

August 12, 1994

Docket No. STN 50-529

503

Mr. William L. Stewart
Executive Vice President, Nuclear
Arizona Public Service Company
Post Office Box 53999
Phoenix, Arizona 85072-3999

Dear Mr. Stewart:

SUBJECT: ISSUANCE OF AMENDMENTS FOR THE PALO VERDE NUCLEAR GENERATING STATION
UNIT NO. 2 (TAC NO. M89800)

The Commission has issued the enclosed Amendment No. 65 to Facility Operating License No. NPF-51 for the Palo Verde Nuclear Generating Station, Unit No. 2. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated July 1, 1994, as supplemented by letter dated August 11, 1994.

The proposed amendment changes the minimum cold-leg temperature for core power levels between 90% and 100% to 552 °F for Unit 2 (which is a reduction of 10 °F from the previous TS requirement). This TS change permits reactor operation at full power with a lower reactor coolant temperature to minimize potential steam generator tube degradation. The cold-leg temperature reduction at power levels above 90% was previously granted for Units 1 and 3 by letter dated June 7, 1994.

A copy of the related Safety Evaluation is also enclosed. A notice of issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

Original signed by:
Brian E. Holian, Senior Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 65 to NPF-51
- 2. Safety Evaluation

cc w/enclosures:
See next page

DISTRIBUTION

Docket File

EAdensam
DHagan, T4A43
OPA, 02G5
JRoe
TQuay
CGrimes, 011E22
Region IV
LTran

NRC & Local PDRs
DFoster-Curseen
GHill (2), T5C3
OC/LFDCB, T9E10
PDIV-2/RF
OGC, 015B18
ACRS (10), TWFN
BHolian
KPerkins, WCFO

*See Previous Sheet for Concurrence

OFC	PDIV-2/DRPW <i>JC</i>	PDIV-2/PM	PDIV-2/PM	SRXB*	OGC*	PDIV-2/D
NAME	DFoster-Curseen	LTran <i>Beh</i>	BHolian:pk <i>Beh</i>	BJones	MYoung	TQuay <i>TRC</i>
DATE	8/12/94	8/12/94	8/12/94	8/8/94	8/11/94	8/12/94

OFFICIAL RECORD COPY

DOCUMENT NAME: PV289800.AMD

220718
9408240163 940812
PDR ADOCK 05000529
P PDR

FILE CENTER COPY

DFD
CP-1

August 12, 1994

Docket No. STN 50-529

Mr. William L. Stewart
Executive Vice President, Nuclear
Arizona Public Service Company
Post Office Box 53999
Phoenix, Arizona 85072-3999

Dear Mr. Stewart:

SUBJECT: ISSUANCE OF AMENDMENTS FOR THE PALO VERDE NUCLEAR GENERATING STATION
UNIT NO. 2 (TAC NO. M89800)

The Commission has issued the enclosed Amendment No. 65 to Facility Operating License No. NPF-51 for the Palo Verde Nuclear Generating Station, Unit No. 2. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated July 1, 1994, as supplemented by letter dated August 11, 1994.

The proposed amendment changes the minimum cold-leg temperature for core power levels between 90% and 100% to 552 °F for Unit 2 (which is a reduction of 10 °F from the previous TS requirement). This TS change permits reactor operation at full power with a lower reactor coolant temperature to minimize potential steam generator tube degradation. The cold-leg temperature reduction at power levels above 90% was previously granted for Units 1 and 3 by letter dated June 7, 1994.

A copy of the related Safety Evaluation is also enclosed. A notice of issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

Original signed by:
Brian E. Holian, Senior Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 65 to NPF-51
- 2. Safety Evaluation

cc w/enclosures:
See next page

DISTRIBUTION

Docket File	NRC & Local PDRs
EAdensam	DFoster-Curseen
DHagan, T4A43	GHill (2), T5C3
OPA, O2G5	OC/LFDCB, T9E10
JRoe	PDIV-2/RF
TQuay	OGC, 015B18
CGrimes, 011E22	ACRS (10), TWFN
Region IV	BHolian
LTran	KPerkins, WCFO

