

7.0 Cumulative Impacts

The staff considered the potential cumulative impacts of constructing and operating one or more nuclear power units at the proposed Grand Gulf early site permit (ESP) site. For purposes of the analysis in Chapter 7, past actions were those related to the existing Grand Gulf Nuclear Station (GGNS). Present actions are those related to the resources at the time of the ESP application until the start of construction. Future actions are those that are reasonably foreseeable through construction and operation of the Grand Gulf ESP unit or units, including decommissioning. The geographical area over which past, present, and future actions could contribute to cumulative impacts depends on the type of action considered and is described below for each impact area.

The impacts of the proposed action, as described in Chapters 4 and 5, are combined with other past, present, and reasonably foreseeable future actions in the vicinity of the Grand Gulf ESP site that would affect the same resources impacted by the current GGNS regardless of what agency (Federal or non-Federal) or person undertakes such other actions. These combined impacts are defined as “cumulative” in Title 40 of the Code of Federal Regulations (CFR) 1508.7 and include individually minor but collectively significant actions taking place over a period of time. It is possible an impact that may be SMALL by itself could result in a MODERATE or LARGE impact when considered in combination with the impacts of other actions on the affected resource. Likewise, if a resource is regionally declining or imperiled, even a SMALL individual impact could be important if it contributes to or accelerates the overall resource decline. For issues considered to be resolved, the staff will verify the continued applicability of all assumptions should an applicant for a construction permit or a combined license reference the Grand Gulf ESP.

For some issues related to the construction and operation of a proposed ESP nuclear unit, there was not sufficient information to allow the staff to evaluate the impacts. These issues are not resolved and an evaluation of cumulative impacts for these issues cannot be completed until additional information is provided by an applicant for a construction permit (CP) or a combined license (COL) that references an ESP for the Grand Gulf ESP site.

7.1 Land Use

For the purpose of this analysis, the geographic area considered for cumulative impacts to land use resulting from construction and operation of the proposed Grand Gulf ESP facility encompasses Claiborne County, Mississippi.

The staff reviewed the available information on the impacts on land use of constructing one or more additional nuclear units at the Grand Gulf ESP site. Cumulative impacts for land use include possible additional growth and land conversions to accommodate new workers and

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services. However, the impacts are expected to be minor as the construction work force and the operations work force are expected to be drawn from an area much wider than Claiborne County, to include the larger cities of Vicksburg, Natchez, and Jackson, Mississippi. Because the work force will be dispersed over these larger cities in the labor supply region, the induced impacts on land use (resulting from either construction or operations of one or more new units at the Grand Gulf ESP site) can be easily absorbed in that wider region. However information on transmission line improvements and associated changes in rights-of-way was not available at the ESP stage. Consequently, this issue is not considered to be resolved.

7.2 Air Quality

The Grand Gulf ESP site is in an area that is in attainment for criteria pollutants. Construction activities at the site may reduce air quality if unmitigated. However, SERI has included mitigation measures to minimize the impact of construction activities on air quality in its environmental report (SERI 2005). Considering the limited duration of construction activities and the mitigation measures described by SERI, the staff concludes that the impacts of construction activities on air quality would be small. Given this conclusion and the current air quality, the staff concludes the cumulative impacts of construction activities would be SMALL, and additional mitigation would not be warranted.

Operation of new nuclear units at the Grand Gulf ESP site would result in increases in some pollutant emissions at the site. Emissions for each unit would be approximately the same as the emissions for the existing GGNS. However, because of the magnitude and intermittent nature of the emissions, the staff concludes that the impacts of operation of new nuclear units at the Grand Gulf ESP site would be SMALL. These same factors lead the staff to conclude that the cumulative impacts of the operation of one or more new units and the existing unit on air quality would be SMALL, and additional mitigation would not be warranted.

