



KANSAS GAS AND ELECTRIC COMPANY

GLENN L. KOESTER
VICE PRESIDENT - NUCLEAR

August 15, 1984

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

KMLNRC 84-143

Re: Docket No. STN 50-482

Ref: 1) Letter of 6/7/84 from DGEisenhut, NRC, to
GLKoester, KG&E

2) Letter KMLNRC 84-028 dated 3/9/84 from
GLKoester, KG&E, to HRDenton, NRC

Subj: Wolf Creek Design Verification Activities

Dear Mr. Denton:

Reference 1) requested additional information beyond that provided by KG&E in Reference 2) concerning Sargent & Lundy design verification activities for Wolf Creek. The Attachment provides information which shows that:

1. Ultimate heat sink (UHS) design calculations reflect as-built conditions,
2. UHS design information was documented in a controlled manner and was coordinated among design interfacing organizations, and
3. UHS design information was properly coordinated internally at Sargent & Lundy.

KG&E has reviewed the information summarized in the Attachment in the offices of both KG&E and Sargent & Lundy. Considering the information provided in the Attachment and that previously provided in Reference 2), KG&E concludes that further independent design verification activities do not appear necessary.

Yours very truly,

GLK:bb

xc:JCollins, Reg. IV

PO'Connor (2)

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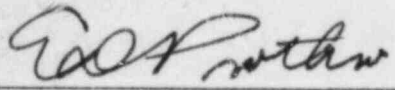
OATH OF AFFIRMATION

STATE OF KANSAS)
) SS:
COUNTY OF SEDGWICK)

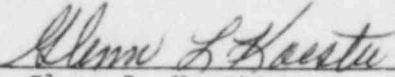
I, Glenn L. Koester, of lawful age, being duly sworn upon oath, do depose, state and affirm that I am Vice President - Nuclear of Kansas Gas and Electric Company, Wichita, Kansas, that I have signed the foregoing letter of transmittal, know the contents thereof, and that all statements contained therein are true.

KANSAS GAS AND ELECTRIC COMPANY

ATTEST:



E.D. Prothro, Assistant Secretary

By 

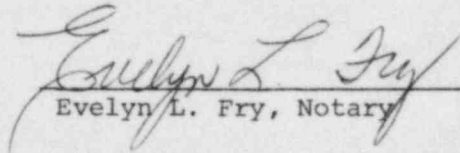
Glenn L. Koester
Vice President - Nuclear

STATE OF KANSAS)
) SS:
COUNTY OF SEDGWICK)

BE IT REMEMBERED that on this 15th day of August, 1984, before me, Evelyn L. Fry, a Notary, personally appeared Glenn L. Koester, Vice President - Nuclear of Kansas Gas and Electric Company, Wichita, Kansas, who is personally known to me and who executed the foregoing instrument, and he duly acknowledged the execution of the same for and on behalf of and as the act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal the date and year above written.





Evelyn L. Fry, Notary

Commission expires on August 15, 1985.

Wolf Creek Generating Station

Unit No. 1

Design Verification Activities

Response to D.G. Eisenhut Letter to G.L. Koester

Dated June 7, 1984

Kansas Gas and Electric Company

August 15, 1984

NRC REQUEST FOR ADDITIONAL INFORMATION

Request (a)

Audit records or other documentation which verify that Sargent & Lundy had performed and updated the calculations needed to support the current Ultimate Heat Sink design.

Response

Sargent & Lundy (S&L) designed the Wolf Creek Generating Station Ultimate Heat Sink (UHS). The major calculations by S&L which supported the design of the UHS included determination of the UHS area and capacity, seepage, heat rejection analysis and stability design of the basin, slopes and dam. First construction on the UHS began in August 1978. UHS construction was completed when filling of the reservoir commenced in May 1980.

A. Design Confirmation for UHS Area and Capacity

The area and capacity of the UHS was originally calculated by the S&L Water Resources and Site Development Division (See Figure 4 for S&L organization Chart) in Calculation No. WR-WC-UH-1, Rev. 0, dated 3/3/77 through coordination with the S&L Mechanical Analytical Division on the required UHS surface area and volume. (Engineering Studies MAD 73-714, 73-806 and 74-031). This calculation was then revised on 2/13/81 based upon survey information from the as-built drawings of the UHS transmitted to S&L by KG&E via letter KWCL0-078 dated 11/3/80. The results from the as-built area and capacity calculation were then used by the S&L Mechanical Analytical Division to revise the heat rejection analysis.

B. Design Confirmation for UHS Seepage Rate

The rate of seepage through the UHS dam was originally calculated by the Geotechnical Division in Calculation No. UHSD-7, Rev. 0, dated 5/10/75. The permeability of the insitu rock was determined through tests by Dames & Moore, and this information was used to calculate the seepage through the UHS.

The rates of seepage were used by the Mechanical Analytical Division as input into the heat rejection analysis. After construction of the UHS dam and slopes was completed, confirmatory permeability tests were performed on soil samples taken from the UHS embankment, as documented in Dames & Moore report DMLK-667 dated 9/26/80. The Geotechnical Division evaluated the results of the confirmatory tests, and confirmed that original calculation UHSD-7 was conservative, since the permeability used in the calculation was greater than the permeability determined through the confirmatory tests. The Geotechnical Division's evaluation of the results of the confirmatory soil tests is documented in a S&L interoffice memorandum dated 11/26/80.

Response to (a) (Continued)

C. Design Confirmation for the UHS Heat Rejection Analysis

The design values for the minimum required UHS surface area and volume of water, the maximum UHS temperature and the maximum UHS water drawdown were determined by the Mechanical Analytical Division in Calculation No. MAD 79-678, Rev. 0, dated 12/28/79. Upon receipt of the as-built area and capacity information from the Water Resources and Site Development Division (WR-IC-UH-1, Rev. 1), a new calculation was performed (MAD 81-556, Rev. 0, dated 10/9/81) to calculate the as-built maximum temperature and drawdown values. In addition, the Mechanical Analytical Division performed Calculation No. MAD 80-503 on 9/9/81 to verify that the rock "islands", which were left in the UHS basin as part of the as-built condition, had no significant effect on the performance of the UHS.

D. Design Confirmation for the UHS Basin, Slopes and Dam

Several calculations, including UHS-2 (Rev. 0 dated 3/14/77), UHS-2A (Rev. 0 dated 5/4/79), UHS-2B (Rev. 0 dated 4/30/79), UHSD-5 (Rev. 0 dated 6/3/75), UHSD-8 (Rev. 0 dated 1/27/76), UHSD-11 (Rev. 0 dated 8/21/74), and HS-DY-CP1 (Rev. 0 dated 1/10/75) were made to support the UHS basin, slopes, and dam design in the areas of ESWS intake channel alignment, static slope stability, seismic stability, maximum settlement and camber. After construction completion on the UHS, the as-built soil properties and UHS profiles were reviewed to verify that the as-built condition conformed to the specified design condition.

After construction of the UHS dam and slopes was completed, confirmatory tests were performed on soil samples taken from the UHS embankment, including consolidation tests; consolidated undrained triaxial tests; and stress and strain controlled cyclic triaxial tests. The results of the confirmatory soil tests are documented in Dames & Moore report DMLK-667 dated 9/26/80. The Geotechnical Division evaluated the results of the confirmatory tests. The evaluation confirmed that original calculations UHS-2, UHS-2A, UHS-2B, UHSD-5, UHSD-8, UHSD-11 and HS-DY-CP1 were conservative, since the soil parameters used in these original calculations conservatively enveloped the soil parameters determined from the confirmatory tests. The Geotechnical Division's evaluation of the confirmatory tests is documented in an interoffice memorandum dated 11/26/80.

The as-built profile of the UHS dam was transmitted to Sargent & Lundy by KG&E in letter KWCL0-078 dated 11/3/80. The Geotechnical Division's evaluation of the as-built profile confirmed that the as-built profile and crest elevation, including crest camber allowance for settlement, were greater than or equal to the specified elevations. This evaluation is documented in a S&L interoffice memorandum dated 6/16/81.

Response to (a) (Continued)

During construction of the UHS basin, the Geotechnical Division generated calculation No. UHS-3 (Rev. 0 dated 6/25/80), in support of the disposition to Field Change Request (FCR) 1-0539-C, which proposed that several rock "islands" be left as-is in the UHS basin to preclude the need for blasting. The calculation was generated to determine the additional volume required to replace the volume lost by not removing the rock "islands". Based upon the results of the calculation, S&L gave conditional approval to FCR 1-0539-C, with direction to excavate additional volume along the northwest slope of the UHS basin.

Summary

Based on the above described design calculations and design calculation confirmations, the as-built configuration of the Ultimate Heat Sink basin, slopes and dam was determined by KG&E to be satisfactorily conservative. A summary of the history of the above listed original calculations and their revisions is provided for the major UHS design studies in Table 1 and Figure 1.

Request (b)

Audit records or other documentation which verify that Sargent & Lundy has maintained and updated the ultimate heat sink design criteria document/data and that this updated information had been properly coordinated with the other design interfacing organizations (i.e. Bechtel, Dames & Moore).

Response

S&L's design of the UHS involved coordination with external interfacing organizations on two primary design subjects. The UHS heat rejection analysis, involving primarily the S&L Mechanical Analytical Division, was coordinated with Bechtel and the SNUPPS organization (including KG&E), as shown in Figure 2. The physical design of the UHS involved primarily the S&L Geotechnical Division and was coordinated with Bechtel, SNUPPS, and Dames & Moore, as shown in Figure 3.