*See Previous Sheet for Concurrence

OFC	PDIV-2/DRPW <i>FC</i>	PDIV-2/PM	PDIV-2/PM <i>BEH</i>	SRXB*	OGC*	PDIV-2/D
NAME	DFoster-Curseen	LTran <i>BEH</i>	BHolian:pk <i>BEH</i>	BJones	MYoung	TQuay <i>TQuay</i>
DATE	8/12/94	8/12/94	8/12/94	8/8/94	8/11/94	8/12/94



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

August 12, 1994

Docket No. STN 50-529

Mr. William L. Stewart
Executive Vice President, Nuclear
Arizona Public Service Company
Post Office Box 53999
Phoenix, Arizona 85072-3999

Dear Mr. Stewart:

SUBJECT: ISSUANCE OF AMENDMENTS FOR THE PALO VERDE NUCLEAR GENERATING STATION
UNIT NO. 2 (TAC NO. M89800)

The Commission has issued the enclosed Amendment No. 65 to Facility Operating License No. NPF-51 for the Palo Verde Nuclear Generating Station, Unit No. 2. The amendment consists of changes to the Technical Specifications (TS) in response to your application dated July 1, 1994, as supplemented by letter dated August 11, 1994.

The proposed amendment changes the minimum cold-leg temperature for core power levels between 90% and 100% to 552 °F for Unit 2 (which is a reduction of 10 °F from the previous TS requirement). This TS change permits reactor operation at full power with a lower reactor coolant temperature to minimize potential steam generator tube degradation. The cold-leg temperature reduction at power levels above 90% was previously granted for Units 1 and 3 by letter dated June 7, 1994.

A copy of the related Safety Evaluation is also enclosed. A notice of issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

A handwritten signature in black ink, appearing to read "B. E. Holian".

Brian E. Holian, Senior Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 65 to NPF-51
2. Safety Evaluation

cc w/enclosures:
See next page

Mr. William L. Stewart
Arizona Public Service Company

Palo Verde

cc:

Mr. Steve Olea
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, Arizona 85007

Jack R. Newman, Esq.
Newman & Holtzinger, P.C.
1615 L Street, N.W., Suite 1000
Washington, D.C. 20036

T. E. Oubre, Esq.
Southern California Edison Company
P. O. Box 800
Rosemead, California 91770

Mr. Curtis Hoskins
Executive Vice President and
Chief Operating Officer
Palo Verde Services
2025 N. 3rd Street, Suite 220
Phoenix, Arizona 85004

Senior Resident Inspector
Palo Verde Nuclear Generating Station
5951 S. Wintersburg Road
Tonopah, Arizona 85354-7537

Roy P. Lessey, Jr., Esq.
Akin, Gump, Strauss, Hauer and Feld
El Paso Electric Company
1333 New Hampshire Avenue, Suite 400
Washington, DC. 20036

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
Harris Tower & Pavillion
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

Ms. Angela K. Krainik, Manager
Nuclear Licensing
Arizona Public Service Company
P. O. Box 52034
Phoenix, Arizona 85072-2034

Mr. Charles B. Brinkman, Manager
Washington Nuclear Operations
ABB Combustion Engineering Nuclear Power
12300 Twinbrook Parkway, Suite 330
Rockville, Maryland 20852

Chairman, Maricopa County Board
of Supervisors
111 South Third Avenue
Phoenix, Arizona 85003

Mr. Aubrey V. Godwin, Director
Arizona Radiation Regulatory Agency
4814 South 40 Street
Phoenix, Arizona 85040



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

DOCKET NO. STN 50-529

PALO VERDE NUCLEAR GENERATING STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 65
License No. NPF-51

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Arizona Public Service Company (APS or the licensee) on behalf of itself and the Salt River Project Agricultural Improvement and Power District, El Paso Electric Company, Southern California Edison Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority dated July 1, 1994, as supplemented by letter dated August 11, 1994, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations set forth in 10 CFR Part I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Facility Operating License No. NPF-51 is hereby amended to read as follows:

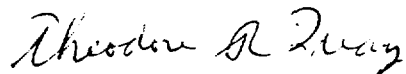
9408240167 940812
PDR ADOCK 05000529
P PDR

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 65, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated into this license. APS shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan, except where otherwise stated in specific license conditions.

