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DESCRIPTION:

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[illegible]

PLANT NAME: Palo Verde 1-3

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United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

PEP ER 75/393

JUL 23 1975

Regulatory File Cy.

Dear Mr. Regan:

Thank you for your letter of April 14, 1975, requesting the Department of Interior's comments on the Nuclear Regulatory Commission's draft environmental impact statement on the Palo Verde Nuclear Generating Station, Units 1, 2, and 3, Maricopa County, Arizona.

Our comments are presented according to the format of the statement or by subject.

General

Parts of the draft statement appear to be somewhat biased toward the project. In composing the final statement, care should be taken to present the necessary information so that the environmental impacts are presented objectively.

We believe there is too much reference to information contained in other documents without summarizing or evaluating that information in the draft statement. More pertinent information should be included in the final statement that directly relate to the environmental concerns about this project.

We suggest that more detailed maps of pipeline and transmission line corridors including associated roads, as well as a proposed layout map of the power generating site be provided in the final statement to facilitate reference to all affected areas.

The draft statement contains many statements that are prefaced by phrases such as, "according to the applicant . . . ." The draft statement is notably lacking in independent environmental analysis by NRC staff experts, and shows little attempt to verify the accuracy of the applicant's information. This situation should be rectified in the final statement.

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In several places in the draft statement, the applicant has indicated that certain measures will be implemented to protect the environment affected by the project. The last paragraph in the Evaporation Ponds section on page 3-23 is one example. Other such indications are made elsewhere throughout the statement, but no related administrative mechanisms are described. The final statement should clarify the implementation procedures related to such proposed protective measures.

In the final statement, the units used to measure water should be made more consistent with each other. Wherever possible water measurements should be stated in common terms or conversion factors presented.

The Station Appearance

The visual impact of the station will be determined to a large degree by how well the buildings blend in with the desert. The color of the facilities should be noted in the final statement.

The Site

On page 2-1, the final statement should indicate the legal subdivisions of the site.

Regional Demography

With regard to the Regional Demography Section, there is a proposed residential development on the west side of the White Tank mountains that should be mentioned in the final statement. Also, population data are 5 years old and should be updated with estimates of present population. Techniques used to formulate population projection in Table 2.1 should be clarified in the final statement.

The final statement should clarify whether or not the two residential developments (noted on page 2-5 as being within 2 and 4 miles southeast of the plant site boundary) are to be developed by the applicant or by others and if this development will affect the definition of the low population zone surrounding the plant site. The final statement should

indicate whether or not these developments and any associated rights-of-way will be on public or private lands. It should further identify the proposed developer of the housing. If the housing is to be developed on public lands or on lands requiring roads or utility rights-of-way across public lands, additional studies including an archeological and cultural resources survey must be conducted. The relationship between these developments and the proposal should be detailed in the final statement.

Mineral Resources

Current mineral production for the four affected counties in Arizona is averaging over $500 million annually while that of the four New Mexico counties in averaging over $200 million annually. Known mineral resources in the vicinity of the plantsite consist of sand and gravel and clays. Mineral resources are not discussed in the environmental statement, but withdrawal of 3,880 acres for site development from all mineral extraction should not significantly alter the availability of either sand and gravel or clays in the area. This information should be included in the final statement. The final statement should also include a discussion of mineral resources along the pipeline and transmission line routes, but should note that a mineral study of the project area was not made.

Land Use

In the Land Use section, a narrative description of interstate highway I-10 and a description of vehicle use of all Federal, State and local roads should be incorporated in the final statement. A large amount of traffic is anticipated as a result of this project, and an evaluation of the existing road system's adequacy would therefore be helpful. Also, the proposed Saddle Mountain BLM recreation area is located 10 miles west of the Palo Verde Nuclear Generating Station. Plans have not been finalized but this proposal has been presented for public consideration in BLM's Management Framework Plan. The final statement should recognize the location and status of this proposed recreation area.

Several Land and Water Conservation Fund assisted public parks in Maricopa County within one to several miles from the proposed alignment of the transmission line corridors are noted on page 5-1. The final statement should include maps identifying their exact locations, and assess the impacts from the development to these areas.

The final statement should clarify the need to move 20 million cubic yards of earth at the station site, the percent of the station site to be disturbed and the percentage to be revegetated.

Archeological and Cultural Resources

The draft statement fails to provide substantive information regarding the project's impact upon archeological and historical resources. It fails to: list all National Register properties that are to be affected by the project, discuss the nature of the effects, and indicate specific measures that will be taken to achieve compliance with Section 106 of the National Historic Preservation Act of 1966 (80 Stat. 95) and Executive Order 11593 in accordance with Title 36, CFR, Part 800. The final statement should incorporate this information and include a copy of the comments by Arizona and New Mexico State Historic Preservation Officers, regarding the effects of the project upon properties either listed on or in the process of nomination to the National Register of Historic Places.

Sensitivity maps such as those mentioned on page 4-2 are predictive models that can be useful in long-term planning. They do not substitute, however, for concrete data for projects involving Federal agencies.

The proposed transmission line corridors should be completely surveyed at the reconnaissance level for archeological resources. The final statement should note such a survey. In particular, the route from the Palo Verde Nuclear Generating Station to the Westwing substation appears to pass very near or through the Skunk Creek Dam and New River Dam archeological districts, as well as site Arizona T:4:6 (Arizona State University), which have been declared eligible for inclusion in the National Register of Historic Places (see Federal Register Vol. 40, No. 63, April 1, 1975). The proposed Palo Verde Nuclear Generating Station to the Kyrene route corridor

passes within 3/4-mile of Snaketown, one of the most important archeological sites in the Southwest - the site is on the National Register and is the Hohokam-Pima National Monument. The project 2 route passes through several areas with extremely high potential for archeological resources such as the San Pedro Valley. The impacts to these important archeological sites should be evaluated in the final statement.