Design criteria, or design bases information, in the S&L UHS scope of work, is documented in design criteria documents, Safety Analysis Report (SAR) sections and engineering compilation reports. Design criteria documents define generalized performance objectives and prescribe analytical and/or test methods. The SAR sections contain all of the same information as the design criteria documents, plus more detailed information which describes how the design objectives are met, how compliance with the relevant Regulatory Guide is accomplished, and the design basis results of analysis and/or testing. Engineering compilation reports are generated at the completion of projects. Design compilation reports contain the same information found in the design criteria documents and the SAR, as well as a summary of the as-built condition (from construction surveillance reports, confirmatory tests and confirmatory as-built calculations), and confirmation that the as-built condition conforms to the original design bases.

Throughout all phases of the project, S&L's design of the UHS was coordinated with the other interfacing design organizations, and the design bases documents were periodically revised to reflect current design information.

UHS Heat Rejection Analysis - Design Basis and Coordination

The design bases information associated with the UHS heat rejection analysis is documented in Design Criteria DC-UHS-01-WC and SAR Site Addendum Section 9.2.5. The heat rejection analysis required external coordination of the design information itemized in Figure 2. The correspondence which documents the transfer of information between S&L, and the other interfacing design organizations is listed in table 2. Table 2 also summarizes the revisions to Design Criteria DC-UHS-01-WC and SAR Site Addendum Section 9.2.5, which were made to reflect the status of design basis information.

Response (b) Continued

UHS Physical Design - Design Bases and Coordination

Design bases information associated with the physical design of the UHS is documented in Design Criteria DC-UHS-02-WC and SAR Site Addendum Section 2.5.5. Physical design of the UHS required coordination with SNUPPS, Bechtel and Dames & Moore on the design information shown in Figure 3.

To develop consistency among all the original SNUPPS sites in the very early stages of the project, the SNUPPS organization (including KG&E), along with the site A/E's and Bechtel, developed a standardized consensus of design criteria for the geotechnical design work associated with each site's UHS. The standardized geotechnical design criteria, documented in BLSE-432, dated 2/1/74, established a prescribed soils testing program as well as safety factors and methods for stability and seismic stability analysis. When Wolf Creek became the only SNUPPS site to design a submerged UHS, the design requirements for the Wolf Creek UHS became unique. Thereafter, S&L was entirely responsible for the development of UHS design basis information, except for the determination of the site specific SSE, which was the responsibility of Dames & Moore. Table 3 summarizes the revisions to the design bases documents, with a list of correspondence which documents the transfer of design basis information between S&L and the other interfacing organizations.

Design coordination between S&L and Bechtel was required primarily during the detailed design phase of the project to develop the physical design interfaces between the UHS intake channel and the ESWS Pumphouse. Changes which occurred during physical design development only impacted the design drawings, and did not cause changes to the original design bases information. Design drawings and/or sketches were routinely revised to reflect the current status of design information. Documentation of the coordination between S&L and Bechtel is summarized in Table 4.

Except for the SSE as noted above, coordination between S&L and Dames & Moore was required to execute the UHS soils testing and investigation program during the engineering study phase of the project; the geotechnical surveillance program during construction of the UHS; and the confirmatory soils test program upon completion of construction on the UHS. Changes which occurred during implementation of the testing, investigation and surveillance programs did not impact the original design bases documents. Documentation of the coordination between S&L and Dames & Moore is summarized in Table 5.

Response (b) UHS Physical Design - Design Bases and Coordination Continued

After construction and testing on the UHS was completed, S&L prepared a report (A-3831), entitled "Engineering Data Compilation for Water Control Structures at Wolf Creek Lake", dated 4/3/81. This report incorporates the UHS design bases information and summarizes the results of Sargent & Lundy's design analysis and soils testing programs, including the confirmatory soil testing. The report also summarizes both the as-built condition of the UHS and Sargent & Lundy's evaluation to verify that the as-built condition conformed to the design basis requirements. The soils testing portions of the report are based upon information provided by Dames & Moore through geotechnical investigation and confirmatory soil test reports. The as-built portions of the report are based upon information provided by Dames & Moore's surveillance report and by KG&E and/or the contractor in the form of Field Change Requests and as-built survey drawings. Documentation of Sargent & Lundy's coordination of the report is summarized in Table 6.

Summary

As described above, the documents which contained design basis information were maintained current by Sargent & Lundy, and Sargent & Lundy's UHS design work was properly coordinated with the work of other interfacing organizations.

Request (c)

Audit records or other documentation which verify that Sargent & Lundy has performed adequate interdivisional coordination associated with the Ultimate Heat Sink design.

Response

A summary of the design data which required interdivisional coordination within S&L is shown in Figure 1. Interdivisional coordination of the UHS design information and design documents was performed in accordance with the S&L Quality Assurance Program, Wolf Creek project specific instructions and Wolf Creek project status reports.

Project specific documents which prescribe the scope of responsibilities among departments/divisions, and the interface of design information among the departments/divisions are:

- Project Instruction PI-WC-003, which prescribes the design and design interfaces between the Mechanical Department and the Structural Department.
- Project Instruction PI-WC-002, which designates the division of responsibility for the processing and coordination of reviews of external to S&L design documents.
- Project Status Reports which list the project design documents, and the responsible division for each document.
- Project Distribution List, which lists each design document (or category of design document) with the required interoffice distribution for each design document.

Throughout the design of the UHS, design input information from one division to another division was documented in interoffice memoranda. Normally, specific design assignments and design input/interface requirements were discussed and resolved in routine project meetings held twice each month or, later in the project, monthly project meetings. The results from calculations, studies and design evaluations from one division, which constituted design input to another division's work, were documented in interoffice memoranda from the originating division to either the Project Engineering Division or the Project Management Division, with carbon copies to the other interfacing division(s). Table 7 summarizes the memoranda which document the interdivisional transmittal of UHS design input information, for the primary interdivisional interfaces shown in Figure 1.

Draft copies of designated design documents, including design criteria, functional descriptions, drawings and specifications were issued for interdivisional review and comment prior to their release for use, as required by the Quality Assurance Program. Draft copies of the design document were issued for review and comment by the originating division via interoffice memorandum to the Project Engineering Division or the Project Management Division, with carbon copies to the other interfacing divisions.

Response (c) Continued

Reviews of the draft document by the reviewing divisions, either with or without comments, were documented by annotating the transmittal memo and/or the attached document. The reviewer signed and dated the annotation, and returned the transmittal memo back to the originating division. Subsequent revisions to the design document were issued for interdivisional review and comment in the same manner as the original. Documentation of interdivisional reviews is not considered by the S&L QA Program as a lifetime record. Such documentation is retained for a minimum of one year by the originating division. Nevertheless, documentation of the interdivisional review and comment on Design Criteria DC-UHS-02-WC is available in the Geotechnical Division's files. The interdivisional review of all revisions to DC-UHS-02-WC is summarized in Table 8, and is representative of the interdivisional review process at S&L for the Wolf Creek Project.

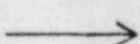
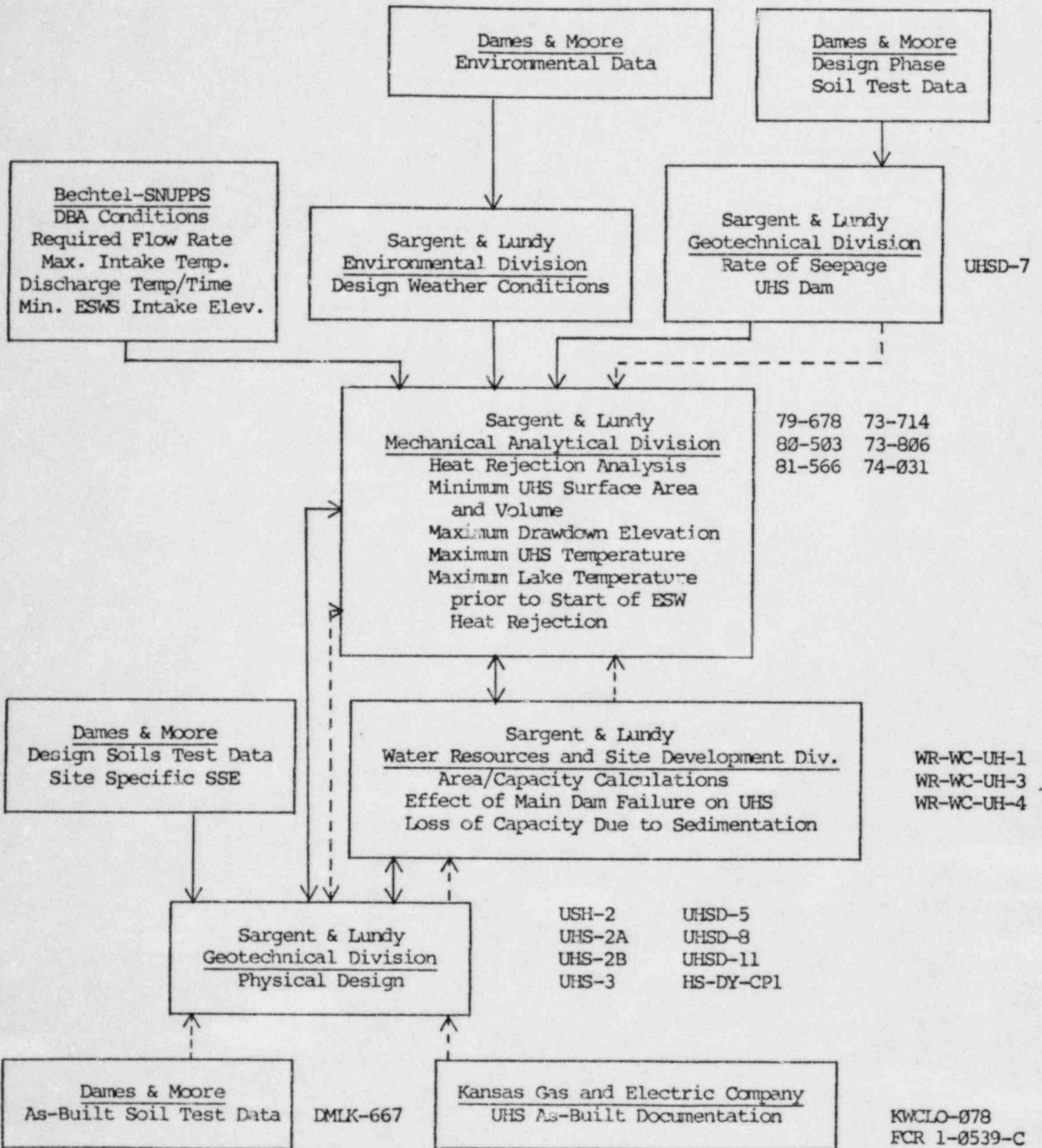
After resolution and/or incorporation of interdivisional review comments, design documents were released for use. Released design documents were issued to designated interoffice divisions for use, as delineated in the Project Distribution List (currently Rev. 10, dated 5/19/79). For example, the Project Distribution List requires the distribution of UHS design criteria documents to the Project Management Division, Structural Project Engineering Division, Electrical Project Engineering Division, Environmental Division, Nuclear Safeguards and Licensing Division, Geotechnical Division, Water Resources and Site Development Division, Structural Analytical Division and Quality Assurance Division. Documentation of controlled interoffice distribution is also normally retained for only a minimum of one year in the project files as it too is not considered a lifetime QA record. However, several interoffice memoranda are available in the project files which substantiate that design documents were distributed internally, as required by the Project Distribution List. Examples of the interoffice distribution for the UHS design criteria documents DC-UHS-01-WC and DC-UHS-02-WC are summarized in Table 9.

