3.9S Construction Activities

As discussed in Section 1.1, STP is developing a combined license (COL) application for the construction and operation of two new units at the STP site. Although a description of construction activities in the Environmental Report (ER) is not required in accordance with NUREG-1555, STP has elected to provide a description of construction activities for STP 3 & 4. The description of activities is pertinent to addressing potential impacts of plant construction as discussed in Chapter 4. Both preconstruction and construction activities, processes, and procedures are discussed in the following paragraphs.

STPNOC anticipates site activities will be performed in the following sequence:

- Preconstruction planning and exploration activities will include such site activities as soil boring/sampling and monitoring wells or additional geophysical borings as allowed by 10 CFR 50.10(a)(2) and the removal and/or relocation of existing facilities in the new plant footprint.

- Site preparation activities will include installation of temporary facilities, construction support facilities, service facilities, utilities, docking and unloading facilities, excavations for facility structures and foundations, and construction of structures, systems and components (SSCs) that do not constitute Limited Work Authorization Activities (LWA) activities as defined by 10 CFR 50.10(a)(1).

- LWA activities for SSCs as set forth by 10 CFR 50.10(a)(1) will include, subsurface preparation, placement of backfill and concrete within an excavation, and installation of foundations prior to the issuance of the COL (Note: The need for an LWA has not yet been determined. These activities may be performed under the COL).

- Construction activities will include the major power plant construction activities under the COL.

For the purposes of analysis in the ~~Environmental Report~~ ER, STPNOC will assume a construction schedule based on providing additional electric generation in 2015 (STP 3) - 2016 (STP 4). The description of site preparation and construction activities in this section will assume that construction on STP 3 will begin following the site preparation for STP 3 & 4, and construction of STP 4 will begin 12 months following commencement of STP 3 construction. The schedule assumes a 12-month duration for site preparation activities, and a 12-month duration for LWA activities, if performed, with the start of major power plant construction activities after the COL is issued. A time period of 45 months from issuance of the COL to fuel load is assumed for STP 3, six months from fuel load to commercial operation for STP 3, and 12 months between start of commercial operation of STP 3 & 4.

If the time between construction starts on the two units is extended, the overall construction time will be extended. The duration of sequential construction of STP 3 & 4 is estimated to be approximately seven and one-half years (from pre-LWA activities

to commercial operations). STPNOC believes this to be a realistic construction schedule scenario.

In addition to the site preparation activities, STPNOC may submit for NRC approval an LWA request to conduct safety-related subsurface and foundation installation activities. STPNOC also plans to provide temporary construction fabrication facilities and laydown space for staging of long lead-time module components to support the construction schedule. These components will be assembled on site into modules as part of the preconstruction activities. The impacts from locating these facilities on site are evaluated as part of this ~~Environmental Report~~ ER.

3.9S.1 Construction Procedures and Processes

As part of the overall construction program for STP 3 & 4, procedures and processes are necessary to ensure protection of the local environmental conditions during construction. These procedures and processes include developing a construction environmental controls plan, which is discussed in the following paragraphs.

3.9S.1.1 Construction Environmental Controls Plan

The construction environmental controls plan contains descriptions of the environmental management controls that may be used at the STP site to assist in meeting the overall environmental management objectives for the project.

The processes for achieving these objectives include:

- Summary Matrix of Environmental and Permit Requirements for Construction

  A summary matrix of environmental requirements for construction will be prepared for the relevant construction phase environmental requirements. The summary may include a listing of the specific permit requirements for STP 3 & 4, the titles of the individuals responsible for ensuring compliance with each requirement, and the calendar or scheduled activity start dates by which compliance with each requirement must be completed and the current status of each action item. Section 1.2 generally describes the permits required for construction.

- Environmental Awareness Training

  Environmental awareness training will be required as part of the site orientation for all construction personnel. The type of training will be based on the need and types of job function at the site. The training will be provided before construction personnel will perform work at the STP site. The training would be based on the environmental requirements applicable to STP 3 & 4 and will cover such topics as general site maintenance, erosion and sediment control, protection of sensitive areas, hazardous material/waste handling, and spills prevention and response. The training sessions would stress the importance of maintaining “environmental awareness” as part of the employee's everyday duties. Environmentally sensitive areas on and adjacent to the site, as well as construction exclusion zones, would be described and located on project drawings.