There is no discussion of the potentially serious impact of Project 3 to archeological resources. We recommend that the final statement document what resources could be affected, and propose a set of procedures to minimize the adverse effects.

We request the opportunity to review the relevant archeological reports that will be prepared. These reports should be made available to the National Park Service, Arizona Archeological Center, P. O. Box 49008, Tucson, Arizona, 85717, in accordance with section 3(a) of Public Law 93-291.

On page 2-5, the cultural and archeological resources survey should also be extended to areas off the project site where impacts to archeological values will result from the project. We are particularly concerned about such impacts associated with uncontrolled recreational use of newly accessible areas along the utility corridors.

The archeological report (ER 2.3.1) notes that 53 sites were identified in the survey of the Palo Verde Hills-Hassayampa River area. Of these, at least 12 are located within the plant site boundary (ER figure 2.3-1). The draft statement does not address the problem of impacts to these archeological resources. There is no indication as to what measures will be adopted to mitigate the adverse effects of the project on cultural resources. The final statement should clearly describe what resources would be affected, what the effects would be, and what plans were proposed to mitigate the adverse effects. There is also no indication in the draft statement that identified sites have been evaluated for their National Register potential. This should be done and all those which meet the criteria outlined in Title 36, CFR 800.10, should be nominated to the National Register of Historic Places. Compliance with Title 36, CFR 800.4, should be documented in the final statement.

There are very serious potential hazards to archeological resources from the access roads, railroad construction, water conveyance pipelines, transmission line system, and the plant site and substation construction. The final statement should thoroughly discuss these potential hazards.

Mitigative Measures to Limit Impact on Archeological and Cultural Resources

The final statement should clarify what mitigation measures will be taken upon the discovery of new archeological resources. We suggest that NRC consider employing a qualified full-time archeologist on survey and construction crews in that, as noted on page 2-9, archeological surveying will continue after construction of the station begins. This would help to avoid any unnecessary destruction of archeological resources.

Archeological resources are finite and nonrenewable. Their destruction through any means, including salvage excavation, results in a significant loss of scientific and interpretive resources. Consideration of preserving any affected resources should be presented in the final statement. This is sometimes possible through a redesign or relocation of some of the plant or corridor facilities. The final statement should document that alternatives which would lessen the impacts on cultural resources have been considered.

Impacts Upon Vegetation and Soils

The discussion of vegetation and soils on p. 6-2 indicates that plant quadrants were established to estimate the percent cover of herbaceous species. Even though this may have been the original intent, percent cover was not determined for herbaceous plants as indicated by Table 2.7-8 of the environmental report. Since salt deposition may have considerable adverse impacts on some herbaceous plants, we suggest that baseline data be gathered on percent cover of herbaceous plants so comparisons can be made after the powerplant has been in operation. This baseline data should be included in the final statement.

Environmental impacts of soil sterilants are not discussed in the draft statement. They should be discussed in the final statement. The vegetation and soils discussion also indicates 10 soil samples were taken in 1973 at various locations on and off site and analyzed for salinity, alkalinity, ph,

texture, organic matter, and available nutrients. The final statement should indicate if any of the soil samples were taken in washes on and off site. Salts may tend to accumulate along washes and at downstream points off the site. If no analyses were made for in-wash soil samples on and off the site, we suggest this be cone to provide baseline data for the final statement.

The discussion of the site on page 4-5 indicates that construction impacts on natural vegetation will not affect the regional ecosystem which is indicated as being the Lower Colorado River subdivision of the Sonoran desert scrub plant community. This project is only one of many other proposed powerplants, powerlines, pipelines, roads, irrigation projects, dams, etc., that could also have adverse effects within this same area. Since comprehensive evaluations on a regional scale were not included, we suggest assessments of impacts on habitat be limited to a more local level.

Also, the site discussion on page 4-5 indicates that rechannelization of East Wash will be the most disruptive ecological disturbance on the powerplant site. We agree, and believe the final statement should quantify how much wash vegetation will be destroyed by this channelization and by construction of site facilities.

Table 10.3 on page 10-9 notes the staff's conclusion that the biological costs associated with the project are minor. The table indicates that 1,600 acres of desert habitat will be lost; the draft statement indicates on page 5-12 that construction of these facilities will result in reduced quality of the aquatic and terrestrial ecosystems along the Salt and Gila Rivers; the transmission line corridors and access roads sections on page 5-1 indicates 1,000 acres of natural vegetation will be disturbed by powerline construction. Further, information in the Environmental Analysis for Project 1 Transmission Lines, Fig. 5.2.1, and the Environmental Analysis for Project 2 Transmission Lines, Table 6.0.1, indicates over 1,300 acres of habitat will be permanently or temporarily disturbed. In addition, an estimated 800 acres of native vegetation will be cleared for powerplant construction.

These data show a greater loss than that expressed in the draft statement without including the loss for the transmission line of Project 3, the pipeline, and the railroad spur. If the NRC staff expects considerably less native vegetation disturbance than indicated in the Palo Verde Nuclear Generating Station Environmental Report and the Environmental Analyses for the transmission lines, this should be thoroughly discussed in the impact section of the final statement. We also recommend that the impact section clearly state how much habitat will be disturbed during construction by each of the following project features: powerplant, pipeline, each transmission corridor, and the railroad spur.

Impacts Upon Vertebrates

The conclusions reached in the discussion of Effects on Ecological Systems beginning on page 4-5 and summarized on page i (3c), that construction of the station, transmission line, and water pipeline will not cause important impacts on fish and wildlife is inconsistent with the information presented elsewhere in the statement. As noted previously, there will be a loss of at least 1,600 acres of desert habitat. In addition, the draft statement indicates on page 5-12 that construction of these facilities will result in reduced quality of the aquatic and terrestrial eco-systems along the Salt and Gila Rivers. The reduced quality of the eco-systems, and the loss of desert habitat constitute important impacts on fish and wildlife. The statement on page i should also be reevaluated in this regard (item 3c). The Onsite Reservoir Section on page 5-15 indicates that the water storage reservoir will be attractive to water birds. The reservoir is intermingled with high buildings and is under powerlines. The final statement should discuss the collision problem water birds will likely have with these structures and powerlines.

