10.2 Irreversible and Irretrievable Commitments of Resources

This section identifies and describes the predicted irreversible and irretrievable commitment of resources that would be involved with the construction and operation of STP 3 & 4. The term “irreversible commitment of resources” applies to environmental resources that could not be altered at some later time, by practical means, to restore the resource’s present order state before construction of STP 3 & 4. “Irretrievable commitment of resources” applies to material resources that, when used by construction or operation of STP 3 & 4, cannot, by practical means, be recycled or restored for other use. This section will summarize the predicted irreversible and irretrievable commitments of resources which will be input into the final benefit-cost balancing of the project.

10.2.1 Irreversible Commitments of Environmental Resources

In the construction and operation of any electric generating station, few environmental resources are irreversibly committed to the facility beyond its operational life. The irreversible commitments of resources resulting from the construction of STP 3 & 4 are categorized below and discussed in the following sections.

- Land use resources
- Water resources
- Ecological resources (terrestrial and aquatic)

10.2.1.1 Land Use Commitments

STP 3 & 4 will be constructed within the existing STP site on 540 acres previously cleared during the construction of STP 1 & 2 and designated for industrial use. Approximately 300 acres of the 540 acres disturbed during site preparation and construction would be dedicated to STP 3 & 4 and its supporting facilities. Once STP 3 & 4 cease operations and the plant is decommissioned in accordance with NRC requirements, the land that supports the facilities could be used for future industrial or nonindustrial use. However, the land committed to the disposal of radioactive and non-radioactive wastes generated as a result of construction and operation of STP 3 & 4 will be governed by the applicable regulations and permits and could not be used for other purposes. The land used for disposal, while not available for other uses, is not considered irreversible since it could be remediated for future use.

10.2.1.2 Water Resource Commitments

As discussed in Chapter 3, the STP 3 & 4 closed-cycle cooling system and ultimate heat sink will require makeup water to replace water lost to evaporation, drift and blowdown. The source of this makeup water will be groundwater and the Colorado River. Once the groundwater is extracted from the aquifer, it is consumed or discharged to the Main Cooling Reservoir (MCR) making it unavailable as a future groundwater resource. The water pumped from the Colorado River would also be consumed or discharged to the MCR making it unavailable as a river resource. In addition, water resources consumed during normal operation of STP 3 & 4 would also

not be readily available as a future resource but should not affect the overall availability of water resources for the area.

10.2.1.3 Ecological Commitments (Terrestrial and Aquatic)

There will be impacts to vegetation and temporary relocation of terrestrial wildlife due to construction and operation of STP 3 & 4. Suitable habitat for most of the species affected is available adjacent to the STP site.

Approximately 240 acres of the 540 acres of vegetation impacted will be restored to preconstruction conditions and will be available as habitat upon completion of construction. In addition, the decommissioning of STP 3 & 4 could eventually result in complete restoration of the area to preconstruction conditions.

Similarly, the aquatic ecology found in streams and wetlands on site would be affected by the construction and operation of STP 3 & 4. There are no important aquatic ecosystems on the STP site or in the Colorado River near the site. Most of the impacts are SMALL and occur during the construction phase of the project; however, loss of aquatic resources such as benthic organisms, fish, and shellfish as a result of impingement and entrainment at the Colorado River intake structure will continue with operation of STP 3 & 4. When STP 3 & 4 are decommissioned, those aquatic resources will return to preoperational levels. Because of the abundance of these resources in the vicinity of the site, the irreversible loss of aquatic resources associated with construction and operation of STP 3 & 4 will have no impact on overall populations.

10.2.2 Irretrievable Commitments of Material Resources

Construction of STP 3 & 4 requires large quantities of building materials that would be considered irretrievable commitments of resources unless they are recycled at decommissioning. Construction materials used for STP 3 & 4 will be similar to that of any major, multiyear construction project. Unlike the earlier generation of nuclear plants, asbestos and other materials considered hazardous will not be used in accordance with safety regulations and practices. The Department of Energy report (Reference 10.2-1) on new reactor construction estimates:

- 12,239 yards of concrete and 3107 tons of rebar for a reactor building
- 2,500,000 linear feet of cable for a reactor building
- 6,500,000 linear feet of cable for a single reactor
- Up to 55,000 feet of piping greater than 2.5 inches for a single 1000 MWe reactor

Specifically for an Advanced Boiling Water Reactor (ABWR), an estimated 13,000 tons of steel and 240,000 cubic yards of concrete will be required. While the amounts of these materials required will be large, the amounts will not be atypical of other types of power plants such as hydroelectric and coal-fired plants, nor of many large industrial facilities (e.g., refineries and manufacturing plants) that are constructed throughout the United States. Use of construction materials in the quantities associated with those

expected for a nuclear power plant, while irretrievable unless they are recycled at decommissioning, will have a small impact with respect to the availability of such resources.

In 1992, the United States Congress authorized the U.S. Defense National Stockpile Centers (DNSC) to sell overstocked commodities (i.e., metals and minerals) owned by the Department of Defense. With 99% of stockpiled materials determined to be excess, DNSC is aggressively selling these materials (Reference 10.2-2). Therefore, use of such materials for the construction and operation of STP 3 & 4 in the quantities associated with those expected for a nuclear power plant, while irretrievable, will have a SMALL impact due to the abundance and availability of such resources. As an example, 460 million cubic yards of concrete (Reference 10.2-3) and 96 million metric tons of steel (Reference 10.2-4) are produced in the Unites States annually. The amount of materials used for STP 3 & 4 will likely be an insignificant fraction of the total such resources used in the United States.

During operations, the main resource irretrievably committed is the uranium used in the fuel cycle. Approximately 17,000 metric tons of enriched uranium is required for each ABWR over an assumed 60-year life of the plant. The World Nuclear Association studies the supply and demand of uranium and states that uranium is ubiquitous on Earth. Uranium is a metal approximately as common as tin or zinc, and it is a constituent of most rocks and even of the sea. The known recoverable reserves of uranium are over four million tons (Reference 10.2-5). Therefore, the uranium that will be used by STP 3 & 4 to generate power, while irretrievable, will have a SMALL impact with respect to the long-term availability of uranium worldwide.

Other irretrievable commitments of resources include those materials (presented under Subsection 5.5.2.1) used for the normal industrial operations of the plant (e.g., miscellaneous supplies, anti-freeze, waste oil) that cannot be recovered or recycled or that are consumed or reduced to unrecoverable forms.

10.2.3 References

10.2-1 “Application of Advanced Construction Technologies to New Nuclear Power Plants – MPR-2610,” U.S. Department of Energy, prepared under Contract DE-AT01-020NE23476, Revision 2, September 24, 2004.

10.2-2 2005 Secretary of Defense Environmental Awards Defense Logistics Agency Defense Stockpile Center Environmental Quality Team Award, available at https://www.denix.osd.mil/denix/Public/News/OSD/SecDef05/EQ/EQ_IT_DNSC.pdf, accessed March 22, 2007.

10.2-3 “Ready Mix Concrete Production for U.S. through May 2007,” National Ready Mixed Concrete Association, available at http://www.nrmca.org/concrete/data.asp, accessed July 23, 2007.

10.2-4 “U.S. Geological Survey, Mineral Commodity Summaries, January 2007,” U.S. Geological Survey (USGS), available at http://minerals.usgs.gov/minerals/pubs/commodity/iron_&_steel/, accessed July 23, 2007.

10.2-5 “Supply of Uranium” March 2007, World Nuclear Association, available at http://www.world-nuclear.org/info/inf75.html, accessed March 21, 2007.