Summary

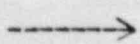
Based upon the procedures and documents described above, KG&E concludes that design input information and design documents associated with the UHS have had satisfactory interdivisional coordination within Sargent & Lundy.

Figure 1

SARGENT & LUNDY UHS CALCULATIONS



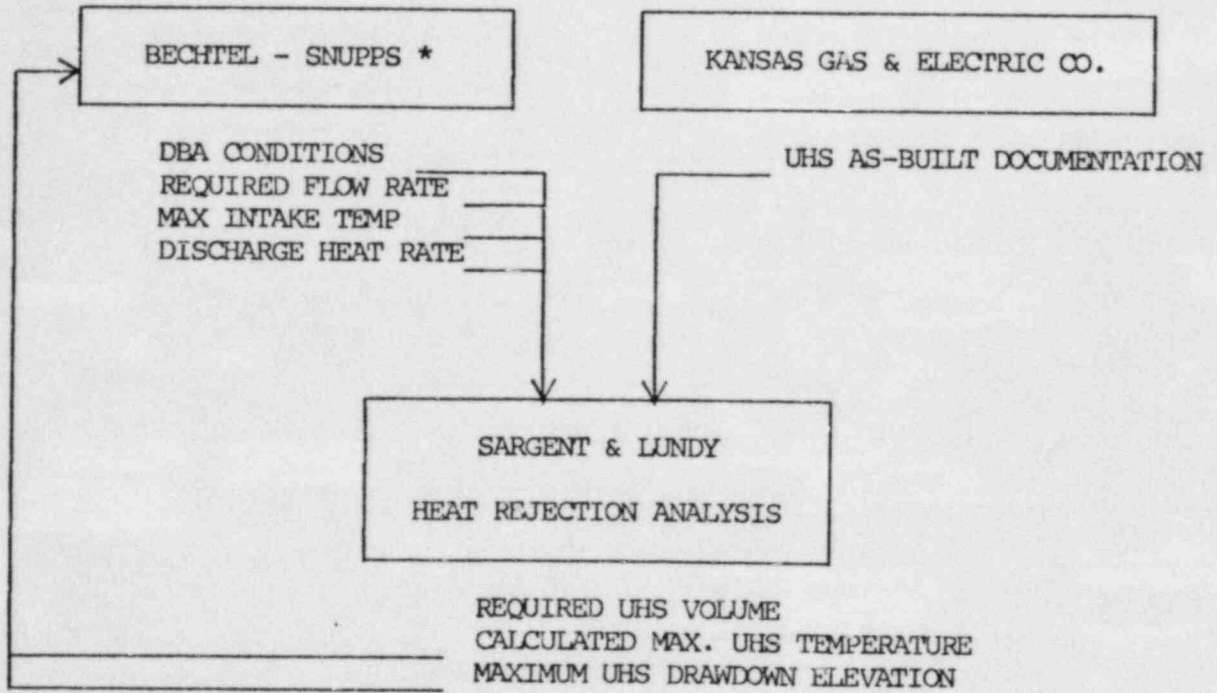
Flow for Original Calculations and Letters



Flow for Design Confirmation Calculations, Letter, FCRs

Figure 2

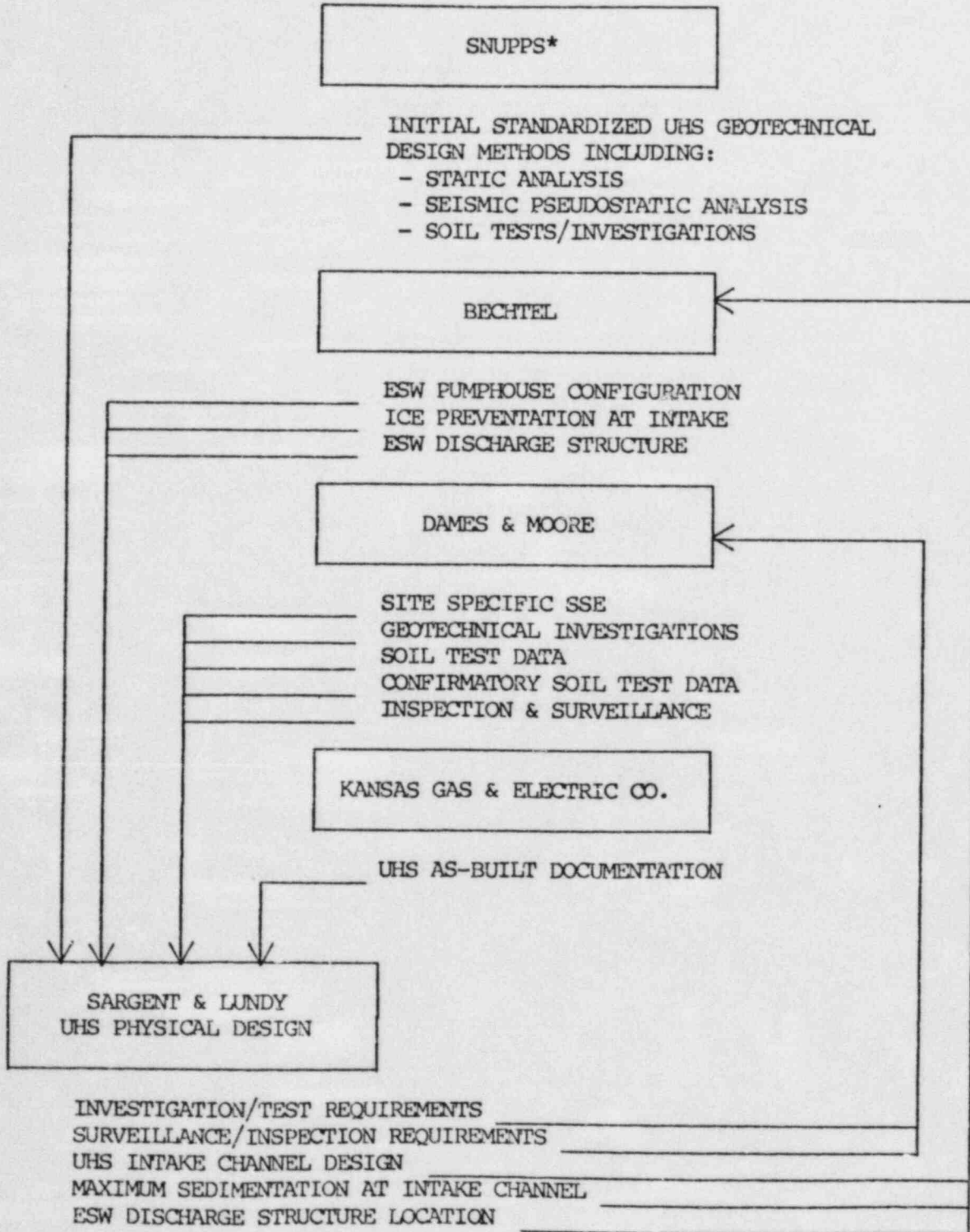
SARGENT & LUNDY
UHS - HEAT REJECTION ANALYSIS
COORDINATION WITH OTHER INTERFACING ORGANIZATIONS



*Includes KG&E involvement.

