	0653	206	150	8		x	yes			x	no
	0654	230	122	8		x	yes			x	no
	0655	210	94	8		x	yes			x	no
	0656	233	202	8	x		yes	x	x		no
	0657	203	251	8		x	no			x	yes
	0658	200	260	8		x	yes			x	no
	0665	210	252	8		x	no	x			no
	0666	230	215	8	x		yes	x	x		no
	0667	233	95	8	x		no	x	x		no
	0668	233	138	8	x		no	x	x		no
	0669	200	103	8		x	yes			x	no
	0672	203	96	8		x	no			x	yes
	0675	203	218	8		x	no			x	yes
	0676	204	216	8		x	yes			x	no
	0678	208	124	8		x	yes			x	no

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OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-2307A	0679	230	141	8		x	yes			x	no
	0685	203	168	8		x	no			x	yes
	0686	210	141	8		x	yes			x	no
	0688	208	288	8		x	yes			x	no
	0689	230	72	8		x	yes			x	no
	0690	230	100	8		x	no			x	no
	0695	193	210	8		x	yes			x	no
	0696	200	212	8		x	yes			x	no
	0700	203	211	8		x	no			x	yes
O-2308A	0704	123	128	8		x	no			x	no
	0705	123	174	8		x	no			x	no
	0706	123	180	8		x	no			x	no
	0707	130	216	8		x	no	x			no
	0708	121	80	8		x	no	x			no
	0709	117	174	8		x	yes			x	no
	0710	117	168	8		x	no			x	no
	0711	117	164	8		x	yes			x	no
	0712	130	99	8		x	no			x	yes
O-2308B	0714	153	166	8		x	no			x	no
	0715	153	174	8		x	yes			x	yes
	0716	132	128	8	x		no	x	x		no
	0717	132	176	8	x		no	x	x		no
	0718	134	180	8	x		no	x	x		no
	0719	150	200	8		x	yes	x			yes
	0720	125	79	8		x	no	x			no
	0721	127	174	8	x		no	x	x		no
	0722	128	166	8	x		no	x	x		yes

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OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3
IEB 80-11 MASONRY WALL DATA SUMMARY

ARCH. DRAWING NUMBER	WALL SEQUENCE NUMBER	GEOMETRY AND CONSTRUCTION						FUNCTION			
		HEIGHT (in)	LENGTH (in)	THICKNESS (in)	CONCRETE BRICK	CONCRETE BLOCK	OPENINGS	FIRE BARRIER	RADIATION BARRIER	PARTITION ONLY	ATTACHMENTS SUPPORTED
O-2308B	0723	128	165	8	x		no	x	x		no
	0724	132	116	8	x		no	x	x		yes
	0725F	162	129	8	x		no	x	x		yes
	0726F	162	178	8	x		no	x	x		yes
	0727F	162	179	8	x		no	x	x		no
	0728F	157	160	8	x		no	x	x		no
	0729F	157	167	8	x		no	x	x		no
	0730F	157	164	8	x		no	x	x		no
	0731F	156	98	8	x		no	x	x		no
O-2308C	1435	217	129	8	x		no	x	x		no
	1436	217	177	8	x		no	x	x		no
	1437	217	179	8	x		no	x	x		no
	1438	217	174	8	x		yes	x	x		no
	1439	217	168	8	x		yes	x	x		no
	1440	217	164	8	x		no	x	x		no
	1442	207	97	8	x		no	x	x		no
K-300A	0012	84	317	8		x	no			x	no
	0013	80	317	8		x	yes			x	no
	0015	84	219	8		x	no			x	no
	0016	84	219	8		x	yes			x	no
K-301A	0057	168	250	8		x	yes			x	no
	0061	142	152	8		x	yes				no
	0062	142	245	8		x	yes				no