The discussion of audible noise on p. 5-22 indicates that it is unlikely that humans and animals will be out of doors during inclement weather. It is a well known fact that both domesticated and non-domesticated animals stay out of doors during inclement weather. The final statement should reflect this information.

Impacts Upon Invertebrates

With regard to the discussion of microorganisms on p. 5-18, we agree with the staff that some preoperational baseline data should be obtained for this group of organisms, due to their importance to plant and animal decomposition and the adverse impact salt deposition may have on microorganisms. This data should be included in the final statement.

With regard to the discussion of invertebrates on p. 5-19, we agree with the staff's conclusion that the effects of salt deposition on desert invertebrates should be investigated if adverse impacts on associated higher animals are found. Baseline data on species and abundance should be gathered for later comparisons and cited in the final statement.

Threatened and Endangered Species

The Mammals Section on page 2-19 indicates that the desert kit fox is an endangered species. The desert kit fox, Vulpes macrotis, is not classified as an endangered species. The San Joaquin kit fox, Vulpes macrotis mutica, a subspecies, is. However, it is not likely this subspecies occurring in California will be found in the project area; therefore, reference to the kit fox should be eliminated in the final statement.

The final statement should mention the southern bald eagle, Mexican duck, and the masked bobwhite quail in Table 4.1. They are endangered and known to exist in the area (see Table 4.1).

The discussion of rare and protected species on page 4-7 indicates the endangered peregrine falcon, Colorado River squawfish, and Gila topminnow are known to occur in the vicinity of powerplant projects 1, 2, and 3. The source reference indicated was the Fish and Wildlife Service's "Threatened Wildlife of the United States," 1973 Edition. Other endangered species listed in this reference are also likely to occur along the powerline routes. These include the following: Project 1 - Yuma clapper rail (Gila River crossing), and spotted bat; Project 2 - spotted bat; and Project 3 - Southern bald eagle, Mexican duck, and spotted bat. The possible presence of these species should be indicated in the final statement. The May 1974, U.S. Department of the Interior document entitled, "United States List of Endangered Fauna" should be cited in any future reference to endangered species.

In the last paragraph of the Water Diversion Effects Section on page 5-15, the staff states that it is hopeful the Arizona Game and Fish Department will examine the impact of water diversion on the endangered Gila topminnow. We believe it is the responsibility of the applicant to make this examination. The U.S. Fish and Wildlife Service will offer as much assistance as possible to the applicant in this regard. You may contact Wilford O. Nelson, Jr., Director, Fish and Wildlife Service, U.S. Department of the Interior, P.O. Box 1306, Albuquerque, New Mexico 87103 in this regard.

We believe the high possibility of endangered Gila topminnow existing in the river and the possibility of the desert pupfish occurring below the Gillespie Dam is sufficient to warrant an aquatic study of this area. Therefore, we recommend that the aquatic ecosystems in the Salt and Gila Rivers downstream of the 91st Avenue Sewage Plant be studied. We believe much of the project-associated biological impact will occur in this area. However, the applicant's consultants have made no aquatic study of these rivers other than a literature review. No mention is made of an aquatic study in this section or in the associated table.

Although impacts to threatened and endangered species have been discussed within the document, there is no mention of compliance with Section 7 of the Endangered Species Act of 1973. The final statement should mention the U.S. Nuclear Regulatory Commission's compliance with this Act.

Impacts on Water Use

In the final statement, the discussion of the operational impacts on water use should be directed more toward an evaluation of how people, wildlife, flora, and fauna are affected by water use. This discussion should consider not only the anticipated increase in sewage effluent, but also the increased competition for water use which the projected increased population will bring about. Figure 5.3 and table 5.8 indicate the increasing surplus of sewage effluent, above the needs of the project, as accompanying growth in population. In the final statement, probable demand for the surplus effluent for uses other than that proposed should be considered in terms of beneficial and adverse impacts in comparison with the proposed plant use. The impacts of heavy metals, toxic or deleterious substances, and biocides on water resources should also be discussed in the final statement.

The consumptive use of the sewage effluent which would otherwise be discharged to the Salt and Gila River and then, in part, return to aquifers by infiltration, constitutes a major effect in this area. This is especially significant as other consumptive water uses and very high natural desert losses dry up these streams much of the time. The analysis of this effect suffers greatly from poor organization and lack of pertinent data in the statement. The section on Water Use on page 2-5 is particularly deficient; it gives no hint of the complexity of water use and re-use in the area. The accompanying figure 2.8 hints at this complexity but should be explained more fully. Without a fuller discussion of water use in the area, it is difficult to follow later discussions on the effects of water diversions. Therefore, we believe the impacts caused by diversion of sewage water, now flowing into the Gila River, to the generating plant for cooling purposes are not adequately described within the draft statement. More comprehensive coverage of these impacts should be included in the final statement as it may eliminate controversies concerning water rights, and provide information for implementation of mitigative measures that may be required.

It is possible that, if the applicant's contracted water entered the river, anybody with senior water rights could take this water. However, evidence has not been provided to indicate that enough (if any) unfilled senior water exist to affect the project's water. Also, as long as water users can show that the river is part of their conveyance system, other users have no right to this water. We recognize that the water rights are a difficult issue. However, considering the adverse impacts to the river ecosystem from the proposed operation, the downstream water diversion alternative should be fully explored and documented in the final statement.