Figure 3

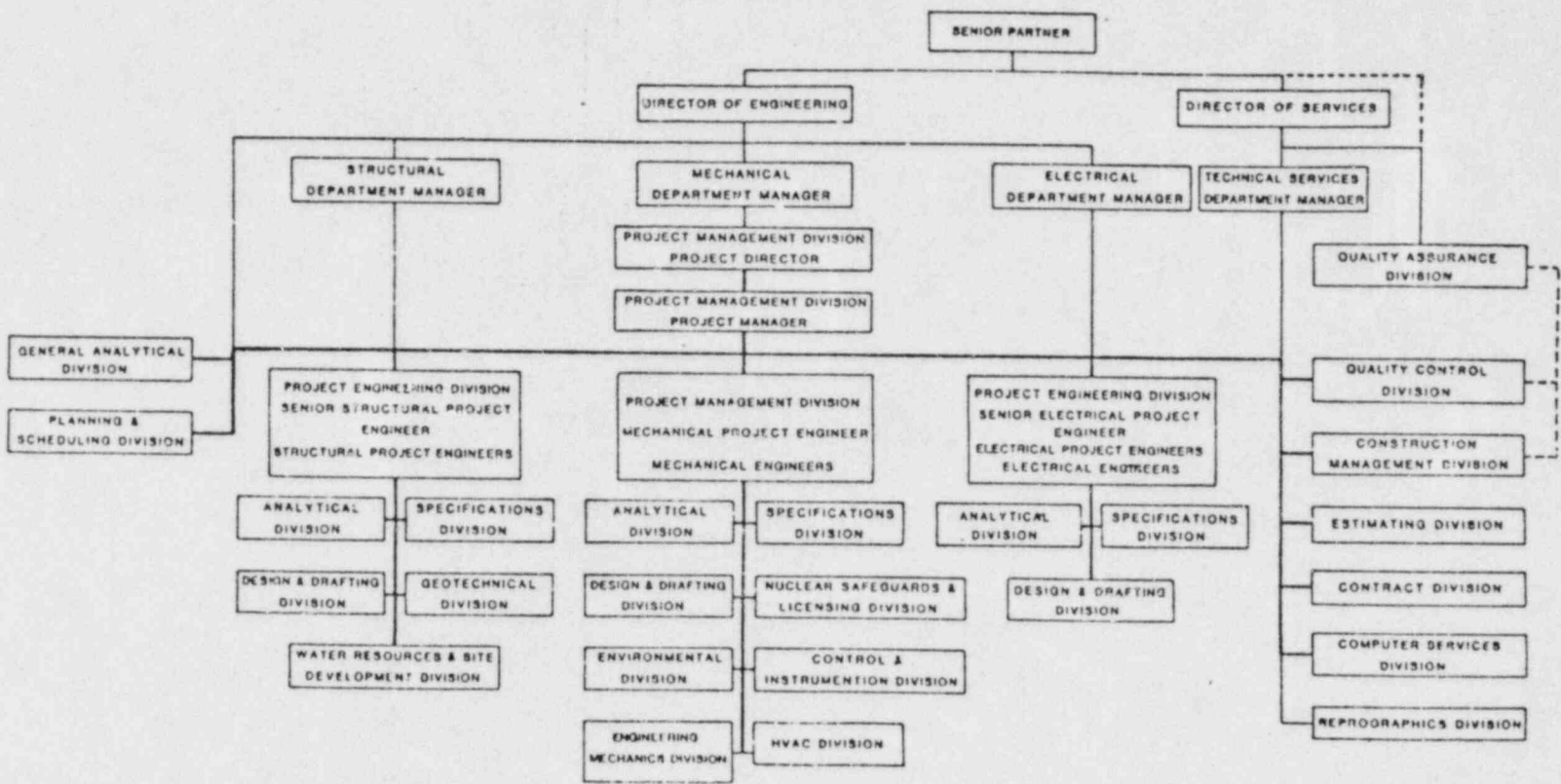
SARGENT & LUNDY
UHS PHYSICAL DESIGN
COORDINATION WITH OTHER INTERFACING ORGANIZATIONS



*Includes KG&E involvement.

Figure 4

Sargent & Lundy Typical Project Organization



LEGEND

- Administrative and/or technical responsibility
- Project coordination
- - - - Programmatic direction or QA activities

TABLE 1
Sargent & Lundy Major UHS Calculations

<u>Calculation Identification No.</u>	<u>Calculation Title</u>	<u>Issue Date</u>	<u>Revision Date</u>	<u>Comments</u>
WR-WC-UH-1	Area/Capacity of UHS	03/03/77	02/13/81	Revision based on as-built information.
WR-WC-UH-4	Loss of Capacity Due to 40 Year Sedimentation	03/03/77	---	No revision required since sedimentation is dependent on the drainage basin above the UHS which has not changed.
MAD 79-678	UHS Performance	12/28/79	10/09/81	Preliminary studies MAD 73-714, 73-806 and 74-31 preceded this design calculation. It was updated by MAD 81-566 - "UHS Performance per As-Built Area and Capacity Data".
MAD 80-503	UHS Depth Evaluation	09/09/81	---	Evaluation of as-built rock "islands" effect on heat rejection.
UHS-D-7	Seepage Through UHS Dam	05/10/75	01/22/81	Revised to add computer printout for record purposes. No update is required since confirmatory permeability tests on UHS embankment material showed that the soil parameters used in the original calculation were conservative.
UHS-2	ESWS Intake Channel New Alignment	03/14/77	01/23/81	Revision 1 added a computer printout attachment for record purposes and added calculations on slope stability for the "rapid drawdown condition" as requested by NRC questions. The calculation did not require as-built revision since confirmatory, consolidated-undrained triaxial tests on the UHS embankment materials showed that the soil parameters used in the original calculation were conservative.
UHS-2A	Stability - Weirge Method UHS Evacuation Slopes	05/04/79	---	No update was required since consolidated - undrained triaxial tests of UHS embankment materials showed that the original soil parameters used in the original calculation were conservative.

TABLE 1 Continued
Sargent & Lundy Major UHS Calculations

<u>Calculation Identification No.</u>	<u>Calculation Title</u>	<u>Issue Date</u>	<u>Revision Date</u>	<u>Comments</u>
UHS-2B	Stability - ESWS Intake Channel	04/30/79	01/25/81	Revision 1 added a computer printout attachment for record purposes. The calculation did not require as-built revision since confirmatory, consolidated-undrained triaxial tests on the UHS embankment materials showed that the soil parameters used in the original calculation were conservative.
UHSD-5	Seismic Stability of UHS Dam	06/03/75	---	No update was required since stress and strain controlled cyclic triaxial tests of UHS embankment materials showed that the original soil parameters used in the original calculation were conservative. See Note 1.
UHSD-8	Camber for UHS Dam	01/27/76	---	No update was required since no update was necessary for calculation UHSD-11.
UHSD-11	Settlement Analysis of UHS Dam	08/21/74	---	No update was required since consolidation tests of UHS embankment materials showed conservative assumptions were made in the original calculation.
HS-DY-CP1	Finite Element Representation of UHS Dam	01/10/75	---	See comment on UHSD-5. See Note 1. This calculation is representative of 6 calculations which comprise the finite element analysis of the UHS dam.
UHS-3	UHS Reservoir As-Built Excavation	06/25/80	---	Calculation was performed in support of FCRI-0539C to determine the additional excavation volume required to replace the cross-sectional volume lost by leaving the rock "islands" in the UHS basin.

Note 1. As-built seismic stability calculations were completed to identify additional margins in the UHS. Calculation results are given in FSAR Sections 2.5.6 and 3C and are evaluated in Wolf Creek SER (NUREG-0381) Section 2.5.6.

TABLE 2

UHS HEAT REJECTION ANALYSIS
S&L COORDINATION OF DESIGN BASIS DOCUMENTS WITH EXTERNAL ORGANIZATIONS

DC-UHS-01-WC	SAR 9.2.5	Correspondence (1)						
		Date	No.	From	To	Subject		
Preliminary Study Phase See Note (*2)	Preliminary	08/20/73	BLSE-104	BPC	SNUPPS	Preliminary description of Standby Service Water System for UHS studies.		
		08/29/73	BLKE-12	BPC	KGE	SNUPPS PSAR table of contents and format guide.		
		08/30/73	BLSE-119	BPC	SNUPPS	UHS criteria for multi-unit sites - 30 day cooling.		
		10/09/73	BLKE-20	BPC	KGE	Notes on meeting of 9/19/73 between BPC, S&L, and KG&E - re: division of responsibilities for PSAR sections.		
		10/17/73	BLSE-195	BPC	SNUPPS	Preliminary information on the UHS requirements for heat rejection, flow, max. inlet temp., and duration.		
		11/02/73	ALK-9	S&L	KGE	Propose max. inlet temp. of 95 instead of 85 .		
		11/06/73	ALK-17	S&L	KGE	Confirm telecon, clarification of heat rejection requirements of BLSE-195.		
		11/08/73	BLSE-237	BPC	SNUPPS	ESW System - general description of function and response to ALK-9, regarding max. inlet temp.		
		11/09/73	BLSE-240	BPC	SNUPPS	Meeting agenda - BPC, SNUPPS, Site A/E's to discuss interfaces.		
		12/11/73	ALK-66	S&L	KGE	First draft PSAR 9.2.5 for review and comment.		
		01/14/74	ALK-109	S&L	KGE	Issue draft PSAR Section 9.2.5 for review & comment.		
		01/24/74	BLSE-407	BPC	SNUPPS	Service water requirements based upon information from NSSS.		
		02/07/74	BLKE-89	BPC	S&L	Response to ALK-109 - review of draft PSAR Section 9.2.5.		
		02/14/74	BLSE-456	BPC	SNUPPS	Clarification of BLSE-407 - re: Service Water System design parameters.		
		05/23/74	BLSE-712	BPC	SNUPPS	ESW System interface with UHS - heat rejection requirements, flow rates, max. intake temp., and division of design responsibilities.		
		Draft Revision 0	Draft PSAR	06/26/74	ALK-1042	S&L	KGE	Issue DC-UHS-01-WC, draft Revision 0, for approval and summarize studies to determine size of UHS.
				07/29/74	KLA-206	KGE	S&L	Response to ALK-1042 - comments on DC-UHS-01-WC draft Revision 0.