Heat, water vapor, and drift plumes from cooling towers associated with operation of new nuclear units at the Grand Gulf ESP site may, on occasion, merge with the plumes from the existing GGNS cooling tower. The staff considers it unlikely that the impacts of the merged plumes on air quality would be significantly different from the impacts of the plume from the GGNS cooling tower. The staff concludes that the air quality impacts of cooling towers for one or more new nuclear units at the Grand Gulf ESP site would be SMALL. The staff also concludes the cumulative impacts on air quality of plumes from the cooling towers would be SMALL, and additional mitigation would not be warranted.

7.3 Water Use and Quality

The assessments performed by the staff and described in Sections 4.3 and 5.3 related to impacts of construction and operation of the proposed Grand Gulf ESP facility explicitly

considered the cumulative impacts of the existing GGNS facility. For instance, the CORMIX model assessment described in Section 5.3.2 was used to estimate the combined discharges of the existing GGNS facility and the proposed ESP facility. By assuming steady-state conditions at a distant future state, the staff adopted a conservative approach to processes that may change incrementally over time. For instance, groundwater drawdown considerations reflected the steady-state drawdown based on population projections well into the future.

7.3.1 Surface Water Use

The watersheds contributing flow to the two streams in the Grand Gulf ESP site are nearly contained within the proposed ESP site, and the remaining drainage area outside the ESP site area would not be expected to change significantly. Therefore, changes in surface water supply outside the site would not alter the surface water conditions of the site's two streams.

Even with alterations in climate patterns and further demands for water upstream of the Grand Gulf ESP site, the Mississippi River is expected to remain the largest and most significant waterway in the United States. Continued regulation of the flow and management of the shoreline by the U.S. Army Corps of Engineers is expected to preserve the course and flow of the Mississippi. No activity at the Grand Gulf ESP site by itself, nor other activities outside the site, would be expected to alter fundamentally the character of the Mississippi River.

Based on the above, the staff concludes that the cumulative impacts of surface water use at the Grand Gulf ESP site would be SMALL, and additional mitigation would not be warranted.

7.3.2 Groundwater Use

The staff found that the information provided by SERI (2005) was not adequate to reliably assess the potential incremental drawdown of the groundwater elevation associated with groundwater wells proposed in the Catahoula formation for the Grand Gulf ESP facility. Consequently, this issue is not resolved. An applicant for a construction permit or combined license referencing the ESP for the Grand Gulf ESP site would be required to provide additional information on the suitability of the Catahoula formation as a source for such water.

7.3.3 Surface Water Quality

As noted above, the watersheds contributing flow to the two streams in the Grand Gulf ESP site are nearly contained within the ESP site, and the land use of the remaining drainage area outside the site would not be expected to change significantly. Therefore, changes in surface water quality outside the site would not alter the surface water quality of the site's two streams.

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The Mississippi River is such a critical national resource that efforts to preserve or improve its quality are expected. Activities at the Grand Gulf ESP site would not fundamentally alter the quality of the Mississippi River because of its vast flow. However, information on the chemical discharges from the proposed facility are unavailable at the ESP stage. Consequently, this issue is not resolved.

7.3.4 Groundwater Quality

The Catahoula aquifer has been identified by the U.S. Environmental Protection Agency Administrator as a sole-source aquifer (EPA 1998). As such, activities over the Catahoula are receiving special attention to protect its quality. The staff identified a range of impacts on groundwater quality that could result, based on available information. Consequently, this issue is not resolved.

7.4 Terrestrial Ecosystem

Construction and operation of one or more new units at the Grand Gulf ESP site were evaluated to determine the magnitude of their contribution to regional cumulative adverse impacts on terrestrial ecological resources. Determinations for construction were made for important terrestrial species (animal and plant) and habitats (as defined in NRC 2000) by evaluating the effect of construction in light of other past, present, and future actions in the region. Determinations for operation were made for resource attributes normally affected by cooling tower operation, transmission line operation, and right-of-way maintenance. For this analysis, the geographic region encompassing past, present, and foreseeable future actions is the area immediately surrounding the Grand Gulf site, including adjoining sections of the Mississippi River bottomland and loess bluffs to the north and south and west into Louisiana, and the area surrounding the existing GGNS Unit 1 transmission line rights-of-way.