3. This license amendment is effective as of the date of issuance and must be fully implemented no later than 45 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Theodore R. Quay, Director
Project Directorate IV-2
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: August 12, 1994

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 65 TO FACILITY OPERATING LICENSE NO. NPF-51

DOCKET NO. STN 50-529

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

Remove

3/4. 2-8

Insert

3/4 2-8

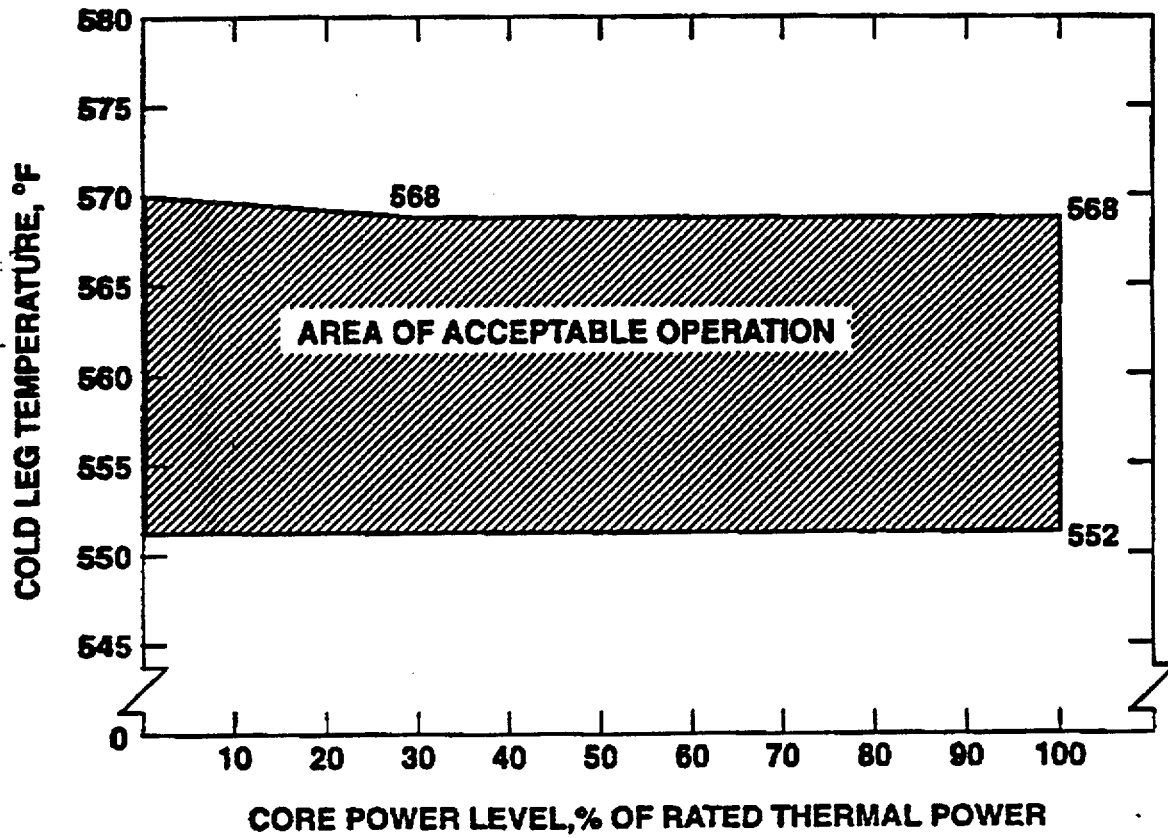


FIGURE 3.2-1

REACTOR COOLANT COLD LEG TEMPERATURE vs. CORE POWER LEVEL

POWER DISTRIBUTION LIMITS

3/4.2.6 REACTOR COOLANT COLD LEG TEMPERATURE

LIMITING CONDITION FOR OPERATION

3.2.6 The reactor coolant cold leg temperature (T_c) shall be within the Area of Acceptable Operation shown in Figure 3.2-1.

APPLICABILITY: MODES 1* and 2*#.

ACTION:

With the reactor coolant cold leg temperature exceeding its limit, restore the temperature to within its limit within 2 hours or be in HOT STANDBY within the next 6 hours.