TABLE 2 Continued

UHS HEAT REJECTION ANALYSIS
S&L COORDINATION OF DESIGN BASIS DOCUMENTS WITH EXTERNAL ORGANIZATIONS

DC-UHS-01-WC	SAR 9.2.5	Correspondence (1)				
		Date	No.	From	To	Subject
Revision 0 09/23/74 See Note (*3)		08/20/74	ALB-1006	S&L	BPC	Transmittal of UHS design heat rejection rates and request information.
		09/06/74	ALK-1078	S&L	KGE	Response to KLA-206 - summarize forthcoming revisions to DC-UHS-01-WC.
		09/24/74	ALK-1083	S&L	KGE	Issue DC-UHS-01-WC, Revision 0, for review & comment.
		10/14/74	KLA-280	KGE	S&L	Response to ALK-1083 - comments on DC-UHS-01-WC, Revision 0.
Draft Revision 1 11/03/74 See Note (*4)		11/01/74	BLKE-150	BPC	KGE	Confirming telecon, ESWS heat rejection requirements.
		11/11/74	ALK-1103	S&L	KGE	Issue DC-UHS-01-WC, draft Revision 1 for review and comment.
Revision 1 01/20/75 See Note (*5)		12/31/74	KLA-333	KGE	S&L	Response to ALK-1103 - no comments on DC-UHS-01-WC, draft Revision 1.
		05/16/75	ALB-1022	S&L	BPC	Comments and request for confirmation of heat rejection requirements defined in BLSE-712.
Revision 2 7/9/75 See Note (*6)		06/11/75	BLKE-236	BPC	KGE	Response to ALB-1022 - Revised heat rejection requirement and flow rate.
		07/11/75	ALK-1225	S&L	KGE	Issue DC-UHS-01-WC, Revision 2, for use.
		06/10/76	BLSE-3185	BPC	SNUPPS	Evaluation of impact if use mixed oxide fuel, heat discharge.
		08/24/76	BLKE-334	BPC	KGE	Confirm S&L telecon of 8/11/76 - additional heat rejection requirements if mixed oxide fuel used - S&L evaluating impact for UHS.
		09/27/78	KLA-1176	KGE	S&L	Schedule for preparation of FSAR and responsible organizations.
		04/10/79	KLA-1242	KGE	S&L	Minutes of 4/4/79 Licensing meeting and revised division of responsibilities.
Revision 3 5/10/79 See Note (*7)	Draft FSAR	05/24/79	ALK-1826	S&L	KGE	Issue DC-UHS-01-WC, Revision 3.
		08/16/79	ALK-1862	S&L	KGE	Issue draft FSAR Section 9.2.5.
		08/29/79	BLKE-522	BPC	KGE	Response to ALK-1862 - comments on draft FSAR 9.2.5.
		09/29/79	BLKE-525	BPC	KGE	Transmit ESWS figures for FSAR Section 9.2.5.

TABLE 2 Continued

UHS HEAT REJECTION ANALYSIS
S&L COORDINATION OF DESIGN BASIS DOCUMENTS WITH EXTERNAL ORGANIZATIONS

DC-UHS-01-WC	SAR 9.2.5	Correspondence (1)				
		Date	No.	From	To	Subject
		11/06/79	ALK-1898	S&L	KGE	Response to BLKE-522 - response to BPC comments and explanation of interface of FSAR data between S&L and BPC. Also contains S&L comments on SNUPPS FSAR Section 6.2.1.
		12/04/79	BLKE-556	BPC	KGE	
	FSAR Revision 0 02/19/80	12/07/79	ALK-1915	S&L	KGE	Response to ALK-1898 - comments in addition to BLKE-522 on S&L draft of FSAR 9.2.5.
		12/21/79	ALK-1920	S&L	KGE	Issue final FSAR Section 9.2.5. Issue final figures for FSAR Section 9.2.5.
	Revision 8 02/26/82	11/03/80	KWCLO-078	KGE	S&L	Transmittal of as-built UHS survey information. Results of as-built heat rejection analysis compared to design requirements, with changes to FSAR Section 9.2.5.
		11/25/81	ALK-6426	S&L	KGE	

TABLE 2 Continued

Notes

- (*1) Correspondence was also carbon-copied to the other interfacing organizations. Organization abbreviations include:
- KG&E = Kansas Gas & Electric
 - S&L = Sargent & Lundy
 - BPC = Bechtel Power Corporation
 - D/M = Dames & Moore
 - DIC = Daniel International Corporation
 - SNUPPS = SNUPPS staff
- (*2) During the initial stages of the project, many studies were performed by both Sargent & Lundy and Bechtel to define the UHS design criteria and to determine the most cost effective type of UHS (cooling tower with UHS versus cooling lake with UHS). See Table 3 for a complete list of correspondence during this initial phase of the project. After selection of a cooling lake with a submerged UHS for Wolf Creek, the design of the UHS became the responsibility of S&L; and S&L prepared DC-UHS-01-WC.
- (*3) Revision 0 of DC-UHS-01-WC incorporated KGE comments of KLA-206.
- (*4) Draft Revision 1 of DC-UHS-01-WC incorporated KGE comments of KLA-230.
- (*5) There were no changes to DC-UHS-01-WC between the draft Revision 1 and the Revision 1 which was issued for use.
- (*6) Revision 2 of DC-UHS-01-WC incorporated the changes in heat rejection rate from the SNUPPS power block and operating modes of the ESWS system; and the temperature and seepage analyses.
- (*7) Revision 3 of DC-UHS-01-WC incorporated internal S&L comments on design criteria format and safety related designators.

TABLE 3

UHS PHYSICAL DESIGN
S&L COORDINATION OF DESIGN BASIS DOCUMENTS WITH EXTERNAL ORGANIZATIONS

DC-UHS-02-WC	CORRESPONDENCE (1)				
	Date	No.	From	To	Subject
Study Phase See Note (*2)	08/16/73	BLSE-99	BPC	SNUPPS	Request input from sites regarding UHS selection - dependent upon selection of cooling tower or cooling lake. If tower, BPC design UHS; If lake, site A/E designs UHS.
	08/30/73	BLSE-119	BPC	SNUPPS	UHS criteria for multi-unit sites - 30 days cooling, two sources of water and design basis events.
	09/24/73	BLSE-154	BPC	SNUPPS	Proposed agenda - meeting between SNUPPS, BPC, and site geotechnical organizations - coordination of analytical methods, safety factors, scope of field programs.
	09/27/73	BLSE-158	BPC	SNUPPS	Final agenda for geotechnical meeting of 10/1/73.
	10/09/73	BLKE-20	BPC	KGE	Notes on meeting of 9/19/73, between BPC, S&L, and KG&E, regarding division of responsibilities for PSAR sections.
	10/25/73	BLSE-205	BPC	SNUPPS	UHS schemes - above grade cooling tower UHS basin versus below grade UHS cooling tower basin.
	10/26/73	ALK-5	S&L	KGE	Proposed breakdown for PSAR Section 3.8.4.8, "Essential Cooling Pond."
	11/05/73	ALK-12	S&L	KGE	Forthcoming meeting - SNUPPS, Bechtel, and site A/E's to discuss UHS Slope Stability Analysis, so that all UHS designs have comparable level of analysis.
	11/06/73	ALK-18	S&L	KGE	UHS schemes - with cooling tower versus with cooling lake.
	11/06/73	BLSE-230	BPC	SNUPPS	Notes of meeting of 10/1/73, and request another meeting among SNUPPS, BPC, and site A/E's and geotechnical consultants to continue coordination and standardization of geotechnical methodology.
	11/06/73	BLKE-31	BPC	KGE	Response to ALK-5, Review of draft PSAR Section 3.8.4.8.
	11/08/73	BLKE-32	BPC	KGE	Submittal date for draft PSAR on UHS.
	11/08/73	BLSE-235	BPC	KGE	Proposed agenda for geotechnical meeting on 11/4/73.
	11/09/73	BLSE-241	BPC	SNUPPS	Transmit standardized and coordinated geotechnical criteria for review prior to meeting of 11/14/73.
	11/12/73	ALK-26	S&L	KGE	UHS schemes - with cooling tower or with cooling lake, plus cost estimates for design/construction to site specific SSE versus SNUPPS SSE.

TABLE 3 Continued

UHS PHYSICAL DESIGN
S&L COORDINATION OF DESIGN BASIS DOCUMENTS WITH EXTERNAL ORGANIZATIONS

DC-UHS-02-WC	CORRESPONDENCE				
	Date	No.	From	To	Subject
	11/20/73	BLSE-264	BPC	SNUPPS	Notes from geotechnical meeting of 11/14/73 - Standardized geotechnical criteria.
	11/23/73	ALK-42	S&L	KGE	Transmit table on seismic category and quality group classifications.
	12/12/73	BLKE-44	BPC	KGE	BPC comments on ALK-42, Seismic Category and Quality Group Classification Table.
	12/21/73	BLKE-49	BPC	KGE	Draft PSAR Section 2.4.11.5.
	01/07/74	BLKE-53	BPC	KGE	Section 2.4 PSAR.
	01/15/74	ALK-116	S&L	KGE	First draft PSAR Section 2.5.5 for review and comment.
	02/01/74	BLSE-432	BPC	SNUPPS	Resolution of comments, and revision to the meeting notes and criteria of BLSE-264.
	02/25/74	BLKE-92	BPC	KGE	Confirming telecon - resolution of comments on ALK-116.
	07/09/74	ALK-1053	S&L	KGE	Meeting notes - UHS design review.
Revision 1 7/16/74	07/16/74	ALK-3028	S&L	KGE	Issue DC-UHS-02-WC, Revision 1, for review and comment.
	08/14/74	KLA-230	KGE	S&L	Response to ALK-3028, comments on DC-UHS-02-WC, Revision 1.
	08/27/74	BLKE-126	BPC	KGE	Response to ALK-1053, safety factor for slope stability analysis and separation of structures between nuclear plant units.
Revision 2 9/20/74 See Note (*3)	11/22/74	DMLK-194	D/M	S&L	Coordinate revisions to PSAR, Chapter 2.
Revision 3 12/6/74 See Note (*4)	01/14/75	ALK-3080	S&L	KGE	Issue DC-UHS-02-WC, Revision 3, for review and comment.
	02/27/75	KLA-382	KGE	S&L	Response to ALK-3080, comments on DC-UHS-02-WC, Revision 3.
	04/28/75	ALDM-3034	S&L	D/M	Issue draft of response to NRC question 323.30W and seismic stability analysis of UHS for review and comment.
	04/30/75	DMLK-279	D/M	S&L	Response to ALDM-3034, comments on draft response to NRC question 323.30W, dynamic analysis UHS Dam.
	05/07/75	ALDM-3035	S&L	D/M	Response to DMLK-279, resolution of comments on draft response to NRC question 323.30W.
	05/16/75	DMLK-288	D/M	BPC/S&L	Site specific SSE is revised to 0.12 g.
	08/11/75	DMLK-309	D/M	KGE	Confirming telecons to S&L and BPC - SSE load to be applied at the base of the foundation.