The area around the Grand Gulf site and GGNS Unit 1 transmission line rights-of-way is rural. Land cover currently consists primarily of upland and bottomland hardwood forests and secondarily of agricultural fields and pasture. Because agriculture is not the primary land use in the area, this area likely has incurred only relatively minor losses of terrestrial plant and animal species and habitats during agricultural conversion, which means most of the species affected likely still occur in neighboring forested areas. For example, the area is known to have been used historically by the Louisiana black bear (*Ursus americanus luteolus*), a Federally threatened species. The Louisiana black bear may have been observed on and near the Grand Gulf site and could occur on the site and in the vicinity. Construction could destroy or displace bears and reduce the suitability of habitat (for example, via fragmentation) or preclude it from future use (for example, via replacement with facilities). This possibility appears greatest in the bottomland area (along the Mississippi River) of the Grand Gulf ESP site, the portion of the site

most likely to be used by bears. However, such an impact would be unlikely, given the relatively small amount of bottomland forested wetland that would be disturbed.

Construction of the proposed unit or units at the Grand Gulf ESP site would disturb 22 ha (55 ac) of bottomland hardwood forest and 59 ha (145 ac) of upland hardwood forest for permanent structures and facilities and equipment staging and borrow areas. In addition, an undetermined amount of mostly upland hardwood forest could also be disturbed by construction for transmission system improvements such as the addition of new transmission lines (see Section 4.1.2). If construction for the addition of new transmission lines occurred entirely within the existing rights-of-way (see Section 4.1.2), the overall contribution of construction of the proposed Grand Gulf ESP facility to cumulative losses of important species (including the Louisiana black bear) and habitats in the region would be SMALL. However, if construction for the addition of new transmission lines required doubling the width of the existing rights-of-way or creation of one or more new rights-of-way (see Section 4.1.2), the overall contribution of construction of the proposed Grand Gulf ESP facility to cumulative losses of important species and habitats in the region would be MODERATE. During the review for this ESP application, no other present or future actions in the region were identified that could significantly affect terrestrial species or habitats.

During the review of the SERI ESP application, no other past, present, or future actions in the region were identified that could significantly affect wildlife and wildlife habitat in ways similar to those associated with Grand Gulf ESP facility cooling tower operation (cooling tower noise; adverse effect on crops, ornamental vegetation, and native plants from cooling tower salt drift; and birds colliding with cooling towers). Thus, because these impacts were considered negligible for the Grand Gulf ESP facility, the cumulative adverse impact of these types of activities in the region would also be considered minor. Consequently, the staff concludes that the contribution of Grand Gulf ESP facility cooling tower operation to cumulative impacts on wildlife and wildlife habitat in the region would be negligible.

During the review of the SERI ESP application, no other past, present, or future actions in the region were identified that could significantly affect wildlife and wildlife habitat in ways similar to those associated with Grand Gulf ESP facility transmission line operation and right-of-way maintenance (birds colliding with transmission lines; flora and fauna affected by electromagnetic fields and right-of-way maintenance; and floodplains and wetlands affected by right-of-way maintenance). Thus, because these impacts were considered negligible for the Grand Gulf ESP facility, the cumulative adverse impacts of these types of activities in the region would also be minor. Consequently, the staff concludes that the contribution of the operation of transmission lines and the maintenance of transmission line rights-of-way to cumulative impacts on wildlife and wildlife habitat in the region would be negligible.

In summary, the need for new transmission lines and selection of one or more routes has not been established at this time. An analysis would be conducted by the transmission and

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distribution system owner and operator under the regulatory process described in Section 4.1.2 prior to or during the CP or COL phase. Therefore, the staff concludes that the contribution of construction of the Grand Gulf ESP facility to cumulative impacts on terrestrial ecological resources in the region is unresolved.

The staff also concludes that the contribution of operation (including cooling tower operation and operation of the upgraded GGNS Unit 1 transmission lines and maintenance of the associated expanded transmission line rights-of-way) and eventual decommissioning of the facility to cumulative impacts on terrestrial ecological resources in the region would be SMALL, and additional mitigation would not be warranted.