It is likely that water quality in the Salt and Gila Rivers will be adversely affected by the project. The staff has determined in Section 5.5.1.1 that there will be a reduced flow in these rivers due to the sewage diversion. We believe that due to the reduced flows, water temperature will increase during the long hot summers. Higher temperatures coupled with other water quality parameters may have adverse effects on the aquatic ecosystem. This should be discussed in the final statement.

The analysis in Water Diversion Effects appears to be based on average flows. This may be acceptable for sewage flow and possibly for contracted diversions, but not for streamflow. Even though highly regulated, streamflow is still highly variable in this reach. On page 5-12, assumptions concerning future flow are based on the average flow of the Gila River below Gillespie Dam for the period 1941-71; it should be noted that during this period, mean annual flow has ranged from zero to over 100,000 acre-feet although the median of the yearly mean discharges is 53,600 acre-feet. Much of the time there has been no flow. Thus, it appears that the final analysis of the effects of the diversions should deal more fully with years of drought when a number of the assumed average flows cannot be relied upon and the effluent from the 91st Avenue and 23rd Avenue Phoenix sewage plants would be the principal sustaining flow in the reach directly above Gillespie dam.

On page 5-14, staff analysis concludes that some degradation of the Fred J. Weiler Green Belt may occur in river segments C and D during 1985 and 1986. We believe significant degradation will occur in these segments. The staff assumes that seepage loss is normally about 50 percent of the water being released from the 91st Street Sewage Plant. This seepage is not lost; it can either become a subsurface flow or contribute to the recharging of the groundwater table. Either way, it is now contributing to the maintenance of the riparian habitat along the Green Belt. Loss of water (surface or subsurface) by diversion of the effluent will have an adverse impact on the riparian vegetation and a corresponding loss of wildlife and nesting habitat. The environmental analysis of impacts on the riparian biological community should be more extensive in the final statement.

We understand Figure 5.3 reflects the entire flow from the 23rd and 91st Avenue Sewage Plants. However, when operating the 23rd Avenue plant at maximum (44,800 acre-feet/yr), only about half the flows reach 91st Avenue via the Salt River. The Roosevelt Irrigation District is presently contracting with the Phoenix Water and Sewers Department for diversion of 20,000 acre-feet/yr at 23rd Avenue. This 20,000 acre-feet diversion will, for all practical purposes, eliminate flow input from the 23rd Avenue plant as flow will not reach 91st Avenue where the impact area begins. For this reason, we recommend the staff reassess the information in Figure 5.3 and make any necessary corrections to expected adverse impacts downstream of 91st Avenue.

Impacts of Evaporation and Transpiration

Although alternatives may need further consideration, the use of sewage plant effluent, much of which is apparently not being put to maximum beneficial use or is wasted, as the major source of cooling water is to be commended. Table 5.8 appears to be logical in its indications that about two-thirds of the water used will represent water otherwise lost by evaporation, transpiration (mainly through phreatophytes) and seepage. However, we suggest there is an error in the next to the last line of the second paragraph on page 5-14. We believe the amount lost by transpiration from salt cedar in the stream reach should read 57,000 acre-ft/yr, not 57,000 acre-ft/acre/yr. The 57,000 acre-ft/acre/yr figure should be reevaluated in drafting the final statement.

The final statement should also note the local water table is rising and consequently, a certain amount of water-logging is apparent. This water-logging contributes to water loss through evaporation.

Impacts to Groundwater

We agree that as noted on page 2-13, in the Groundwater Section, the magnitude of overall irrigation return flow to groundwater in the project area is probably on the order of 25 percent if all types of channel conditions are considered. Locally, of course, where ditches are lined, return flow may be much less. On the basis of the available data, the amount of drawdown predicted on page 5-2 as a probable result of the pumping of about 1,000 gpm during construction and operation appears to be correct.

No mention of potential problems resulting from land subsidence due to groundwater withdrawal was noted in the draft environmental statement. At the site itself, it has been estimated that the withdrawal rate may result in a drawdown of about one foot per year, and that this impact is considered by the NRC staff to be minor and acceptable (p. 5-2, par. 5.5.5.). However, land subsidence associated with known water-level declines has evidently been a significant problem in the general region adjoining the site and in localities along the transmission line routes that are under consideration. In the applicant's environmental analyses of transmission lines, it has been noted that land subsidence associated with water-level

declines would be a potential geologic problem west of Phoenix, near Gila Bend, near or south of Saguaro, and near or southwest of Vail. Subsidence has amounted to nearly five feet along parts of the tentative alignments. In the final statement, it would be advisable to discuss this potential problem and provide information on any design modifications required to cope with the problem.

Groundwater Monitoring

The groundwater monitoring program mentioned on page 6-1 seems to be oriented toward observation of effects of pumping at the site. We suggest that this program should include baseline measurements as well as measurements continuing during operation of the plant, and during diversion of the effluent. These considerations should be included in the final statement.

We believe that the annual monitoring of groundwater for dissolved solids is not sufficiently frequent considering the potential migration of chemical waste into the aquifers and the associated environmental impacts. We are particularly concerned with the possible seepage of waste chemicals from the evaporation pond into the groundwater. In drafting the final statement, the monitoring intervals should be reevaluated. It is also noted in the Water Quality Section that the applicant will be required to monitor water quality in neighboring wells. The final statement should define the frequency and type of tests to be employed and the location of the wells in relation to the plant site.

Water Cooling System

The final statement should address the possibility of using the heated cooling water as a source of energy as well as feasibility of desalting the water and returning it to the Gila River rather than releasing it into the atmosphere.

Evaporation Ponds

The applicant's consultants informed us on July 15, 1975, through the Phoenix Office of the Fish and Wildlife Service, that the water storage reservoir will be about 80-85 acres rather than the 313 acres indicated in the draft statement. This information should be revised in the final EIS. Also, the loss of surface area will reduce the amount of evaporation. Therefore, the final statement should indicate whether the amount of water diverted for cooling purposes will correspondingly be reduced.