SURVEILLANCE REQUIREMENTS

4.2.6 The reactor coolant cold leg temperature shall be determined to be within its limit at least once per 12 hours.

*See Special Test Exception 3.10.4.

#With K_{eff} greater than or equal to 1



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 65 TO FACILITY OPERATING LICENSE NO. NPF-51,
ARIZONA PUBLIC SERVICE COMPANY, ET AL.
PALO VERDE NUCLEAR GENERATING STATION, UNIT NO. 2
DOCKET NO. STN 50-529

1.0 INTRODUCTION

By letter dated July 1, 1994, the Arizona Public Service Company (APS or the licensee) submitted a request for changes to the Technical Specifications (TS) for the Palo Verde Nuclear Generating Station, Unit 2 (Appendix A to Facility Operating License No. NPF-51). The Arizona Public Service Company submitted this request on behalf of itself, the Salt River Project Agricultural Improvement and Power District, Southern California Edison Company, El Paso Electric Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority. The proposed changes would modify TS Figure 3.2-1, "REACTOR COOLANT Cold-leg vs CORE POWER LEVEL," of TS 3/4.2.6, "REACTOR COOLANT Cold-leg TEMPERATURE," to include the cold-leg temperature between 552 °F and 562 °F at core power levels between 90 percent and 100 percent within the AREA OF ACCEPTABLE OPERATION. This TS change would permit reactor operation at full power with a lower reactor coolant temperature to minimize potential steam generator tube degradation due to primary water stress corrosion cracking (PWSCC).

By letter dated August 11, 1994, the licensee supplemented its application. The additional information contained in this letter was clarifying in nature, was within the scope of the initial notice, and did not affect the NRC staff's proposed no significant hazards determination.

2.0 BACKGROUND

The cold-leg temperature reduction at power levels above 90 percent was previously granted for Units 1 and 3 by letter dated June 7, 1994. The change was not requested for Unit 2 due to continuing analysis arising from steam generator tube plugging in that unit. Currently, Figure 3.2-1 of the Palo Verde Unit 2 TS specifies a minimum cold-leg temperature of 562 °F for core power levels between 90 percent and 100 percent. This TS requirement is supported by the safety analyses documented in the Updated Final Safety Analysis Report (UFSAR). Operation of Palo Verde Unit 2 is currently restricted by an administratively imposed 10 °F reduction in the reactor coolant cold-leg temperature, by maintaining reactor power at approximately 88 percent of rated core power to satisfy the current TS requirements. The licensee requested a change to the TS to allow Unit 2 to operate at full power

9408240170 940812
PDR ADDCK 05000529
PDR

with a 10 °F deduction in the reactor coolant cold- and hot-leg temperatures. The hot-leg temperature reduction is needed to minimize the steam generator tube degradation (e.g., PWSCC).

3.0 EVALUATION

In support of its proposed changes to the TS, the licensee submitted the results of an evaluation for all transients and accident analyses documented in the UFSAR with the reduced cold-leg temperature. For events that were no longer bounded by the analyses presented in UFSAR, new analyses were performed to ensure that the acceptance criteria are still met for each event.

For transients involving an increase in heat removed by the secondary system or a decrease in reactor coolant flow rate, the UFSAR analysis covers cold-leg temperatures of 550 °F and above; therefore, no new analysis is needed. Regarding transients involving a decrease in heat removal by the secondary system, the loss of condenser vacuum event is affected by a reduction in cold-leg temperature and was reanalyzed assuming a cold-leg temperature of 550 °F. The results of the analysis were acceptable.

The consequences of a main feedwater line break are more limiting with higher values of cold-leg temperature; therefore, this event was not reanalyzed. Transients involving reactivity and power distribution anomalies were reviewed for power levels above 90 percent. Acceptable results are assured because adequate thermal margin remains available with the reduced cold-leg temperature.

The transients involving an increase in reactor coolant system inventory are determined to be independent of the value of cold-leg temperature. Similarly, transients involving a decrease in reactor coolant system inventory are not affected because either a higher cold-leg temperature is more limiting or the results of analysis are independent of cold-leg temperature.

The licensee also performed a reanalysis for a postulated main steam line break with induced multiple steam generator tube ruptures, assuming cold-leg temperatures of 550 °F and 540 °F. The results demonstrate that the Palo Verde administrative limits for primary iodine activity will ensure that the dose consequences remain acceptable.