TABLE 3 Continued

UHS PHYSICAL DESIGN
S&L COORDINATION OF DESIGN BASIS DOCUMENTS WITH EXTERNAL ORGANIZATIONS

DC-UHS-02-WC	CORRESPONDENCE (1)				
	Date	No.	From	To	Subject
Revision 4 10/22/75 See Note (*5)	10/23/75	ALK-3144	S&L	KGE	Issue DC-UHS-02-WC, Revision 4, for use.
	09/27/78	KLA-1176	KGE	S&L	Schedule for preparation of FSAR document with responsible organizations.
	04/10/79	KLA-1242	KGE	S&L	Minutes of 4/4/79 Licensing meeting with revised division of responsibilities.
Revision 5 7/26/79 See Note (*6)	07/31/79	ALK-3447	S&L	KGE	Issue DC-UHS-02-WC, Revision 5, for record purposes.
	12/03/79	DMLK-603	D/M	KGE	Issue first draft of FSAR Sections 2.5.4, 2.5.5, and 2.5.6.

TABLE 3 Continued

UHS PHYSICAL DESIGN
S&L COORDINATION OF DESIGN BASIS DOCUMENTS WITH EXTERNAL ORGANIZATIONSNotes

- (*1) See Note 1 of Table 2.
- (*2) During the initial stages of the project, many studies were performed by both S&L and Bechtel to define the UHS design criteria and to determine the most cost effective type of UHS (cooling tower with UHS versus cooling lake with UHS). After the selection of a cooling lake with submerged UHS for Wolf Creek, the design of the UHS became the responsibility of S&L; and S&L prepared Design Criteria DC-UHS-02-WC, Revision 1.
- (*3) Revision 2 of DC-UHS-02-WC incorporated comments from Sargent & Lundy's QA Division, and comments from KG&E, KLA-230, and was issued for internal Sargent & Lundy comments only.
- (*4) Revision 3 of DC-UHS-02-WC incorporated comments from Sargent & Lundy's internal review of Revision 2, and added the finite element analysis method to evaluate seismic stability, as a result of comments from the NRC.
- (*5) Revision 4 of DC-UHS-02-WC incorporated revisions to safety factors for rapid drawdown and steady state analysis (as a result of NRC comments); revised the SSE from 0.1 g. to 0.12 g.; added applicability of tornado induced wave action, and added additional dynamic soil tests.
- (*6) Revision 5 of DC-UHS-02-WC incorporated criteria for analysis of the UHS dam slope protection, as a result of a KGE audit.

TABLE 4

UHS PHYSICAL DESIGN DEVELOPMENT COORDINATION
CORRESPONDENCE BETWEEN SARGENT & LUNDY AND BECHTEL (1)

Date	Number	From	To	Subject
11/27/73	ALK-43	S&L	KGE	Transmit to Bechtel - drawing SK-11173-1, UHS boring location plan.
01/14/74	BLKE-59	BPC	KGE	Probable maximum wave run-up.
01/16/74	BLKE-63	BPC	KGE	Transmit sketches of ESW Pumpouse intake bay.
07/31/74	BLKE-118	BPC	KGE	Transmit drawings of ESW Pumpouse.
08/27/74	BLKE-126	BPC	KGE	Response to ALK-1053, safety factor for slope stability analysis and separation of structures between nuclear plant units.
08/29/74	BLKE-127	BPC	KGE	Routing of ESWS pipes, including discharge pipes to UHS.
09/11/74	BLKE-131	BPC	KGE	Coordinates for the ESWS Discharge Structure.
09/13/74	BLKE-131	BPC	KGE	Transmit preliminary ESWS Pumpouse general arrangement drawings M-1G080, Revision A, and M-1G081, Revision A.
10/28/74	BLKE-147	BPC	KGE	Confirm telecon, elevation of UHS intake with maximum silt level.
10/30/74	ALB-3003	S&L	BPC	Confirm bottom elevation for UHS intake channel.
11/19/74	BLKE-156	BPC	KGE	Transmittal of sketches SK-C-133, Revision A, and SK-C-175, Revision A.
02/21/75	KLB-090	KGE	BPC	ESWS Discharge Structure.
03/03/75	BLKE-191	BPC	KGE	Transmit preliminary sketches of ESWS Discharge Structure.
03/17/75	ALB-3007	S&L	BPC	Response to BLKE-191, comments and proposed new location for ESWS Discharge Structure.
03/21/75	BLKE-204	BPC	KGE	Response to KLB-090, transmittal of sketches on ESWS Discharge Structure and confirming telecon to resolve alternate location for ESWS Discharge Structure.
04/03/75	BLKE-212	BPC	KGE	ESWS Discharge Structure.
04/09/75	ALB-3011	S&L	BPC	Response to BLKE-204, Comments on ESWS Discharge Structure.
05/22/75	BLKE-225	BPC	KGE	Transmittal of preliminary drawings M-1G080, Revision B, and M-1G081, Revision B.
08/14/75	BLKE-253	BPC	KGE	Confirming telecons for weeks of 7/14/75 through 7/28/75 - UHS intake channel at ESWS Pumpouse and location coordinates for ESWS Pumpouse.
09/16/75	BLKE-261	BPC	KGE	Request that KGE authorize a study to determine probability of frazil ice formation in cooling lake, UHS.
10/17/75	BLKE-2385	BPC	KGE	Confirming telecons for weeks of 9/29/75 through 10/6/75 - Unit 2 ESWS Pumpouse alternatives and frazil ice study.
01/16/76	BLKE-287	BPC	KGE	Confirming telecon - BPC is authorized to proceed with study to determine if frazil ice could form in UHS area lake.
01/26/76	ALB-3020	S&L	BPC	Transmittal of draft drawing S-80 dated 1/15/76, UHS layout.

TABLE 4 Continued

UHS PHYSICAL DESIGN DEVELOPMENT COORDINATION
CORRESPONDENCE BETWEEN SARGENT & LUNDY AND BECHTEL (1)

Date	Number	From	To	Subject
03/29/76	BLKE-302	BPC	KGE	Confirming telecons for weeks of 3/8/76 through 3/15/76 - retaining walls at ESWS Pumphouse and confirmed receipt and discussion of telecopied sketch on alternate intake channel grading at ESWS pumphouse.
04/01/76	BLKE-303	BPC	KGE	Response to BLKE-287 - Transmittal of report "Frazil ice formation in UHS" and additional study required to determine width intake channel.
04/14/76	BLKE-306	BPC	KGE	Confirming telecons for weeks of 3/22/76 through 3/29/76 - retaining walls at ESWS Pumphouse intake; frazil ice study, development of ice in lake; and minimum lake (UHS) level.
04/23/76	BLKE-309	BPC	KGE	Confirming telecons for weeks of 4/5 through 4/12 - grading and retaining walls at ESWS Pumphouse intake; and five foot berm on UHS intake channel to prevent ice blockage.
04/27/76	BLKE-310	BPC	KGE	Notes on meeting of 3/29/76 regarding frazil ice and ice blockage.
06/02/76	ALK-3201	S&L	KGE	Request additional justification for widening UHS intake channel bench.
08/23/76	BLKE-329	BPC	KGE	Summary and recommendation of study - ice prevention in ESWS Pumphouse intake and UHS intake channel.
08/24/76	BLKE-334	BPC	KGE	Confirming telecons for weeks of 8/2/76 through 8/9/76 - frazil ice and ice blockage in UHS intake channel.
10/04/76	BLKE-337	BPC	KGE	Confirming telecons for weeks of 9/13/76 through 9/20/76 - relocation of ESWS Pumphouse and BPC process for review of S&L drawings.
11/12/76	ALB-3028	S&L	BPC	Transmittal of preliminary drawing S-80, Revision A.
11/23/76	ALB-3029	S&L	BPC	Transmittal of preliminary drawing S-184, Revision B.
11/30/76	BLKE-344	BPC	KGE	Confirming telecons for weeks of 10/25/76 through 11/8/76 - design for Unit 2 ESWS Pumphouse; agenda for 11/6/76 meeting. Request information for design of ESWS Discharge Structure.
12/03/76	BLKE-346	BPC	KGE	Confirming telecons for weeks of 11/15/76 through 11/22/76 - BPC comments on review of S&L drawings S-80, Revision A, and S-184, Revision B.
12/08/76	BLKE-347	BPC	KGE	Notes on meeting of 11/16/76 - ESWS Pumphouse relocation.
02/15/77	ALB-3030	S&L	BPC	Transmittal of drawings S-80, Revision B, and S-184, Revision C.
02/23/77	ALB-3031	S&L	BPC	Request additional information regarding ESWS Pumphouse and Discharge Structure.
04/19/77	BSTP	BPC	S&L	BPC comments on S&L drawing S-80, Revision B.
04/26/77	ALB-3036	S&L	BPC	Transmittal of sketches of UHS with field survey spot elevations for routing of ESWS Discharge pipes, drawings S-82 and S-83.
05/16/77	BSTP 6083	BPC	S&L	BPC acknowledge receipt of S&L drawings S-82 and S-83, with no comments.