Also in this section, the statement that there will be no communication with natural waters appears to be incorrect. Seepage in the storage reservoir is estimated at 300 acre-feet per year on page 5-2. Since the evaporation pond is also constructed with 12 inches of soil cement, it should be clarified in the final statement whether similar leakage can be anticipated from the evaporation pond area. The proposed lining for the reservoir and evaporation ponds consisting of 12 inches soil cement, is not adequately defined. More information will be needed in the final statement to determine if the applicant's 40-year life estimate for the pond linings is reasonable. This information should be included in the final statement. Moreover, an explanation is needed as to the feasibility of designing reservoirs and ponds without any planned seepage.

In the final statement, the particle size of the dessicated pond waste should be specified and an analysis made of their potential contribution to the air-blown particulates of the surrounding area as a vegetative cover to reduce fugitive dust will apparently not be provided.

Cooling System Alternatives

The evaluation of alternatives that consume less or no water appears to be particularly important in this arid area. Several factors that are only alluded to in the draft statement should be further considered in the final statement. It appears that the proposed cooling-water supply is based on the full use of three units. The initial outlays for the proposed cooling-water supply would unfavorably affect the feasibility of andprobably preclude other cooling alternatives using less water for Units 2 and 3. Thus issuance of a construction permit now commits 76,000 acre-feet until 40 years after completion of the project. The staff's analysis of the applicant's forecast of electricity demand up to 1985 concludes that it is an upper bound and that Units 1 and 2 may not be needed until later than planned. The final statement should extend to the need for Unit 3, as that unit could also be delayed. The staff also indicates that dry cooling towers are a better alternative in this arid climate than elsewhere. Though currently in use only for smaller fossil fired units, the towers would require new turbine designs for use with the proposed large units. It should be further explored whether such designs are likely to be available by the time that the proposed large increments of power are needed. The

possibility of using smaller units in the interim which can be designed for dry cooling now, and which can be more closely tailored to the uncertain growth in electricity demand in the future, should be further evaluated as well.

Wastewater Conveyance Pipeline

In the final statement, details concerning the wastewater conveyance pipeline routes should be provided as the information contained in the Wastewater Conveyance Pipeline Section on page 3-31 is insufficient to analyze the impacts from this feature to the environment. The justification for a 50-foot right-of-way for the pipeline and the type of right-of-way restoration proposed by the applicant should be discussed in the final statement. The method of construction, the source of power for the temporary and permanent pumping stations, maintenance access, and provisions for flood damage should be adequately discussed in the final statement.

The last sentence of the Wastewater Conveyance Pipeline Section on page 3-31 refers to Section 3.9.3. In the draft statement, this section does not exist. The final statement should clarify this discrepancy.

The Wastewater Conveyance Pipeline Section on page 4-4 indicates that topsoil will be replaced in agricultural areas after construction of the pipeline. We recommend that this procedure should apply whever topsoil is removed in natural areas due to construction of the pipeline, powerplant, and transmission lines, except where impossible due to project structures. The final statement should note whether or not the soil will be replaced in areas of natural vegetation. Also, the final statement should present data on the length of time necessary for the land to recover from construction of the wastewater conveyance pipeline, and what specific measures will be taken to deter erosion. All species of plants planted for this purpose should be identified. This section indicates that land disturbed by the pipeline construction will recover and be unchanged from its former use. The final statement should indicate that it will take several decades at least for mature woody vegetation to return due to harsh desert conditions unless a revegetation program occurs.

The final statement should include more specific information regarding the need for 3 acres for a pumping station. It should indicate whether or not a surge pond will be required at that location. The extent of access roads required for the wastewater conveyance pipeline should be presented. Also, the design and color of the pumping station, manholes, and vents should be discussed to determine visual impacts.

Wastewater Conveyance Pipeline Alternatives

With regard to the water conveyance pipeline, the environmental report discussed the potential alternative of diverting cooling water near Gillespie Dam rather than at the 91st Avenue Sewage Plant. Although the applicants indicated this alternative is not feasible due to water rights and water quality problems, we believe it deserves more consideration in the final statement since it eliminates diversion of water from the Fred J. Weiler Green Belt and the State's proposed Salt River Natural Area.

Reactor, Steam Electric, and Fuel Systems

The draft statement lacks information concerning the source and amount of start-up electrical power. This information should be included in the final statement. We believe the existing power system into the PVNGS appears to be inadequate to provide start-up power as at least one 115 kV line and a new substation might be necessary as a supplement. The proposed location of the new substation (Buckeye) would not conform to the BLM Management Framework Plan. Evidence of consultation with the Bureau of Land Management State Directors for Arizona and New Mexico should be provided in the final statement to ensure consideration of appropriate BLM Management Framework Plans.

In the final statement, a comparison of EPA standards to the effluent from generators noted in the Combustion Effluents Section would be helpful.

Radioactive Wastes

The first paragraph of the Liquid Wastes Section states that no liquids containing radioactive waste will be discharged to the environment, whereas the Table 3.3 description seems to indicate there may be such releases under certain conditions. It also seems inconsistent with the last paragraph in Section 3.5.1.3. These inconsistencies should be clarified in the final statement.

Table 5.4 does not assess exposure to radiation for the total ecosystem. It does not address risk factors from fuel/waste loss, transport, spills, accidents, or exposure of elements of the ecosystem over the life span of the generating plant. In the final statement, this table should include the above information.