- Environmental Compliance Reviews/Coordination Meetings

  Periodic site environmental compliance reviews/coordination meetings between site project personnel would be conducted to discuss current and future construction work activities as they relate to maintaining environmental compliance. The meeting would also provide a forum to discuss and resolve any outstanding environmental corrective actions/issues.

- Environmental Compliance Inspections and Documentation

  Periodic environmental compliance field inspections of construction activities would be performed by STP personnel. The field inspections would be conducted and documented to confirm that the site activities remain in compliance with the applicable environmental requirements for the project. Onsite areas/activities covered during the inspections include:

  – Adherence with approved clearing limits, buffers, and exclusion zones.

  – Adequate installation and maintenance of erosion and sediment control measures.

  – Correct implementation of required mitigation measures for work in and around environmentally sensitive resources as discussed in Section 4.6 (e.g., wetlands, rivers and streams, potential archeological sites).

  – Proper solid waste management activities (e.g., sufficient number of trash containers, waste segregation, use of designated storage areas, labeling).

  – Proper hazardous materials management activities (e.g., stored to minimize spills, reduce exposure, prevent fires/explosions).

  – Implementation of fugitive dust control measures (e.g., watering roads, covering truck loads).

  Environmental inspection reports would be used to document the results of each site inspection and to note and describe any areas of concern requiring corrective actions.

3.9S.2 Environmental Procedures

Although current STP site environmental procedures address regulatory and permit requirements, additional permit requirements may be incorporated that address specific measures for mitigation of environmental impacts during the construction phase. Various types of environmental procedures for the construction of STP 3 & 4 are discussed in the following paragraphs.

3.9S.2.1 Noise and Vibration

Procedures related to mitigating noise and vibration impacts from construction activities may include measures such as restricting noise and vibration generating activities to daylight hours, prohibiting construction activities from specific roads and

neighborhoods, use of less vibration producing equipment and/or methods (e.g., dampeners, staggering activities), and verifying that noise control equipment on vehicles and equipment is in proper working order. Notifications to regulatory agencies and nearby residents regarding atypical noise and vibration events (e.g., pile driving, steam/air blows) may also be performed.

3.9S.2.2 Air Quality (Fugitive and Vehicular Emissions)

Air quality protection procedures will describe the techniques that would be used to minimize the generation of fugitive dust from construction activities and reduce the release of emissions from construction equipment and vehicles. Fugitive dust control measures such as watering of roads, covering truck loads and material stockpiles, reducing materials handling activities, and limiting vehicle speed are typically required. Visual inspection of emission control equipment is also a common requirement.

3.9S.2.3 Erosion and Sedimentation Control

Erosion and sedimentation control procedures will describe the measures to be taken during the course of construction. These measures will cover temporary and permanent measures and all relevant detailed engineering drawings illustrating the permanent plant design. Depending on conditions and permit requirements for construction of STP 3 & 4, the information may include:

- Clearing limits and maintenance of existing vegetative cover
- Site grading
- Topsoil stripping and stockpiling
- Temporary erosion controls (e.g., silt fencing, mulching, erosion control blankets, temporary seeding)
- Permanent erosion controls (e.g., reestablishing natural drainage patterns, vegetated swales, permanent seeding/plantings)
- Check dams, rip-rap, retention/detention basins, and sediment barriers
- Slope restoration and protection
- Roads and equipment crossings
- Maintaining drainage patterns

3.9S.2.4 Construction Storm Water Management

Construction storm water management procedures would be established to describe the measures used to manage storm water runoff from construction areas and to prevent and/or minimize contamination of storm water due to project activities (e.g., hazardous material storage, waste management, material stockpiles).