7.5 Aquatic Ecosystem

The staff evaluated the magnitude of impacts on regional aquatic ecological resources from construction and operation of one or more new units at the Grand Gulf ESP site. Determinations for construction were made for the generic categories of important aquatic species (animal and plant) and habitats (as defined by NRC 2000) by evaluating the effect of construction in light of other past, present, and future actions in the region. Determinations for operation were made for resource attributes normally affected by the cooling water system. This includes an evaluation of the potential effect of water intake, consumption, and discharge. For this Chapter 7 analysis, the geographic region encompassing past, present, and foreseeable future actions is the area immediately surrounding the Grand Gulf ESP site, including adjoining sections of the Mississippi River and the area surrounding the existing GGNS Unit 1 and transmission line rights-of-way.

From an aquatic ecological perspective, the construction of GGNS Unit 1 in the 1970s did not change the Mississippi River significantly. The construction of radial wells, which collect makeup water by extracting groundwater near the river shoreline, and the discharge structure only caused temporary disruption of the shoreline habitat. While pre-construction surveys indicated that organisms living in the shoreline habitat were few, the stabilization of the banks with concrete mats (completed by the late 1970s along the entire reach of the river in the vicinity of the Grand Gulf site) further limited habitat for benthic organisms in the shoreline region. Few other changes have affected the river habitat since the construction of GGNS Unit 1, outside of the occasional dredging activities.

Construction related to the Grand Gulf ESP facility intake and discharge systems would have minimal and temporary impacts on aquatic organisms. No species of special interest or Federally or State-listed threatened and endangered species are expected to be affected by construction activities. The staff concludes the overall contribution of construction to cumulative losses of aquatic organisms in the region would be minor, and no further mitigation would be needed beyond that identified in Section 4.4.2.

The staff considered the potential cumulative impacts related to water use and to impingement and entrainment of aquatic organisms. GGNS Unit 1 uses radial wells, which do not impinge or entrain aquatic organisms. Operation of the proposed ESP facility intake structure would lead to some future impingement and entrainment of aquatic organisms. Future actions for this analysis are considered to be those for operation of the proposed facility through a complete license term and the time for the licensee to complete decommissioning of the new nuclear unit or units.

SERI's current plans include the use of an intake structure that is of similar design to the ones used at River Bend Station. The location of the intake structure near the entrance of the embayment and off the bottom of the river would likely decrease impingement by removing the structure from areas with a higher concentration of fish. The water consumed for the proposed facility would be approximately 0.2 percent of the flow of the river at extreme low-flow conditions. The intake screens would be sized so the average intake through the screen would have a flow velocity of less than or equal to 0.15 m/s (0.5 ft/s). Based on these design plans, impingement and entrainment during operation of the proposed facility would be minimal.

Operation of the proposed intake structure would not be expected to affect species of special interest or Federally or State-listed threatened and endangered species. Decommissioning of the proposed facility would result in the cessation of water consumption from the river and the impingement and entrainment impact would end. Therefore, the staff concludes the contribution of the cooling water intake operation from one or more new nuclear units to the cumulative impact on aquatic organisms in the region would be negligible, and additional mitigation would not be warranted.

The staff also considered the potential cumulative impacts related to water discharge. The geographical area over which the cumulative effects were considered for past, present, and future actions is the Mississippi River. Since the operation of GGNS Unit 1 began, heated effluent has been discharged into the river. The size of the plume that includes the combined discharge from both GGNS Unit 1 and the proposed Grand Gulf ESP facility would be small in comparison to the length and width of the Mississippi River along the Grand Gulf site. Operation of the proposed discharge structure would not be expected to affect species of special interest or Federally or State-listed threatened and endangered species.

The amount of water, its temperature and chemical composition, are regulated by the Mississippi Department of Environmental Quality (MDEQ) through the National Pollutant Discharge Elimination System (NPDES) permit program. The MDEQ regulates point sources discharging pollutants to ensure the protection and propagation of a balanced, indigenous population of fish, shellfish, and other aquatic organisms. The MDEQ is required to take into consideration the cumulative impacts of multiple discharges to the same body of water. Discharges from all sources on the Grand Gulf site and other area facilities would be included in the review and development of permit requirements for a new nuclear unit or units.

