Union Electric
Callaway Plant

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November 16, 2000

U. S. Nuclear Regulatory Commission
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ULNRC-4343

Gentlemen:

SUPPLEMENTAL INFORMATION
INSPECTION REPORT NO. 50-483/2000-017
CALLAWAY PLANT
UNION ELECTRIC CO.

Ref: **1) NRC Inspection Procedure 71121.02, ALARA Planning & Controls**
2) ULNRC 4298 dated August 21, 2000
3) EA-00-208

During the Regulatory Conference conducted November 9, 2000, Union Electric was given the opportunity to provide additional information regarding the findings described by Inspection Report 2000-017, ALARA Planning and Controls. The requested information is presented in the attachment.

None of the material in the response is considered proprietary by Union Electric.

If you have any questions regarding this position, or if additional information is required, please contact me or Mr. Mark A. Reidmeyer, Regional Regulatory Affairs Supervisor at phone 573/676-4306, or e-mail: mareidmeyer@cal.ameren.com.

Very truly yours,

R. D. Affolter
Vice President, Nuclear

RDA/MAR/JWH/RRR/slk
Attachment: 1) Supplemental Information

IE01

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Station Definition of a "Job"

At the Regulatory Conference in the Arlington, Texas, NRC Offices on November 9, 2000, the NRC Staff indicated that each station should define the term "job" as it relates to the station's work planning process. The NRC Staff discussed "job" in general terms as the lowest level at which ALARA Planning occurs.

Callaway Plant procedures use the Work Authorizing Document (WAD) as the document that classifies a particular activity as a "job". Work Authorizing Documents may be Work Requests (corrective maintenance), Preventive Maintenance Requests (PMR), Surveillance Task Sheets, Modifications, HP generated WADs or Scaffolding Permits. All of these are referred to as Work Requests (WRs), work packages, or WADs in the Work Control System and Radiation Work Permit (RWP) System. Callaway Plant procedure APA-ZZ-00320, Processing Work Requests, Section 3.1, requires the Planner to:

> ***"Compose detailed instructions for Safety Related and Special Scope activities that are complex in nature and require step by step instructions beyond existing approved procedures. Procedure PDP-ZZ-00003, Work Document Processing, provides guidelines for composing these detailed work instructions."***

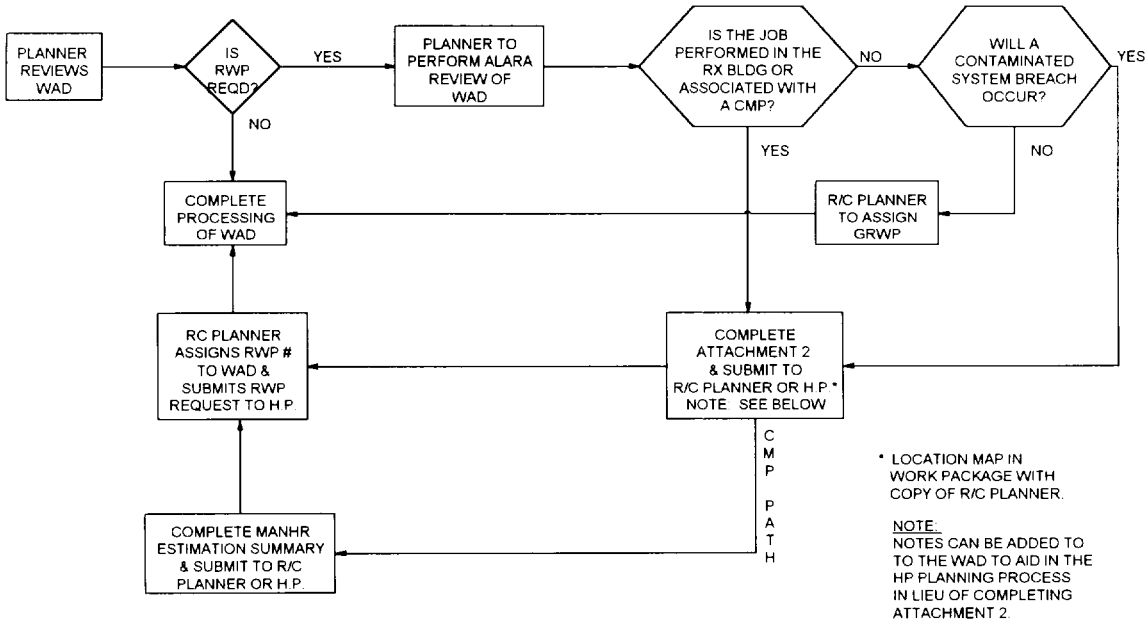

Figure 1 - RWP Flow Path from Attachment 2 of PDP-ZZ-00003

PDP-ZZ-00003, Work Document Processing, provides the Planner with detailed instructions and checklists outlining the planning process. Section 4.5, Planning ALARA/RWP Review Process, and Attachment 2 of the procedure provide instructions

