

September 20, 1995

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

SUBJECT: ISSUANCE OF AMENDMENTS FOR THE PALO VERDE NUCLEAR GENERATING STATION
UNIT NO. 1 (TAC NO. M91148), UNIT NO. 2 (TAC NO. M91149), AND UNIT
NO. 3 (TAC NO. M91150)

Dear Mr. Stewart:

The Commission has issued the enclosed Amendment No. 100 to Facility Operating License No. NPF-41, Amendment No. 88 to Facility Operating License No. NPF-51, and Amendment No. 71 to Facility Operating License No. NPF-74 for the Palo Verde Nuclear Generating Station, Unit Nos. 1, 2, and 3, respectively. The amendments consist of changes to the Technical Specifications (TS) in response to your application dated December 7, 1994, and supplemented by letter dated August 1, 1995.

These amendments change Note 5 to Table 4.3-1 of TS 3/4.3.1 to allow verification of the shape-annealing matrix elements used in the core protection calculators. This provides the option of using generic shape-annealing matrix elements in the core protection calculators. Presently, cycle-specific shape-annealing elements are determined during startup testing after each core reload. Use of a generic shape-annealing matrix eliminates several hours of critical path work during startup after a refueling outage.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next 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

Docket Nos. STN 50-528, STN 50-529
and STN 50-530

Enclosures: 1. Amendment No. 100 to NPF-41
2. Amendment No. 88 to NPF-51
3. Amendment No. 71 to NPF-74
4. Safety Evaluation

DISTRIBUTION

Docket File
PUBLIC
PDIV-2 Reading
EGA1
JRoe
WBatman
CGrimes, 011E22
BHolian
CThomas
LKopp
KPerkins, WCFO
HWong, RIV
GHill (6), T5C3
OC/LFDCB, T9E10
OGC, 015B18
OPA, 02G5
ACRS (4), T2E26
LHurley, RIV
EPeyton
JBianchi, WCFO (2)

cc w/encls: See next page

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DOCUMENT NAME: PV91148.AMD

OFC	PDIV-2/LA	PDIV-2/PM	PDIV-2/PM	OGC <i>no legal object</i>
NAME	EPeyton	CThomas <i>CM</i>	BHolian <i>30pk</i>	<i>Wital</i>
DATE	8/21/95	8/30/95	8/30/95	9/13/95

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DF011/09

September 20, 1995

Mr. William L. Stewart
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- OC/LFDCB, T9E10
- OGC, 015B18
- OPA, 02G5
- ACRS (4), T2E26
- LHurley, RIV
- EPeyton
- JBianchi, WCFO (2)

cc w/encls: See next page

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OFC	PDIV-2/LA	PDIV-2/PM	PDIV-2/PM	OGC <i>no level object</i>
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DATE	8/21/95	8/30/95	8/30/95	9/13/95

OFFICIAL RECORD COPY



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

September 20, 1995

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

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and STN 50-530

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4. Safety Evaluation

cc w/encls: See next page

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PDR ADOCK 05000528
P PDR

cc w/encls:
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U. S. Nuclear Regulatory Commission
Harris Tower & Pavillion
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Arlington, Texas 76011-8064

Chairman, Board of Supervisors
ATTN: Chairman
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Phoenix, Arizona 85003

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

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

DOCKET NO. STN 50-528

PALO VERDE NUCLEAR GENERATING STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 100
License No. NPF-41

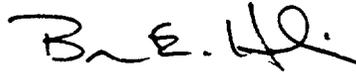
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Arizona Public Service Company (APS or the licensee) on behalf of itself and the Salt River Project Agricultural Improvement and Power District, El Paso Electric Company, Southern California Edison Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority dated December 7, 1994, as supplemented by letter dated August 1, 1995, 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 Chapter 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-41 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 100, 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.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment: Changes to the Technical
Specifications

Date of Issuance: September 20, 1995

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 100 TO FACILITY OPERATING LICENSE NO. NPF-41

DOCKET NO. STN 50-528

Replace the following page of the Appendix A Technical Specifications with the enclosed page. The revised page is identified by Amendment number and contains marginal lines indicating the areas of change. The corresponding overleaf page is also provided to maintain document completeness.