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Additionally, all NPDES permits must be renewed every 5 years, allowing MDEQ to ensure the permit limits provide the appropriate level of protection to the environment. During the review of the proposed Grand Gulf ESP site, the impacts from discharge of heated effluent (for example, water temperature, dissolved oxygen, thermal stratification, impact to fauna), cold shock, and chemical treatment of the cooling water were considered. Because the NPDES permit issued by MDEQ would govern the operational impacts on the aquatic environment whether the facility operates alone or jointly with GGNS Unit 1 under a cumulative effect scenario, the operational impacts of water discharge on aquatic organisms would be minor.

In summary, the staff concludes that the contribution of construction, operation (including operation of the intake structure), and eventual decommissioning of the Grand Gulf ESP facility to the cumulative impacts on aquatic ecological resources in the region would be SMALL, and additional mitigation would not be warranted.

7.6 Socioeconomics, Historic and Cultural Resources, Environmental Justice

Much of the analyses of socioeconomic impacts presented in Sections 4.5 and 5.5 already incorporate cumulative impact analysis because the metrics used for analysis only make sense when placed in the total or cumulative context. For instance, the impact of the total number of additional housing units that may be needed can only be evaluated with respect to the total number that will be available in the affected area. Therefore, the geographical area of the cumulative analysis varies depending on the particular impacts considered, and may depend on specific boundaries, such as taxation jurisdictions, or may be distance-related, as in the case of environmental justice.

Given the current plans and construction activities for road improvements in the region of the Grand Gulf ESP, the potential cumulative increase in the number of vehicles during a combined outage, construction, and permanent workforce egress and ingress into the site are unlikely to have an adverse impact on the local road system.

The construction and operation of one or more additional units at the Grand Gulf ESP site would not be likely to add to any cumulative socioeconomic impacts beyond those already evaluated in Sections 4.5 and 5.5. In other words, the impacts of issues such as transportation or taxes are not likely to be detectable beyond the regions previously evaluated and will quickly decrease with increasing distance from the site. The staff concludes that construction impacts would generally be SMALL, but there are exceptions if more workers than expected settle in Claiborne County and Jefferson County, in which case a MODERATE impact level may be reached for the impacts on roads, housing, and some public services. In terms of beneficial effects, the impacts on regional economies would be MODERATE beneficial in Warren County

and tax revenues benefit to Claiborne County would be beneficially LARGE under current Mississippi law, but would depend on how taxation of the new unit or units is resolved by the state of Mississippi.

With regard to historic and cultural resources, the construction and operation of the proposed additional unit or units at the Grand Gulf ESP site would not add to the cumulative impacts on these resources beyond those identified in Sections 4.6 and 5.6. SERI will have procedures to ensure that either known or newly discovered historic and cultural sites would not be inadvertently affected during onsite activities that involve land disturbances. Construction, operation, and maintenance of the new facility would not affect land outside the bounds of current GGNS facility operations. Therefore, any additional cumulative impacts would be negligible.

The staff found no unusual resource dependencies or practices or environmental pathways through which minority and low-income populations would be disproportionately affected. As a result, the cumulative environmental impacts related to environmental justice would be SMALL. If tax revenues dramatically increase, the residents of Claiborne County (who are disproportionately minority and low-income) would enjoy LARGE beneficial tax revenue impacts. However, if significant demands are placed on Claiborne County services as a result of more workers than expected settling in the county (without a corresponding increase in tax revenues), the socioeconomic impacts of reduced services or higher taxes would fall disproportionately on the residents of the county. In that case, the environmental justice impacts would be MODERATE.

The conclusion of LARGE net beneficial impacts by the NRC staff was based on certain assumptions. These include: there would be no more than 3150 construction workers and 1160 new operations workers at the Grand Gulf ESP site; no less than 50 percent of these workers would come from the 80-km (50-mi) region surrounding the site; new workers would tend to live in the larger communities in the region; there are no significant changes in the terms and conditions for taxability of real property under Mississippi tax law; and regional populations of minority and low-income populations will remain in the same geographic locations. The specific level within the wide range of possibilities depends largely on to what extent the local communities have access to the tax base represented by the new units.