for the Planner to incorporate ALARA planning into the job instructions. Each WR follows the flow path in Figure 1.

After the Planner completes the initial ALARA review of the Work Request, the documentation is submitted to the Rad/Chem Planner, who determines the need for additional ALARA planning or assigns the job to an existing RWP. All Reactor Building and plant modification jobs are submitted to the HP Department for additional ALARA planning.

The HP Department evaluates the Work Request utilizing plant procedure HTP-ZZ-01201, Preparation and Maintenance of General and Specific Radiation Work Permits. At this juncture, HP may combine Work Requests that govern similar jobs or similar job locations into one HP generated WAD to:

1. Simplify sign-in and to ease worker confusion with the various numbers (WAD and RWP) they must remember to access the plant Radiological Controlled Area (RCA).
2. Minimize the unwarranted administrative burden of maintaining multiple RWPs for individual jobs.

Although multiple jobs may be assigned to the same RWP and the formal ALARA review is documented in a single Pre-Job ALARA Review, each job is reviewed as a separate entity and dose is tracked by the individual job. In summary, the Work Request or Work Authorizing Document is the lowest level at which ALARA Planning occurs at the Callaway Plant.

Analysis Based on Callaway's Definition of a "Job"

The following details the Callaway Plant's position on each Radiation Work Permit (RWP) based on Callaway Plant's definition of "job" as it is applied in the station's work control system and ALARA program.

RWP 99-50903 - Scaffolding

RWP 99-50903, Scaffolding in the Reactor Building, encompassed 161 Scaffold Permits constructing 723 individual elevated work platforms. Only one Scaffold Permit exceeded 5 person-rem (6.259 person-rem).

Based on the above, the actual job dose for 160 of the 161 jobs assigned to RWP 99-50903 did not exceed 5 person-rem. The remaining job, SC992839 – Install Scaffold for Snubber Binding Inspections and Snubber Removal, exceeded 5 person-rem and would satisfy the Group II screening criteria to enter the Significance Determination Process.

RWP 99-53321 - Remove and Install Steam Generator (S/G) Manway Covers and Inserts

RWP 99-53321 covered eight Work Authorizing Documents generated by the Callaway Plant Work Control System. Two WADs were generated for each Steam Generator, one for removal of the manways and inserts and the other for reinstallation. Each of the above WADs received ALARA Planning as required by plant procedure PDP-ZZ-00003.

Manway and insert work involves changing radiological conditions. HP generated WADs were used to create new jobs based on similar radiological conditions and job mechanics to simplify RCA in-processing for workers. Using this method allowed workers to complete one manway removal and immediately move to the next manway without requiring the worker to exit the biological shield area to switch Work Authorizing Documents. Requiring workers to exit the biological shield to switch Work Authorizing Documents would increase dose and radwaste generation without any value added to the job or ALARA initiatives.

The new Work Authorizing Document numbers are noted in the table below. During the formal ALARA Review process HP evaluated each job. This second tier ALARA review augments the review performed in accordance with PDP-ZZ-00003.

When RWP 99-53321 is analyzed on a per job basis, the actual dose totals are as noted in the following table.

Work Authorizing Document (WAD)	WAD Description	Actual Dose (Rem)
953321CLEAN	Clean manway inserts	1.208
953321INSERT	S/G Insert removal and installation	2.129
953321MAN	S/G manway removal, installation & bolt hole work	3.720
953321SETUP	Set up for removal and installation of S/G Manways	1.053
953321STUDS	S/G manway stud cleaning activities	0.433
953321TEARDN	Tear down of manway cover and insert equipment	0.000

Based on the above, there are no jobs where actual job dose exceeded 5 person-rem.