Upon completion of the detailed design, the temporary and permanent storm water management measures will be addressed in the STP 3 & 4 Erosion and Sediment Control Plan and Storm Water Management Plan. These plans and the relevant detailed design drawings will be referenced therein, and will address the erosion and sedimentation control measures to be used to control storm water runoff and to prevent and/or minimize contamination of storm water from construction activities.

3.9S.2.5 Protection of Sensitive Resources

Procedures will be established to describe the mitigation measures for environmentally sensitive resources either within the STP site or in the immediate surrounding areas that have the potential to be adversely impacted during construction. These areas have been identified during preconstruction surveys of the site area as part of the overall development and permitting effort. Mitigation measures, if any required will be addressed under the STP 3 & 4 permits as discussed in Section 1.2.

The following lists some environmentally sensitive resources that may be encountered during construction activities at the STP site, along with the typical mitigation measures required to eliminate and/or minimize impacts on the resources.

- Wetlands — Primary mitigation measure is avoidance, based on preconstruction surveys and installation of exclusion fencing. Some activities may require temporary impacts to wetlands. These impacts will be mitigated by following permit conditions that may include:
  - Reduced clearing limits and preservation of existing vegetative cover
  - Maintenance of existing drainage patterns
  - Prohibitions/restrictions on equipment and vehicular travel
  - Prohibition of maintenance/refueling near wetland boundaries

  The requirements for restoring disturbed areas would also be addressed.
- Rivers and streams — Primary mitigation measure is avoidance through installation of exclusion fencing. Mitigation measures for direct impacts to waterways (e.g., crossing of a pipeline, constructing an access road, installing discharge pipe) may be spelled out in permits. Mitigation measures may include the following:
  - Limits on the length of time of the disturbance
  - Seasonal limits and restrictions for in-water work
  - Reduced clearing limits and preservation of existing vegetative cover near the stream banks
  - Installing only specified crossings (e.g., mat bridges)

  - Using silt curtains and other sediment transport barriers
  - Restrictions on fill activities and materials
  - Restoring stream beds, banks, and natural vegetation

- Areas of special status wildlife habitats or vegetation — Primary mitigation measure is avoidance, based on preconstruction surveys, establishment of buffer zones, and installation of exclusion fencing. In rare instances, construction activities may inadvertently encounter special status wildlife species, their habitat, or vegetation, in which case work in the immediate area would be halted and appropriate state agency officials and/or environmental consultants would be contacted to determine proper mitigation measures so that work may resume.

- Archeological/cultural resource areas — Primary mitigation measure is avoidance based on preconstruction surveys, establishment of buffer zones, and installation of exclusion fencing. In rare instances, construction activities may inadvertently encounter buried archeological/cultural resources, in which case work in the immediate area would be halted and archeological experts (such as representative from the State Historical Preservation Office) would be contacted to determine proper mitigation measures so that work may resume.

3.9S.2.6 Unanticipated Discoveries

Procedures addressing unanticipated discoveries would be developed to describe the process to be followed in the event such discoveries are made during construction. The procedures will address on and offsite notifications. Unanticipated discoveries may include:

- Contaminated or suspect soils and groundwater
- Drums and tanks
- Building foundations
- Cultural artifacts
- Bones

In the event this occurs, construction will be required to immediately stop work in the area of the unanticipated discovery and to immediately report the situation. For unanticipated discoveries that may be immediately hazardous to human health, the site safety representative would also be immediately notified. Additional investigations, sampling, analysis, and notifications to appropriate agencies may be required.

3.9S.2.7 Hazardous Materials Management

The hazardous materials management procedures will describe the management program that would be implemented and how petroleum products and chemical substances (termed “hazardous materials”) will be managed to minimize the potential

for threats to human health and the environment. The management program will address the need for Material Safety Data Sheets for all materials brought on site, and county, as well as state-specific requirements, regarding handling, storage, use, and disposal.

3.9S.2.8 Solid Waste Management (Hazardous/Nonhazardous Wastes)

Solid waste management procedures will be used to describe the management program for handling construction wastes generated at the site. The management program will address nonhazardous wastes and hazardous wastes through separate procedures. In all cases, the management program will be compliant with the relevant environmental requirements including county and state-specific waste handling and transportation practices and approvals, waste minimization activities, and offsite recycling of certain common construction wastes (e.g., used oil, antifreeze, scrap metal, wood).