REMOVE

3/4 3-16

INSERT

3/4 3-16

TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES IN WHICH SURVEILLANCE REQUIRED</u>
D. Supplementary Protection System				
Pressurizer Pressure - High	S	R	Q	1, 2
II. RPS LOGIC				
A. Matrix Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
B. Initiation Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
III. RPS ACTUATION DEVICES				
A. Reactor Trip Breakers	N.A.	N.A.	M, R (10)	1, 2, 3*, 4*, 5*
B. Manual Trip	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*

PALO VERDE - UNIT 1

3/4 3-15

AMENDMENT NO. 78

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

- * - With reactor trip breakers in the closed position and the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel.
- (1) - Each STARTUP or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days.
- (2) - Heat balance only (CHANNEL FUNCTIONAL TEST not included), above 15% of RATED THERMAL POWER; adjust the linear power level, the CPC delta T power and CPC nuclear power signals to agree with the calorimetric calculation if absolute difference is greater than 2%. During PHYSICS TESTS, these daily calibrations may be suspended provided these calibrations are performed upon reaching each major test power plateau and prior to proceeding to the next major test power plateau.
- (3) - Above 15% of RATED THERMAL POWER, verify that the linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the Core Protection Calculators.
- (4) - Neutron detectors may be excluded from CHANNEL CALIBRATION.
- (5) - After each fuel loading and prior to exceeding 70% of RATED THERMAL POWER, the incore detectors shall be used to determine or verify the shape annealing matrix elements used in the Core Protection Calculators.
- (6) - This CHANNEL FUNCTIONAL TEST shall include the injection of simulated process signals into the channel as close to the sensors as practicable to verify OPERABILITY including alarm and/or trip functions.
- (7) - Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation or by calorimetric calculations and if necessary, adjust the CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to the actual flow rate. The flow measurement uncertainty may be included in the BERRI term in the CPC and is equal to or greater than 4%.
- (8) - Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or calorimetric calculations.
- (9) - The quarterly CHANNEL FUNCTIONAL TEST shall include verification that the correct current values of addressable constants are installed in each OPERABLE CPC.
- (10) - At least once per 18 months and following maintenance or adjustment of the reactor trip breakers, the CHANNEL FUNCTIONAL TEST shall include independent verification of the undervoltage and shunt trips.



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. 88
License No. NPF-51

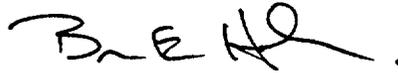
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Arizona Public Service Company (APS or the licensee) on behalf of itself and the Salt River Project Agricultural Improvement and Power District, El Paso Electric Company, Southern California Edison Company, Public Service Company of New Mexico, Los Angeles Department of Water and Power, and Southern California Public Power Authority dated December 7, 1994, as supplemented by letter dated August 1, 1995, 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 Chapter 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:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 88, 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.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment: Changes to the Technical
Specifications

Date of Issuance: September 20, 1995

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 88 TO FACILITY OPERATING LICENSE NO. NPF-51

DOCKET NO. STN 50-529

Replace the following page of the Appendix A Technical Specifications with the enclosed page. The revised page is identified by Amendment number and contains marginal lines indicating the areas of change. The corresponding overleaf page is also provided to maintain document completeness.

REMOVE

3/4 3-16

INSERT

3/4 3-16

TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES IN WHICH SURVEILLANCE REQUIRED</u>
D. Supplementary Protection System				
Pressurizer Pressure - High	S	R	Q	1, 2
II. RPS LOGIC				
A. Matrix Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
B. Initiation Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
III. RPS ACTUATION DEVICES				
A. Reactor Trip Breakers	N.A.	N.A.	M, R(10)	1, 2, 3*, 4*, 5*
B. Manual Trip	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*

TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

- * - With reactor trip breakers in the closed position and the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel.
- (1) - Each STARTUP or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days.
- (2) - Heat balance only (CHANNEL FUNCTIONAL TEST not included), above 15% of RATED THERMAL POWER; adjust the linear power level, the CPC delta T power and CPC nuclear power signals to agree with the calorimetric calculation if absolute difference is greater than 2%. During PHYSICS TESTS, these daily calibrations may be suspended provided these calibrations are performed upon reaching each major test power plateau and prior to proceeding to the next major test power plateau.
- (3) - Above 15% of RATED THERMAL POWER, verify that the linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the Core Protection Calculators.
- (4) - Neutron detectors may be excluded from CHANNEL CALIBRATION.
- (5) - After each fuel loading and prior to exceeding 70% of RATED THERMAL POWER, the incore detectors shall be used to determine or verify the shape annealing matrix elements used in the Core Protection Calculators.
- (6) - This CHANNEL FUNCTIONAL TEST shall include the injection of simulated process signals into the channel as close to the sensors as practicable to verify OPERABILITY including alarm and/or trip functions.
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- (9) - The quarterly CHANNEL FUNCTIONAL TEST shall include verification that the correct (current) values of addressable constants are installed in each OPERABLE CPC.
- (10) - At least once per 18 months and following maintenance or adjustment of the reactor trip breakers, the CHANNEL FUNCTIONAL TEST shall include independent verification of the undervoltage and shunt trips.