RWP 99-53323 - Eddy Current/Robotic Plugging/Stabilizing/Electrosleeving

RWP 99-53323 covered 16 Work Authorizing Documents generated by the Callaway Plant Work Control System. Four WADS were generated for each Steam Generator (S/G), one each for:

- Eddy current testing

- Electrosleeving
- Tube plugging/stabilizing
- In-Situ Testing

Each of the above documents received ALARA Planning as required by plant procedure PDP-ZZ-00003.

HP generated WADs were created to combine each individual S/G Work Authorizing Document under one Work Authorizing Document for each of the four jobs noted above. Additionally, four WADs were created for support activities as noted in the table below. Using this method allowed workers to perform a job, Eddy Current Testing, etc., on all S/Gs without requiring the worker to exit the biological shield area to switch Work Authorizing Documents.

The new Work Authorizing Document numbers are noted in the table below. During the formal ALARA Review process HP evaluated each job. This second tier ALARA review augments the review performed in accordance with PDP-ZZ-00003.

When RWP 99-53323 is analyzed on a per job basis the actual dose totals are as noted in the following table.

Work Authorizing Document (WAD)	WAD Description	Actual Dose (Rem)
953323CLSOUT	Closeout inspection on S/G	0.317
953323EC	Eddy current testing	21.390
953323PLUG	S/G remote tube plugging	5.553
953323SETUP	Eddy current testing, tube plugging and stabilizing activities area set up	3.824
953323SITU	S/G in-situ pressure testing	0.018
953323SLEEVE	Electrosleeving operations	24.251
953323STAB	S/G remote stabilizing of S/G tubes	0.000
953323TEARDN	S/G Eddy current testing, tube plugging and stabilizing activities area equipment tear down	2.306

Based on the above, the actual job dose for five of the eight jobs did not exceed 5 person-rem. The remaining three jobs all exceeded 5 person-rem and would satisfy the Group II screening criteria to enter the Significance Determination Process.

RWP 99-53324 - Health Physics Support for Primary and Secondary Steam Generator Activities

RWP 99-53324 has only one Work Authorizing Document (953324JOBCOV) assigned and evaluated. The actual job dose was 5.641 person-rem and would satisfy the Group II screening criteria to enter the Significance Determination Process.

RWP 99-53022 - Foreign Object Search and Retrieval

RWP 99-53022 covered four Work Authorizing Documents generated by the Callaway Plant Work Control System. Each of these WADs received ALARA Planning as required by plant procedure PDP-ZZ-00003.

HP generated WADs were created to combine these Work Authorizing Documents. This allowed workers to perform a job on all S/Gs without requiring the worker to exit the biological shield area to switch Work Authorizing Documents.

The new Work Authorizing Document numbers are noted in the following table. During the formal ALARA Review process HP evaluated each job. This second tier ALARA review augments the review performed in accordance with PDP-ZZ-00003.

When RWP 99-53022 is analyzed on a per job basis the actual dose totals are as noted in the following table.

Work Authorizing Document (WAD)	WAD Description	Actual Dose (Rem)
953022FOSAR	Perform Foreign Object Search and Retrieval	3.395
953022SETUP	Area & Equipment Set Up for FOSAR	0.377
953022SSI	Secondary Side S/G Inspection	2.502
953022TEARDN	Area & Equipment Tear Down	0.144

Based on the above, there are no jobs where actual job dose exceeded 5 person-rem.

RWP 99-52520 - Reactor Coolant Pump Seal Removal and Replacement

When RWP 99-52520 is analyzed on a per job basis the actual dose totals fall out as noted in the following table.

Work Authorizing Document (WAD)	WAD Description	Actual Dose (Rem)
A194831H	Back Seat Pump – A RCP	0.025
A194831J	Remove Install Mechanical Seal – A RCP	2.711
A201958A	Remove/Install Mechanical Seal – B RCP	1.842
A201958B	Remove/Install Vibration Probes – B RCP	0.492
P545084	Seal Inspection/Replacement – C RCP	2.916
A545084B	Backseat pump – C RCP	0.173
A545084C	Remove/Install Vibration Probes – C RCP	0.315
R545084A	Check Leak Off (Retest) – C RCP	0.017
R545084B	VT-2 Inspection (Retest) – C RCP	0.024
P595347	Seal Inspection/Replacement – D RCP	4.952
A595347A	Remove/Install Vibration Probes – D RCP	0.109
R595347B	VT-2 Inspection (Retest) – D RCP	0.024
W644695	Replace #1 seal leak off pipe – D RCP	0.000

Based on the above, there are no jobs where actual job dose exceeded 5 person-rem.