We do not agree with the staff's conclusion in the Preoperational Radiological Monitoring Section that the preoperational radiological monitoring program proposed by the applicant and summarized in Table 6.4 is adequate to provide baseline data. We suggest that in both the operational and preoperational radiological monitoring programs some native plants be included in this program, as well as agricultural crops. The jackrabbit is the only wildlife species being monitored. We suggest the desert cottontail be substituted for the jackrabbit since it is more common, has a small home range, and is more important to the human food chain and a wider variety of predators. In addition to the desert cottontail, we suggest that a few key species representing a cross section of the food chain be sampled including but not restricted to: mammalian and avian predators, small mammals, seed eating birds, amphibians and reptiles.

The final statement should clarify the statistical accuracy of the baseline study cited in the Ecology Section of the Preoperational Monitoring discussion.

In the Transportation of Radioactive Material Section, a summary of pertinent portions of the AEC transportation report should be included in the final statement.

The Solid Wastes Section does not adequately address off-site shipment. Items such as special precautions, mode of handling, and location of radioactive burial areas for the plant, should be included in the final statement.

Wet solid radioactive wastes are described as being packaged for offsite shipment to burial grounds in "55-gallon shipping containers" on page 3-19. It would be advisable to provide assurances in the final statement that these containers would be approved for long-term containment of this material, as opposed to ordinary 55-gallon drums.

We suggest that, in the final statement, the planned radiological burial grounds referred to on page 7-2 (par. 7.2) be identified. Also, a reference should be provided to any environmental statement which contains an evaluation of the environmental impacts of that action as related to geology and hydrology of the specific sites proposed for burial of wastes from Palo Verde Nuclear Generating Station, Units 1, 2, and 3.

Non-Radioactive Wastes

The plant sewage system, after operation, uses only about 15 acre-feet per year (13,500 gpd), whereas the ground water supply will provide a maximum of 1600 acre-feet per year. Also Figure 3.3 seems to indicate ground water will be fed into the cooling system. These apparent discrepancies should be explained in the final statement.

With regard to the section - Other Non-Radioactive Wastes on page 3-25, the final statement should provide supporting data to substantiate the staff's belief that the 48-acre disposal site will accommodate all waste for the life expectancy of the project.

The "unidentified dispersant" noted in the Water Supply Section on page 3-19 used to regulate pH should be identified. If this chemical is hazardous, a fuller explanation of its use should be given in the final statement.

Transmission Lines

The transmission system discussion is based on future alignments of the lines. Therefore, little detail was expended on this subject. Regardless of future right-of-way regulations and land ownership problems including Indian reservation land, the proposed and alternate corridors should be assessed in the final statement. Also, a detailed map of all existing and proposed lines in the affected areas should be provided in the final statement.

The maps represented as figures 3.9 and 3.10 are far too small to determine place names and are therefore of little use in locating various project features. We suggest that larger maps be incorporated in the final statement.

A table of vegetational community analysis should be included in the Transmission Lines Section in the final statement, and data concerning the physiography, geology and soils should be summarized in the discussion of the various transmission line corridors.

In reference to the discussion of Project 1 transmission lines on page 3-26, we do not agree with the staff's statement that it is evident the applicant has favored potential rights-of-way sharing with existing utility corridors. To our knowledge, there are several existing or potential rights-of-way sharings for the Westwing transmission line south and east of the White Tank Mountains, but there are few if any, in the applicant's proposed corridor west and north of these mountains. For example, the BLM Management Framework Plan (MFP) has established a preferred corridor for future utility rights-of-way in various districts. The proposed PVNGS to Westwing Substation route does not conform to the preferred corridor, nor does it parallel any existing right-of-way. The final statement should present the relationship among all proposed and alternative rights-of-way to existing or proposed Federal/State utility corridors.

No discussion is included in the draft statement regarding the use of existing right-of-way access roads or construction of new access roads. This is an area of probable impact that should be discussed in the final statement. The draft statement indicates that the proposed route for the transmission corridors are the best routes, environmentally. However, the reasons why these routes are better than the alternative routes are not provided. The final statement should provide a more thorough discussion of why the proposal has the best routes, environmentally, including the environmental criteria used for route selection.

The alternatives that exist for the three transmission line projects should be described so that a comparison of the proposed system against the alternative systems could be made. In fact, the only alternative transmission line corridors discussed in any detail are for the Kyrene line. There are no maps showing where the alternatives go. A reader who is not fully familiar with the area could not understand the exact locations of the alternatives. The NRC has summarized into two pages a detailed corridor analysis prepared by the

applicants. These two pages do not sufficiently encompass all of the comparisons of environmental advantages and disadvantages of the alternatives. If the reader does not have the applicant's report to read along with the draft, it is impossible to make an educated judgment of the viability of these alternative routings. More information including legible maps, should be incorporated in the final statement.

The following data are absent in the draft statement and should be presented in the final statement:

1. Number of miles of transmission line having less than 180' spacing between the proposed lines and adjacent existing lines.

2. Number of miles having a 2000' spacing between the proposed lines and adjacent existing lines.

3. Numbers of towers to be used of each type (free standing or guyed).

4. Number of microwave communication sites needed, their location, acreages used, if power is available to them, if access is developed to them, and a map of their locations.

5. Number of miles of new access roads needed.

6. Number of miles of existing access roads that could be used.

7. Width and grades to be used on access roads.

8. Number of acres to be temporarily used for access roads, pulling sites,marshalling areas, assembly areas, camps, storage, concrete batch plants, and concrete disposal areas.

9. Number of acres to be permanently occupied for access roads, substations, and towers.

10. Number of acres in the rights-of-way.

11. Number of pulling sites, marshalling areas, assembly areas, camps and batch plants, plus the location of each.

12. Amount of concrete needed for foundations and anchors, and amount of steel.

13. Amount and source of aggregates and water needed.

14. Size of conductors.

15. Number of workers in transmission line construction.

16. Land ownership map and table.

17. Description of maintenance needs.

18. Survey and design requirements.

Although it is frequently possible to avoid direct impacts by adjusting transmission line tower placement, it is not always achieved. The final statement should take into account the impacts to cultural resources which may result, the visual impact on a site of National Register quality, and the potential for increased vandalism of resources previously inaccessible.