7.7 Nonradiological Health

In Section 5.8.1, the cumulative health impacts of construction and operation of the existing GGNS Unit 1 and proposed ESP unit(s) on the ambient temperature of the Mississippi River with regard to potential formation of thermophilic microorganisms were evaluated. The evaluation showed that the addition of the Grand Gulf ESP unit(s), which would use cooling towers as the source of cooling, would not be a significant impact because the discharge would

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be into a large river. SERI (2005) currently uses biocides to reduce hazards from microbiological organisms in the cooling towers for GGNS Unit 1, and has committed to employ appropriate industrial hygiene practices to protect the occupational workers from the effect of thermophilic microorganisms in the cooling towers for the new unit(s). Health risk to workers is expected to be dominated by occupational injuries at rates below the average U.S. industrial rates. Health impacts on the public and workers from noise and dust emissions were also evaluated and found to be small. The staff concludes that the cumulative impacts on nonradiological health would be SMALL, and additional mitigation would not be warranted. Impacts from electromagnetic fields remain unresolved.

7.8 Radiological Impacts of Normal Operations

The radiological exposure limits and standards for the protection of the public and for occupational exposures have been developed assuming long-term exposures, and therefore incorporate the cumulative impact. As described in Section 5.9, the public and occupational doses predicted from the proposed operation of the Grand Gulf ESP unit or units would be well below regulatory limits and standards. Specifically, the site boundary dose to the maximally exposed individual from the existing unit and the proposed new unit(s) combined would be well within the regulatory standard 40 CFR Part 190. For purposes of this environmental impact statement (EIS) analysis, the geographical area within 80-km (50-mi) of the Grand Gulf ESP site was included.

As stated in Section 2.5, SERI has conducted a radiological environmental monitoring program around the Grand Gulf site since 1978. The radiological environmental monitoring program measures radiation and radioactive materials from all sources including GGNS. The NRC and the State would regulate any reasonably foreseeable future actions that could contribute to the cumulative radiological impact.

Therefore, the staff concludes that the cumulative radiological impacts of operation of the Grand Gulf ESP facility and the existing operating GGNS Unit 1 would be SMALL, and additional mitigation would not be warranted. Issues related to gas-cooled reactor design accidents are not considered to be resolved because of the lack of information.

7.9 Fuel Cycle, Transportation, and Decommissioning

The addition of the proposed unit(s) at the Grand Gulf ESP site would result in the need for additional fuel. The impacts of producing this fuel include mining of the uranium ore, milling of the ore, conversion of the uranium oxide to uranium hexafluoride, enrichment of the uranium hexafluoride, fuel fabrication where the uranium hexafluoride is converted into uranium oxide fuel pellets, and disposition of the spent fuel in a proposed Yucca Mountain repository. As discussed in Section 6.1 of this EIS, the environmental impacts of fuel-cycle activities for the

proposed unit(s) would be a maximum of four times those presented in Table S-3 (10 CFR 51.51). Table S-3 provides the environmental impacts from uranium fuel cycle operations for a model 1000-MW(e) light-water reactor operating at 80 percent capacity with a 12-month fuel loading cycle and an average fuel burnup of 33,000 MWd/MTU. Per 10 CFR 51.51(a), the NRC staff considers the impacts in Table S-3 to be acceptable for the 1000-MW(e) reference reactor. As discussed in Section 6.1.1 of this EIS, advances in reactors since the development of Table S-3 impacts will have the effect of reducing environmental impacts of the operating reference reactor. For example, a number of fuel management improvements have been adopted by nuclear power plants to achieve higher performance and to reduce fuel and separative work (enrichment) requirements. Fuel cycle impacts would occur not only at the Grand Gulf site but would also be scattered to other locations in the United States or, in the case of foreign-purchased uranium, in other countries. The NRC staff considers the cumulative fuel cycle impacts of operating GGNS and the proposed ESP unit(s) for the 1000-MW(e) light-water reactor scaled model to be SMALL. Cumulative impacts for other than light-water reactor designs are not resolved.