TABLE 4 Continued

UHS PHYSICAL DESIGN DEVELOPMENT COORDINATION
CORRESPONDENCE BETWEEN SARGENT & LUNDY AND BECHTEL (1)

Date	Number	From	To	Subject
02/07/78	BDKE-095	BPC	Vendor	Transmittal of drawing C-KC-304, Revision 1.
03/14/78	ALK-3347	S&L	KGE	Confirming January engineering meeting - UHS intake channel with layout for future Unit 2 ESWS Pumpouse.
08/08/78	ALB-3042	S&L	BPC	Transmittal of UHS drawings S-80, Revision D; S-81, Revision C; S-184, Revision E; S-181, Revision J and S-182, Revision D.
02/23/79	BSTP	BPC	S&L	BPC comments on S&L drawings S-80, Revision D and S-81, Revision C.
01/03/80	BDKE-255	BPC	Vendor	Transmittal of drawings C-KC 303, Revision 4; C-KC 305, Revision 5; and C-KC 306, Revision 5.
02/12/80	BDKE-263	BPC	Vendor	Transmittal of drawings C-KC 301, Revision 5 and C-KC 302, Revision 4.
03/11/80	ALK-3492	S&L	KGE	Transmittal of drawing S-80, Revision F.
06/05/80	BDKE-300	BPC	Vendor	Transmittal of drawings C-KC 302, Revision 5; C-KC 303, Revision 5; C-KC 305, Revision 6; and C-KC 306, Revision 6.
06/05/80	BDKE-298	BPC	Vendor	Transmittal of drawing C-KC 301, Revision 1.
12/03/80	BDKE-362	BPC	Vendor	Transmittal of drawings C-KC 303, Revision 6; and C-KC 305, Revision 7.
02/20/81	ALB-3043	S&L	BPC	Transmittal of UHS drawings S-80, Revision K; S-81, Revision F; S-180, Revision E; S-181, Revision L; S-182, Revision E; and S-184, Revision J.
04/27/81	BDKE-412	BPC	Vendor	Transmittal of drawing C-KC 305, Revision 8.
06/09/81	BSTP-26203	BPC	S&L	BPC acknowledge receipt of drawings S-80, Revision K; S-81, Revision F; and S-184, Revision J, with no comments.
10/16/82	BDKE-515	BPC	Vendor	Transmittal of drawing C-KC 305, Revision 9.
04/20/82	BDKE-0637	BPC	Vendor	Transmittal of drawing C-KC-303, Revision 7.
05/05/82	BDKE-0650	BPC	Vendor	Transmittal of drawing C-KC-305, Revision 10.

Note 1: See Note 1 of Table 2.

TABLE 5

UHS PHYSICAL DESIGN COORDINATION CORRESPONDENCE
BETWEEN SARGENT & LUNDY AND DAMES & MOORE (1)

Date	Number	From	To	Subject
11/02/73	ALK-10	S&L	KGE	Boring locations for UHS soil investigation.
11/06/73	ALK-21	S&L	KGE	Retransmit UHS boring locations.
11/07/73	ALK-22	S&L	KGE	Transmit drawing SK-11173-1 - UHS boring location plan.
11/15/73	None	D/M	S&L	Confirming meeting - lab tests to be performed on UHS test pit bulk samples.
12/05/73	None	D/M	S&L	Preliminary results from tests on UHS test pit bulk samples.
12/14/73	ALK-71	S&L	KGE	Transmit revision to drawing SK-11173-1, UHS boring location plan.
01/11/74	None	D/M	S&L	Preliminary results of dynamic testing of proposed UHS embankment soils.
06/21/74	None	D/M	S&L	Representative soil properties for design analysis.
06/26/74	None	D/M	S&L	Issue draft report, "Geotechnical Investigation - UHS Reservoir and Dam," for review and comment.
07/30/74	DMLK-131	D/M	S&L	UHS, HS-series soil boring program.
08/06/74	None-Meeting	S&L	D/M	Resolve comments on draft "Geotechnical Investigation Report - UHS."
08/08/74	ALDM-3000	S&L	D/M	Soil testing requirements, ESW piping and UHS.
10/02/74	DMLK-158	D/M	S&L	Confirm telecon - comment on ESW and UHS borings, with resolution.
10/02/74	DMLK-159	D/M	S&L	As-drilled coordinates for ESW and UHS borings.
10/14/74	ALDM-3012	S&L	D/M	Response to DMLK-159, concur with location for as-drilled borings.
12/03/74	DMLK-197	D/M	S&L	Confirm meeting, D/M is to develop stress controlled dynamic triaxial tests.
12/09/74	DMLK-205	D/M	S&L	Preliminary data from dynamic triaxial tests.
12/20/74	DMLK-218	D/M	S&L	Data from dynamic triaxial tests.
01/02/75	DMLK-223	D/M	S&L	Data from dynamic triaxial tests.
01/29/75	DMLK-235	D/M	S&L	Issue draft results of stress controlled dynamic triaxial tests.
01/30/75	DMLK-236	D/M	S&L	Additional information to clarify DMLK-235.
04/01/75	DMLK-266	D/M	S&L	As tested coordinates and elevations for UHS test pits and borings.
04/22/75	DMLK-278	D/M	S&L	Preliminary data - stress controlled dynamic triaxial tests.
04/28/75	DMLK-	D/M	S&L	Report - results of stress controlled dynamic triaxial tests.
05/07/75	ALDM-3035	S&L	D/M	Response to DMLK-235 - comments on report on stress controlled dynamic triaxial test results and interpretation of results.
07/29/75	DMLK-304	D/M	S&L	Confirm meeting - resolution of comments from ALDM-3035 regarding stress controlled dynamic triaxial tests.
10/14/76	None	D/M	S&L	Issue final report "Geotechnical Investigation, Category I Pond and Dam, Ultimate Heat Sink."

TABLE 5 Continued

UHS PHYSICAL DESIGN COORDINATION CORRESPONDENCE
BETWEEN SARGENT & LUNDY AND DAMES & MOORE (1)

Date	Number	From	To	Subject
04/27/79	DMLK-509	D/M	S&L	Summary of Reg. Guide 1.70 requirements, with proposed instrumentation and sampling and request requirements for UHS embankment test program.
05/30/79	ALDM-3059	S&L	D/M	Response to DMLK-509 - Sample and test program requirements for undisturbed samples from UHS dam embankment to verify soil properties.
08/02/79	DMLK-555	D/M	S&L	Dispersive characteristics of borrow material from UHS Dam.
04/18/80	ALDM-3062	S&L	D/M	Response to DMLK-555 - perform additional tests on as-placed UHS dam embankment material.
04/23/80	DMLK-625	D/M	KGE	Response to ALDM-3052 - confirming that additional soils tests will be performed.
04/30/80	DMLK-626	D/M	KGE	Proposed procedure for filling/inspection of UHS Dam for review and comment.
05/12/80	DMLK-628	D/M	Sherard	Request Sherard to assess impact of dispersive type clays in UHS dam.
05/16/80	None	Sherard	D/M	Response to DMLK-628 - opinion on dispersive soils in UHS dam.
06/03/80	ALK-3542	S&L	KGE	UHS dam - dispersive characteristics.
06/03/80	ALK-3543	S&L	KGE	Revised UHS fill/inspection procedure.
07/23/80	DMLK-649	D/M	S&L	Response to ALDM-3052, results of dispersive tests on UHS embankment soils.
09/26/80	DMLK-667	D/M	S&L	Report - results of confirmatory tests on material from UHS embankment.

Note 1: See Note 1 of Table 2.

TABLE 6

SARGENT & LUNDY COORDINATION OF REPORT
ENGINEERING DATA COMPILATION

Report A-3831	Correspondence				
	Date	Number	From	To	Subject
Draft 1	10/14/76	None	D/M	S&L	Issue final report, "Geotechnical Investigation, Category I Pond and Dam, Ultimate Heat Sink."
	07/31/79	ALK-3447	S&L	KGE	Design Criteria DC-UHS-02-WC, Revision 5.
	01/30/80	ALK-3477	S&L	KGE	Issue draft Report, "Engineering Data Compilation for Water Control Structures at Wolf Creek Lake" for review and comment.
	03/05/80	KNLA-003	KGE	S&L	Response to ALK-3477 comments on engineering data compilation report.
	03/11/80	DMLK-620	D/M	S&L	Comments on draft report on engineering data compilation.
	06/06/80	FCR 1-0539C	DIC	S&L	Additional excavation in UHS to leave "rock islands."
	09/26/80	DMLK-667	D/M	S&L	Report - results of confirmatory tests on material from UHS embankment.
	11/03/80	KWCLO-078	KGE	S&L	Transmittal of as-built UHS survey information.
	01/26/81	ALDM-3065	S&L	D/M	Response to DMLK-620, confirming that D/M comments will be incorporated into report.
	02/04/81	CLKWC-328	DIC	KGE	Transmittal of all lake work cross-section drawings.
Final	04/03/81	None	S&L	KGE	Issue final Report A-3831, "Engineering Data Compilation for Water Control Structures."
	01/26/81	ALK-3658	S&L	KGE	Response to KNLA-003 - resolution of comments on "Engineering Data Compilation for Water Control Structures".