Also, the discussion of transmission lines indicates that an "edge effect," created by transmission line roads, assembly areas, and pulling sites, may be beneficial to some wildlife. We do not anticipate an "edge effect" since most of the lines pass through areas without dense vegetation, such as creosote flats. Washes with dense vegetation already have sufficient edge and it is our understanding little riparian vegetation will be removed at stream crossings where dense vegetation occurs. The possibility of an "edge effect" resulting from the project should be reevaluated in the final statement.

With regard to the discussion of transmission corridor impacts on page 4-7 and 4-9, we support the staff's suggestion that the applicant drive over vegetation intercepted by access roads wherever possible, rather than remove it. However, we cannot agree with the staff's conclusion that there will be no detrimental effect on annual plants. Unless this suggestion is followed as well as others noted in Appendix C, Staff Recommendations to Mitigate Construction Effects, which would eliminate access to the construction road after construction is completed, most vegetation will be prevented from growing due to continued traffic on the construction road. The final statement should address this fact.

The final statement should specify the maintenance requirements of the transmission system and their associated environmental impacts.

The subject of induced voltages and effects upon man is somewhat inconclusive. The reference that the staff is unaware of any campgrounds which would be crossed by transmission lines apparently does not recognize that recreation activity patterns in the area are not necessarily associated with developed facilities, i.e., hunting, sightseeing, photography, off-road vehicle use, etc. The effects of induced voltages should be reevaluated in the final statement. Furthermore, the transmission system section should deal more thoroughly with the shock hazards of underground metal objects and the physiological hazards of electrical fields to both man and wildlife.

The Department anticipates the opportunity to assist the applicant in the assessment of the impacts and acceptability of the transmission line corridors when they are known. If, at the time the applicant applies for rights-of-way across public lands, the proposed transmission line routes have not been thoroughly analyzed and such analysis is not documented in a previous EIS, the Department may require the drafting of an EIS for the granting of such rights-of-way.

Transportation Connections

The final statement should provide information concerning the access road traffic volume anticipated, road standards, material to be hauled, method of construction, the impacts of construction, operation and maintenance, and land ownership along rights-of-way. Also, in the Roads Section on page 4-3, a discussion of access roads for transmission lines is needed in the final statement.

The final statement should clarify whether there are any social costs associated with the Wintersburg Road relocation so that a more complete evaluation of the socioeconomic impacts of the project can be achieved.

The need for the railroad, number of trips anticipated, materials to be hauled, method of construction, the impacts of construction, operation and maintenance, and land ownership along the right-of-way, should also be discussed in the final statement.

The conclusion on page 4-3 that ". . . no serious impacts on present or future land use are anticipated as a consequence of spur line construction" is not sufficiently justified by the discussion of the railroad spur construction. Further discussion concerning lands involved, acreage, cuts and fills, cubic yards of earth to be moved, drainage changes and streets crossed, trestles, cattle passes, fenches, culverts, other linear facilities such as telephone lines, pipelines, etc., and maintenance and operating procedures should be included in the final statement.

In addition, the planned railroad spur right-of-way should be surveyed by a professional archeologist. In the final statement, the Transmission Line Corridors and Access Roads Section on page 5-1 should discuss the impacts of access and spur roads on outdoor recreation and existing transportation system.

Impacts of the Project on People

We believe population growth will surely have an impact on hunting, recreation, etc. These impacts should be considered in the final statement.

In table 4.3, the construction payroll for each year seems excessive. For example, it would be about $41,000 per worker in 1983. The figures should be rechecked in drafting the final statement.

On page 8-2, it is noted that the combined reserve margin of the participants in 1973 was 26%. This is not consistent with the detailed reserve margins of each of the utilities on page 8-4. There, each is noted as less than 26%; therefore, it would not average 26%. These figures should be rechecked.

The last sentence of the Introduction of Projected Consumption and Peak Demand indicates that demand for an additional 2,000 MW is forecast for 1984-85 when the Central Arizona Project begins operation. The power supply for the Central Arizona Project will come from the Navajo Project and is estimated to be approximately 527 MW. Those Arizona Nuclear Power Project participants who had purchased interim power from the United States' share of Navajo will need to replace the recaptured amount, when the Central Arizona Project becomes operational, as follows:

Arizona Public Service	16.4 MW
Salt River Project	107.2 MW
Tucson Gas and Electric	8.7 MW
	132.3 MW

The final statement should evaluate this information.

Operational Monitoring

On p. 6-6, the Ecology Section indicates staff evaluation of the operational monitoring program will be done at the time of application for an operating license and will be described in the environmental technical specifications of the operating license. The applicant should consult with the U.S. Fish and Wildlife Service about the design of the monitoring program during its planning phase.

Hydroelectric Power

We believe the four-sentence discussion of hydroelectric power on page 9-8 is insufficient. The fact that the Federal Power Commission does not presently have authority to license construction of dams in certain areas does not relieve the need for discussion of the environmental impacts of hydroelectric power should it be authorized for construction in the future. The FPC publication P-42 Hydroelectric Resources of the U.S. Developed and Undeveloped, dated January 1, 1972, lists many hydrosites in Arizona and California that have not been developed. The final statement should include relevant information presented in this report in a more extensive discussion of hydroelectric power.

Mitigative Measures

Measures and controls to limit adverse impacts during construction generally appear to be vague, unenforceable, lacking in detail, and imprecise as noted on pages 4-14 and 4-15. These measures should be reevaluated in the final statement.