The addition of the proposed ESP unit(s) would result in additional shipments of unirradiated fuel to the site and additional shipments of spent fuel and waste from the site. Cumulative impacts would be approximately twice that of the existing operating plants. Environmental impacts from transportation of unirradiated fuel, spent fuel, and waste are found in Section 6.2 of this EIS based on specific reactor types proposed for the proposed ESP unit(s). The following conclusions were derived from the NRC staff's analysis of unirradiated fuel shipments: (1) the number of unirradiated fuel shipments equates to less than one truck shipment per day within criteria specified in Table S-4 of 10 CFR 51.52, (2) annual dose to workers and the public would be less than the dose specified in Table S-4, and (3) health impacts are projected to be small (i.e., less than 1×10^{-4} detriment/yr). The following conclusions were derived from the NRC staff's analysis of spent fuel: (1) after accounting for conservative assumptions in the staff's evaluation, doses to the worker and the public would be within criteria specified in Table S-4, and (2) health impacts from normal conditions and accident conditions would be small (i.e., less than 0.1 detriment/yr). Regarding transportation of waste shipments, the NRC staff concluded that the normalized number of waste shipments would be within the value specified in Table S-4 for the 1100-MW(e) reference reactor. Cumulative impacts of transportation, for operating both GGNS and the proposed light-water reactor ESP unit(s), would be SMALL. Cumulative impacts for other than light-water reactor designs are not considered to be resolved. As discussed in Section 6.3 of this EIS, environmental impacts from decommissioning are expected to be small as the licensee would have to comply with decommissioning regulatory requirements. In Supplement 1 to NUREG-0586, *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities*, the NRC staff found the impacts on radiation dose to workers and the public, waste management, water quality, air quality, ecological resources, and socioeconomics to be small (NRC 2002). However, because SERI was not required to (and did not) submit information regarding decommissioning in its ESP application, this issue is not resolved.

7.10 Staff Conclusions and Recommendations

The staff evaluated in a cumulative sense the potential impacts resulting from construction and operation, including decommissioning, of one or more new nuclear units at the Grand Gulf ESP site. For the duration of the proposed action (construction period plus 40 years of operation), the evaluation took into account the potential impacts from factors known or likely to affect the environment. This included considering conditions at the site and surrounding vicinity from past, present, and future human activities.

For each impact area, the staff concludes the potential cumulative impacts resulting from construction and operation are generally SMALL, and additional mitigation would not be warranted. However, several areas (ecological impacts from construction, socioeconomic impacts, and environmental justice) have the potential for a MODERATE impact. In these cases, mitigation measures may be warranted, including habitat restoration and assistance with infrastructure and public services in Claiborne County. In certain cases (land use, water use and water quality, terrestrial ecosystems, nonradiological health, radiological impacts of operation of non-light-water reactor designs, and decommissioning), information was not available to resolve issues. In these cases, an applicant for a construction permit or a combined license referencing the Grand Gulf ESP would have to provide the necessary information at that stage.

7.11 References

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."

40 CFR Part 190. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations."

40 CFR Part 1508. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 1508, "Council on Environment Quality."

System Energy Resources, Inc. (SERI). 2005. *Grand Gulf Site Early Site Permit Application*. Revision 2, Jackson, Mississippi. Available at <http://www.nrc.gov/reading-rm/adams.html>, Accession No. ML052780449.

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U.S. Nuclear Regulatory Commission (NRC). 2000. *Standard Review Plans for Environmental Reviews for Nuclear Power Plants*. NUREG-1555, Office of Nuclear Reactor Regulation, Washington, D.C. Available at <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1555/>. |

U.S. Nuclear Regulatory Commission (NRC). 2002. *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1, Regarding the Decommissioning of Nuclear Power Reactors*. NUREG-0586, Supplement 1, Volumes 1 and 2, Washington, D.C. |