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

ARIZONA PUBLIC SERVICE COMPANY, ET AL.

DOCKET NO. STN 50-530

PALO VERDE NUCLEAR GENERATING STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 71
License No. NPF-74

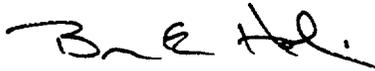
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 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - 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-74 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 71, 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.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment: Changes to the Technical
Specifications

Date of Issuance: September 20, 1995

ATTACHMENT TO LICENSE AMENDMENT

AMENDMENT NO. 71 TO FACILITY OPERATING LICENSE NO. NPF-74

DOCKET NO. STN 50-530

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 100 TO FACILITY OPERATING LICENSE NO. NPF-41,
AMENDMENT NO. 88 TO FACILITY OPERATING LICENSE NO. NPF-51,
AND AMENDMENT NO. 71 TO FACILITY OPERATING LICENSE NO. NPF-74
ARIZONA PUBLIC SERVICE COMPANY, ET AL.
PALO VERDE NUCLEAR GENERATING STATION, UNIT NOS. 1, 2, AND 3
DOCKET NOS. STN 50-528, STN 50-529, AND STN 50-530

1.0 INTRODUCTION

By application dated December 7, 1994, as supplemented by letter dated August 1, 1995, the Arizona Public Service Company (APS or the licensee) requested changes to the Technical Specifications (Appendix A to Facility Operating License Nos. NPF-41, NPF-51, and NPF-74, respectively) for the Palo Verde Nuclear Generating Station, Units 1, 2, and 3. 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 the Technical Specifications (TS) to allow the use of generic shape-annealing matrix (SAM) elements in the core protection calculators (CPCs). Presently, cycle-specific SAM elements are determined during startup testing after each core reload. Use of a generic SAM would eliminate several hours of critical path work after a refueling outage.

The staff questioned the licensee about the data used for the generic SAM and the monitoring of CPC synthesized axial shapes. The licensee responded to these questions by letter dated August 1, 1995. This information clarified the original submittal and did not expand the scope of the original no significant hazards determination published in the Federal Register on January 4, 1995 (60 FR 495).

2.0 EVALUATION

The CPCs rely upon the excore detector signals to trip the reactor in the event of an anticipated operational occurrence (AOO) to ensure that the specified acceptable fuel design limits on minimum departure from nucleate boiling ratio (DNBR) and peak linear heat rate are not violated. To do this, each CPC channel synthesizes the core average axial power shape from three levels of excore detector signals. The relative excore detector readings are

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subsequently adjusted within the CPCs by a set of channel dependent shape annealing constants. These SAM constants are typically measured during the reload startup power ascension and installed into the CPC channels. Incore and excore signal data are taken at regular intervals during the initial startup power ascension and the incore data is subsequently processed through a computer code to determine the relative power at the core periphery. An automated data reduction code is then used to verify the data, calculate the SAM constants, and determine whether the measured SAM meets a set of review and acceptance criteria to justify its implementation into the CPC channels.

The licensee has proposed to change Note 5 of Table 4.3-1 in TS 3/4.3.1 to allow either a determination of a cycle-dependent SAM or verification of the acceptability of a generic SAM to be used in the CPCs. The cycle-specific SAMs from previous cycles have been found not to be reload dependent and, in fact, would have been acceptable for other cycles, even other units. In addition, since the cycle-specific SAM is only measured once during reload startup, the representation has been observed to be less accurate as the cycle progresses and the power shape evolves from a flattened cosine to a saddle shape. The generic SAM would be based on middle-of-cycle data and, therefore, would be more representative of the entire cycle. If a generic SAM is used, the matrix elements will be validated each cycle during startup testing and must meet the same acceptance criteria as the cycle-specific SAM elements. This ensures that the axial power shapes generated by the CPCs will still remain within the required uncertainties and that the CPCs will trip the reactor so that minimum DNBR and peak linear heat rate are not violated in the event of an AOO. If these criteria are not met, APS would calculate a cycle-specific SAM to be used in the CPCs. In response to a staff concern, APS has confirmed that it intends to monitor the CPC synthesized axial shapes at least quarterly during each cycle to verify the continued acceptability of the CPC axial shape synthesis.

Based on the above review, the staff finds the proposed TS change to provide the option of using generic SAM elements in the CPCs acceptable.

3.0 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.

4.0 ENVIRONMENTAL CONSIDERATION

The amendments change a surveillance requirement. The NRC staff has determined that the amendments involve 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 amendments involve no significant hazards

consideration, and there has been no public comment on such finding (60 FR 495). Accordingly, the amendments meet 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 amendments.

5.0 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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

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