In the staff evaluation of transmission line and water pipeline corridors on page 4-17, comment #6 states, "It shall be required that the applicant consider all recommendations concerning habitat restoration made by State and Federal agencies." In view of this, we suggest the following recommendations be

incorporated in this section of the final EIS: a separate fish and wildlife management and public use plan be prepared. In addition, to facilitate revegetation, all topsoil removed from natural areas due to road and other construction activities should be replaced. Biologists should be retained by the applicant to determine critical wildlife zones such as potential endangered species habitat within the transmission line corridors. Biological and construction survey crews should work together to avoid these areas during survey alignment.

Unavoidable Adverse Environmental Effects

This section in general, is too brief and vague to present an accurate representation of the unavoidable adverse impacts from the implementation of the project. An estimate of the degree of certain impacts should be indicated, or a statement made that the impact cannot be estimated. For instance, it is stated on page 10-2 that "Bird mortality will increase . . ." with no indication as to what degree mortality will increase. The final statement should assess the bird mortality in greater detail. As another example; on page 10-2, it is stated: "Increased salt concentrations in the soil in the local environs of the cooling towers are likely to cause an alteration in ecological community composition." The final statement should indicate specifically how much the salt concentration will increase, and what alteration is likely to occur in the ecological community composition.

On page 10-1 in the discussion of the unavoidable adverse effects on water resources, the potable water system will require a maximum consumptive use of 1600 acre-ft/yr of ground water. The final statement should clarify whether the 1600 acre-ft/yr will be consumed only during construction, or for the life of the plant.

Irreversible and Irretrievable Commitments of Resources

The draft statement does not consider any recreation, cultural values, wildlife, esthetics, soil, water, etc., as being irreversibly committed by the proposal. This assumption should be reassessed in the final statement.

The final statement should include reference to those archeological resources which will be damaged, destroyed, or salvaged through excavations.

Interrelationships with Other Utilities

The final statement should clarify which participants are now making wholesale sales to Mexico. The amounts sold or imported by the participants from Mexico on either a regular or standby basis should also be presented in the final statement.

In the Regional Relationships Section, the text states that "WSCC has no reserve margin requirements for its members." However, Western Systems Coordinating Council (WSCC) has published design criteria recommending that areas or systems should meet or exceed at least one (of three) WSCC criterion for installed and planned generating capacity. The final statement should discuss this issue.

Appendix C

The NRC staff recommendation in the general comments of Appendix C that "heavily compacted soils should be loosened to facilitate natural revegetation" may require caution in its application, because of the occurrence on upland surfaces of "rock fragments with fine-textured soil beneath" as noted on page 2-9 in the soils section. Where this condition is present, care should be taken in loosening or scarifying the surface because this may expose the finer underlying materials to wind erosion and to erosion by surface runoff, negating the goal of the revegetation effort. This aspect should be noted in the final statement.

Reference should be made to the mitigative measures specified in Appendix C at the end of the Summary and Conclusions section on page iii in the final statement.

Evaluation of Proposed Action

In the final statement, it would be helpful to indicate in each of the sections and subsections of chapter 10, Evaluation of Proposed Action, where supporting and detailed information concerning each of the general subject areas can be found in the statement or the environmental report.

Minor Comments

On page 5-1, the second paragraph of the Transmission Line Corridors and Access Roads Section should be changed to indicate the Kyrene, not the Westwing, transmission lines pass near South Mountain and Sierra Estrella Parks.

In the fourth paragraph of the site discussion on page 4-5, it is mistakenly noted that Winter's Wash parallels the eastern edge of the site. The final statement should indicate Winter's Wash as being on the western edge of the site.

In the second paragraph of the Aquatic Section on page 2-14, the common name of Meda fulgida should be changed from Gila spindace to spikedace as listed in the American Fisheries Society's "Common and Scientific Names of Fishes," Third Edition. The endangered Gila topminnow is believed to inhabit the Gila River downstream of Gillespie Dam as noted on page 2-14. Discussions with Arizona Game and Fish Department and Arizona State University representatives lead us to believe there is a high probability this species also exists upstream of the Dam. The final statement should consider this possibility.

The following minor corrections in geologic information are suggested for inclusion in the final statement. "Sedimentary rock units" should be deleted on page 2-9 (par. 2.4.2, line 7), as the sediments are described as uncemented, except locally by caliche stringers and nodules (applicant's ER, p. 2.4-4, 2.4-5). "Askosic" should be "Arkosic" on page 2-9 (par. 2.4.2, line 4). "Ranges in thickness from 35 to 285 feet" should be changed to "ranges in thickness up to 285 feet," as the Tertiary fanglomerate, though similarly described by the applicant (ER, p. 2.4-4), is described elsewhere as being usually absent on buried bedrock highs, a circumstance which is illustrated by the geologic cross-section (ER, Figure 2.4-2).

We suggest the title "Environmental Monitoring Programs," be changed to the following: "Protective and Mitigative Measures Incorporated in the Project." "Environmental Monitoring Programs" could be a subheading to the above. Mitigative measures incorporated into the project to compensate for irreplaceable losses should also be included if required.

On page 10-6, the Employment and Taxes and Other Benefits Section estimates the total construction payroll to be $465 million. Table 4.3 cites this total as $456 million. This discrepancy should be corrected in the final statement.

Summary and Recommendations

We recommend that a fish and wildlife management and public use plan be prepared along with a proposed implementation schedule for site, pipeline, and transmission line rights-of-way. This plan would be prepared by the applicant in concert with the Department of the Interior and other appropriate Federal, State, and local agencies. We also recommend that this plan and proposed implementation schedule be developed as a project feature and be included in the final statement and license application.

In general, the information contained in the draft environmental statement does not adequately address several major issues. These include: preparation of a fish and wildlife management and public use plan; consideration of impacts of, and alternatives to the water conveyance pipeline; consideration of alternative transmission line corridors; and plans for an adequate monitoring program. These should be discussed in the final statement.

We hope these comments will be helpful to you in the preparation of the final statement.

Sincerely yours,

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