Additionally, cycle-specific loss-of-coolant accident (LOCA) evaluations were performed for Unit 2, Cycle 5. These evaluations included a reduction in cold-leg temperature of 10 °F. The resultant peak clad temperature remains less than the current analysis of record limit of 2091 °F and the licensing basis limit of 2200 °F.

Due to the higher number of plugged steam generator tubes in Unit 2, the licensee performed additional analyses to examine LOCA results taking into account a greater tube plugging limit. This analysis examined operation of Unit 2 during Cycle 5 at 100 percent power with up to 1100 steam generator tubes plugged (with no restriction on the number of plugged tubes in each steam generator). The analysis determined that the results of the reference

analysis documented in the PVNGS Unit 2 Cycle 5 Reload Analysis Report conservatively apply at a peak linear heat generation rate of 13.2 KW/ft, a reduction from 13.5 KW/ft that has subsequently been incorporated in the Unit 2 Core Operating Limits Report (COLR). The analysis explicitly evaluated the impact of the increase in the number of plugged steam generator tubes on the refill/reflood hydraulic transient of the limiting large break LOCA and the consequential impact on the fuel cladding temperature and maximum local cladding oxidation of the hot rod. Regarding small-break LOCA scenarios, the licensee concluded that the peak cladding temperature of the limiting small-break LOCA continues to be hundreds of degrees less than that of the limiting large-break LOCA. Additionally, the licensee stated that the post-LOCA long term cooling analysis, which currently extends to 1000 plugged tubes for each steam generator, conservatively bounds the 1100 total plugged tube analysis.

The staff noted that currently Unit 2 steam generators (SGs) have a total of approximately 967 tubes plugged (226 in SG 21; 741 in SG 22). Therefore, the LOCA analysis performed with an assumption of 1100 tubes plugged provides a margin of approximately 133 tubes. Additionally, each of the last two outages for eddy current inspection has resulted in tube plugging rates whereby the tube plugging margin may be exceeded during the next scheduled outage (approximately 248 tubes were plugged during U2R4; and 409 during U2M5). The licensee stated that a contingency plan is being evaluated (including, potentially, further reducing the peak linear heat generation limit) in case the upcoming outage results in exceeding the steam generator tube plugging limit assumed in the analysis. Additionally, the staff notes that the non-LOCA analyses were reanalyzed with the assumption of 1000 tubes plugged per SG. The licensee committed to inform the staff and summarize corrective actions if either the non-LOCA or LOCA tube-plugging limits are exceeded.

Further, the licensee clarified several items in its letter of August 11, 1994. The licensee's submittal stated that core protection calculator (CPC) coefficients exhibit little sensitivity to a reduction in cold-leg temperature. The licensee supported their conclusion of no negative effect on the design basis event (loss of external load) with a discussion of temperature filter coefficients that provide for lead/lag inputs in transients. Regarding control element assembly drop events, the staff questioned why reactor coolant density changes would not have an adverse affect on drop times. The licensee stated that the safety analysis drop time is assumed at 4 seconds, and surveillance data continues to be in the range of 2.5 seconds, maintaining adequate margin. Similar to the calculation necessary for Unit 1, the licensee took credit for negative moderator temperature coefficient (MTC) (even though the TS allow a positive MTC for beginning of cycle operation). The staff verified that the value of negative MTC is appropriate for this time in cycle length, and notes that core operating limits supervisory system database and/or addressable constants may need to be reverified by the licensee prior to operation with positive MTC values following the next refueling outage. Finally, the staff questioned why the pressurizer spray events were not dependent on the value of T-cold. The licensee stated that the events are based on the dynamic response of the CPCs and that analysis shows that, with a 550 °F inlet temperature, the CPCs respond appropriately.

In summary, based on the results of the Unit 2 cycle-specific evaluations and the evaluations discussed above, a 10 °F reduction in cold-leg temperature is acceptable for Unit 2. The staff has reviewed the licensee's submittal and finds that the proposed TS change is supported by appropriate analysis and is acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arizona State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (59 FR 35767). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: B. Holian
C. Liang

Date: August 12, 1994