Conclusions

Using the Occupational Radiation Safety Significance Determination Process, the Callaway Plant has determined that five jobs that accrued more than 5 person-rem each during Refueling Outage 10 exceeded their dose projections by more than 50 percent, however none of the jobs accrued actual doses greater than 25 person-rem. Since there were greater than 2 jobs that accrued more than 5 person-rem (but less than 25 person-rem), this would appear to constitute one apparent white finding.

The jobs that constitute this one apparent white finding are listed in the table below.

Work Authorizing Document (WAD)	WAD Description	Actual Dose (Rem)
953323EC	Eddy current testing	21.390
953323PLUG	S/G remote tube plugging	5.553
953323SLEEVE	Electrosleeving operations	24.251
953324JOBCOV	HP Job Coverage for S/G Primary & Secondary Work	5.641
SC992839	Install scaffold for snubber binding inspections and snubber removal	6.259

However, other considerations should be evaluated when determining the significance of this issue.

- The ALARA Planning and Controls inspection identified issues that occurred during Refuel 10 in October/November 1999, prior to the April 2000 implementation of the Revised Reactor Oversight Process (RROP). Additionally, an Occupational Radiation Exposure inspection in March 2000 (NRC Inspection Report No. 50-483/00-07) found no ALARA issues.
- Job In-Progress ALARA Reviews were performed during Refuel 10. Some actions were taken to address dose overruns. However, a conscious decision was made to not amend dose projections, albeit sufficient justification existed to make some adjustment to the projections. Some of the reasons for not adjusting dose projections were:
    1. a concern for worker let down as work progressed toward achieving the original goal, and
    2. the organization perceived no compelling reasons for adjusting projections nor any penalties for maintaining the original dose projections based on the regulatory inspection process in effect at the time.
- The issue was self-identified while Refuel 10 was in progress, is documented in the station's Corrective Action Program and extensive root cause analyses have been completed.
- The ALARA SDP appears to allow aggregation of the significance of individual findings based on multiple occurrences. Endorsement of the Linear No-Threshold hypothesis supports the position that regardless of individual exposures, increasing collective dose increases aggregate risk. It is presumed that this position, at least in part, provides the basis and justification for aggregating the significance of subsequent individual findings. Justification for aggregating in this manner is not limited to issues involving dose. Any risk rate, quantifiable by probabilistic risk assessment (PRA), or other means, may be integrated into a cumulative risk analogous to the risk associated

with collective dose. Using material condition as an example, any degraded material condition incrementally affecting the instantaneous Core Damage Frequency (CDF) or Large Early Release Factor (LERF) (both representing risk rates) when integrated over a time interval represents a cumulative risk. This cumulative risk is additive for each degraded condition as well as for multiple occurrences of the same condition. As a result, any condition characterized by PRA values can be evaluated for increased cumulative risk. Therefore, it can be justified to aggregate (in the same manor as the ALARA SDP) the significance of any individual condition affecting a Plant's CDF or LERF based on the number of concurrent or repeated conditions occurring over an arbitrary timeframe. However, none of the Cornerstone areas encompassing conditions affecting CDF/LERF have incorporated aggregation of significance for individual occurrences (not withstanding the Physical Protection SDP which aggregates based on multiple conditional changes to CDF/LERF and which is currently under revision). A consistent approach to significance aggregation must be developed and globally implemented or a regulatory basis must be developed and approved for the differential treatment of collective dose risks verses the other quantifiable risks associated with the civilian uses of nuclear energy.

What Callaway will do Different in the Future

The Callaway Plant is strengthening its Job In-Progress ALARA Review process to more frequently and rigorously assess jobs which are projected to exceed their estimated person-rem projections. These Job In-Progress ALARA Reviews will include a detailed assessment of activities, identification of causes for overruns, and documentation of the assessment. Additionally, these Job In-Progress ALARA Reviews may, as deemed appropriate during the assessment process, necessitate:

- stopping the job to adequately assess the issues,
- re-projecting person-rem estimates based on the justification attained during the assessment process, and
- additional formal reviews up to and including Plant ALARA Review Committee review of the corrective actions and new dose projections.