Note 1: See Note 1 of Table 2

TABLE 7
 SUMMARY OF INTEROFFICE MEMORANDA
 INTERDIVISIONAL INTERFACE OF DESIGN INPUT INFORMATION

Design Input	Interoffice Memorandum (1)			
	Date	From: Div/Individual	To: Div/Individual	Description
1. Design Weather Conditions	7/31/73	ENVD/Pocalujka	MAD/Baschiere	Met. data for Lake/UHS
	8/01/73	ENVD/Nicholas	MAD/Baschiere	Met. station data for Lake/UHS
	8/08/73	ENVD/Pocalujka	MAD/Baschiere	Order met. data from Weather Records Center
	8/09/73	MAD/Warren	ENVD/Pocalujka	Ordering met. data
2. UHS Seepage Rate	5/15/75	GTD/Ramanujam	SPED/Kutin	Seepage rate through UHS Dam
3. Heat Rejection Analysis	9/15/75	MAD/Rozman	PMD/Spakoski	Results of study - inlet/outlet temperature and average depth
	9/21/76	MAD/Rozman	PMD/Spakoski	Results of re-evaluation of UHS heat rejection given fuel change.
	2/01/79	MPED/Rohwer	MAD/Yee	Request analysis of UHS drawdown
	12/27/79	MAD/Yee	PMD/Millendore	Results of UHS heat rejection analysis based upon revised heat curves from Bechtel
	1/19/80	MAD/Ardiga	MAD/File	Lake performance sensitivity - maximum lake temperature. This material was incorporated into the Environmental Report.
	8/24/81	MAD/Yee	PMD/Peterson	Results of the calculation on UHS depth - as-built rock islands
	9/14/81	MAD/Yee	PMD/Peterson	Results of calculation - as-built UHS heat rejection

TABLE 7 Continued
SUMMARY OF INTEROFFICE MEMORANDA
INTERDIVISIONAL INTERFACE OF DESIGN INPUT INFORMATION

Design Input	Interoffice Memorandum (1)			
	Date	From: Div/Individual	To: Div/Individual	Description
4. UHS Area/Capacity	5/10/83	MAD/Yee	PMD/Peterson	UHS heat rejection - performance sensitivity given postulated UHS Dam settlement
	7/26/78	SPED/Kutin	WRSDD/Bhamidipaty & GTD/Nelson	Review potential for ice build-up per IE Circular & KLA-1151
	8/10/78	WRSDD/Komanduri	SPED/Kutin	Results of evaluation on potential for ice build-up in UHS
5. Effect of Main Dam Failure on UHS	2/27/81	WRSDD/Komanduri	PMD/Peterson	Results of the calc. - as-built UHS Area/Capacity
	11/12/74	WRSDD/Gopalacharya	SPED/Kutin	Effects of Main Dam failure on UHS
6. Lab Test Recommendations	1/03/74	ESD/Dhavalala	ESD/File	Lab testing for UHS soils
7. UHS Physical Design	11/09/73	GTD/Holish	SPED/Kutin	Preliminary design scope and design criteria for UHS
	7/11/74	GTD/Kocunik	SPED/Kutin	Results of calc. for design of UHS riprap
	5/01/75	GTD/Ramanujan	SPED/Kutin	Results of dynamic triaxial tests
	5/07/75	GTD/Ramanujan	SPED/Kutin	Confirming that the UHS stability analyses will be revised to incorporate an SSE = 0.12g
	9/18/79	GTD/Nelson	SPED/Kutin	UHS dam - camber requirements
	1/18/80	GTD/Nelson	SPED/Kutin	Dispersion potential in UHS embankment

TABLE 7 Continued
 SUMMARY OF INTEROFFICE MEMORANDA
 INTERDIVISIONAL INTERFACE OF DESIGN INPUT INFORMATION

Design Input	Interoffice Memorandum (1)			
	Date	From: Div/Individual	To: Div/Individual	Description
	06/16/80	GTD/Nelson	SPED/Kutin	Results of calculation on additional excavation to support FCR 1-0539-C
	11/17/80	GTD/Nelson	SPED/Kutin	Dispersion potential in UHS dam soils
	11/26/80	GTD/Nelson	SPED/Kutin	Evaluation of the results of the confirmatory UHS soil tests
	12/02/80	GTD/Nelson	GTD/File	Evaluation of the shear modulus
	06/16/81	GTD/Nelson	SPED/Kutin	Results of evaluation of as-built UHS dam elevations

Note 1. Definition of division abbreviations:

SPED = Structural Project Engineering Division
 PMD = Project Management Division
 GTD = Geotechnical Division
 QAD = Quality Assurance Division
 SAD = Structural Analytical Division
 WRSDD = Water Resources and Site Development Division
 SED-S = Structural Engineering Division - Structures
 EPED = Electrical Project Engineering Division
 MAD = Mechanical Analytical Division
 ENVD = Environmental Division
 MPED = Mechanical Project Engineering Division (Now the Project Management Division - PMD)
 ESD = Earth Sciences Division
 Partner = S&L Partner

TABLE 8
Summary of Interdivisional Review and Comment
On Design Criteria DC-UHS-02-WC (7)

Revision		Revision Description	Issued for Interdivisional Review Via Memo			Review Comments
No.	Date		Dated	From: Division/Name	To: Division/Name	
I.	7/16/74	First draft for review & comment issued internally and externally	7/01/74	GTD/Holish	SPED/Kutin	Returned w/o comments
					SPED/McLaughlin	Returned w/o comments
					PMD/Spakoski PMD/Goldlust	Returned with comments; comments resolved before 7/16/74 issue date
					GTD/Steinback	Returned w/o comments
II.	9/20/74	Incorporated QAD and KGE comments including the addition of a summary sheet, cross-reference to DC-UHS-01-WC and the safety classification. Issued for internal comment only.	9/20/74	GTD/Holish	For QAD review, see Note 1.	
					SPED/Kutin	
					SPED/McLaughlin	Returned w/o comments
					PMD/Spakoski PMD/Goldlust	Returned with comments
III.	12/06/74	Incorporated internal comments from Revision 2 issue, and added finite element analysis method to evaluate seismic stability.	12/04/74	GTD/Holish	QAD/Gillis	Comments; See Note 2
					SPED/Kutin	Returned with comments
					SPED/McLaughlin	Returned with comments

TABLE 8 Continued
 Summary of Interdivisional Review and Comment
 On Design Criteria DC-UHS-02-WC (7)

Revision		Revision Description	Issued for Interdivisional Review Via Memo			Review Comments
No.	Date		Dated	From: Division/Name	To: Division/Name	
					PMD/Spakoski	Returned with comments and memo; See Note 4
					PMD/Goldlust	Returned w/o comments
					GTD/Steinbach	
					QAD/Gillis	Format comments; See Note 3
IV.	10/22/75	Revised to incorporate comments on Revision III and to reflect additional dynamic analysis.	4/17/75	GTD/Nelson	SAD/Chu	Returned with comments; See Note 6
			9/05/75	GTD/Nelson	PMD/Spakoski	Returned w/o comment
					SPED/McLaughlin	Returned w/o comment
					SPED/Kutin	Returned with comment
					SAD/Chu	Returned with comments; See Note 5
					QAD/Gillis	
					WRSDD/Annambhotla	Returned with comments
					GTD/Holish	Returned w/o comment
V.	7/26/79	Revised to add slope protection, UHS dam, per KGE audit	8/09/78	GTD/Nelson	SPED/Kutin, Shires	Returned w/o comment

TABLE 8 Continued
 Summary of Interdivisional Review and Comment
 On Design Criteria DC-UHS-02-WC (7)

Revision		Revision Description	Issued for Interdivisional Review Via Memo			Review Comments
No.	Date		Dated	From: Division/Name	To: Division/Name	
					PMD/Spakoski	
					EPED/Feyen	Returned w/o comment
					SED-S/Kazni	Returned w/o comment
					WRSDD/Talukder	Returned w/o comment
					QAD/Villasenor	Returned w/o comment

Notes:

1. A copy of Revision I of the Design Criteria was transmitted to QAD at the time of formal release for use. Comments on Design Criteria documentation of issue and sign-offs were transmitted via interoffice memorandum dated 8/29/74 from Tella/QAD to Kutin/SPED. Comments were incorporated into revision II of DC-UHS-02-WC. After this Revision I issue, QAD was placed on controlled distribution for interdivisional review and comment on draft revisions prior to release for use.
2. Comments on Design Criteria format were transmitted via interoffice memorandum dated 9/26/74 from Tella/QAD to Holish/GTD.
3. Comments on format were transmitted via interoffice memorandum dated 3/04/75 from Tella/QAD to Holish/GTD.
4. Additional comments were returned via interoffice memorandum from Spakoski/PMD to Kutin/SPED after review of the final Revision III was released for use.
5. Comments transmitted via interoffice memorandum dated 9/12/75 from Huang/SAD to Nelson/GTD.
6. Comments transmitted via interoffice memorandum dated 4/25/75 from Huang/SAD to Nelson/GTD. Comments resolved in meeting of 4/24/75.
7. See Note 1 of Table 7.

TABLE 9
Examples of Controlled Interoffice
Distribution of Design Documents

Interoffice Memorandum (1)			
Date	From: Div/Individual	To: Div/Individual	Transmittal of:
6/18/75	PMD/Spakoski	PMD/Goldlust MAD/Aschoff ENVD/Mehta NSLD/Crass EPED/Clark SPED/McLaughlin SPED/Kurtin SAD/Chu GTD/Holish WRSDD/Annambhotla /Martin MPED/Rohwer GTD/Nelson SDD/Bandyopadhyay ADD/Gerlach	DC-UHS-01-WC, Revision 2
5/24/79	PMD/Rohwer	EPED/Clark SPED/Shires MAD/Werhane NSLD/Dunn SAD/Kao SPED/Kutin ENVD/Mehta PMD/Millendore GTD/Nelson WRSDD/Pahati QAD/Skale CMD/Yesensky	DC-UHS-01-WC, Revision 3
8/21/79	SPED/Kutin	MPED/Rohwer EPED/Clark & Feyen SPED/Shires SED-S/Kazmi ENVD/Mehta NSLD/Dunn SAD/Kao HVACD/Ornberg QAD/Talamo & Villasenor GTD/Nelson WRSDD/Pahati QCD/Kurtz QAD/Skale	DC-UHS-02-WC, Revision 5

Note 1: See Note 1 of Table 7.