3.9S.2.9 Asbestos and Lead-Based Paint

In the event that hazardous materials are encountered such as asbestos, asbestos-containing material, and lead-based paint, a process would be established to address the county and state-specific regulatory requirements (e.g., TCEQ requirements) for containment and/or removal of such materials by trained, authorized personnel. Site-specific procedures would also address regulations governing the overall management of the removal and abatement work including:

- Prework notifications
- Removal by certified contractors
- Handling prior to disposal
- Transport to and disposal at licensed facilities
- Post-work closure reports

3.9S.2.10 Spill Prevention and Response

The spill prevention and response procedures will address how to manage all hazardous materials and wastes in such a manner to prevent releases and to minimize the potential for threats to human health and the environment in the event of a release. The management program will address the need for secondary containment, spill response materials, spill thresholds for reporting the release to the environment (e.g., reportable quantities), emergency response actions, and notification requirements for project personnel and county/state agencies.

3.9S.2.11 Cleanup and Restoration

Procedures will be established to describe the requirements for cleanup and restoration of the STP site and any other areas used during construction (e.g., offsite laydown yards). Contractors will clean up and remove unused construction materials and debris, restore all surface (e.g., swales, roads, fences, gates, walls) and

subsurface (e.g., drainage tiles, wells, utilities) features in accordance with permit requirements, and adhere to the requirements regarding permanent stabilization, including revegetation of disturbed areas.

3.9S.3 Site Preparation Activities

The site preparation activities and approximate durations are described in the following sections. Beginning site preparation activities 12 months before the first major construction activity allows time for STPNOC to acquire the necessary permits (as discussed in Section 1.2), install temporary facilities (e.g., storage warehouses, concrete batch plant), relocate items within the STP 3 & 4 footprint, stage equipment, begin module assembly, and complete preparation activities to support power plant construction. These types of activities are intended to prepare the site for construction of STP 3 & 4. Typical construction activity durations are summarized in Table 3.9S-1.

3.9S.3.1 Installation and Establishment of Environmental Controls

The construction activities will comply with federal, state, and local environmental regulations and permit requirements. In addition, best management practices, such as silt fencing, will be used to minimize impacts during preconstruction, and construction activities will be performed in accordance with the Construction Environmental Controls Plan previously discussed in Subsection 3.9S.1.1.

3.9S.3.2 Road and Rail Construction

Construction access to the STP site will be via a paved road, Farm-to-Market (FM) 521. The construction traffic will minimize disruption of existing traffic patterns by entering the site from the north where FM 1468 meets FM 521, or via the west entrance to the plant property from FM 521. The existing STP 1 & 2 traffic will continue to enter from the east entrance off FM 521. To the extent practical, STPNOC will use the existing site road system and drainage systems installed during construction of STP 1 & 2 which are still in use. The existing drainage ditch that runs east and west through the STP 3 & 4 footprint, north of the existing switchyard, will be relocated to accommodate the new units. The new switchyard for STP 3 & 4 will be located north of the newly relocated drainage ditch, and a road system into the switchyard will be built.

A heavy haul route approximately 2-1/2 miles long will be built on site to support the transport of heavy modules and components from the existing heavy haul route from the barge slip. Adequate temporary traffic surfacing will be installed, as needed, as part of the heavy haul route. A tie-in to the existing haul route near the Security Department firing range will be constructed and the new section of heavy haul route will run north and east around the existing essential cooling pond, under the high-voltage transmission lines, then south into the STP 3 & 4 power block to the construction laydown and fabrication areas. Temporary construction parking lot, construction laydown and fabrication areas will be cleared, grubbed, graded, and graveled or paved with a road system to accommodate the site construction traffic. The existing rail line on site will be upgraded and the route to Buckeye, Texas will be reestablished. The upgrades will include the installation of new ballast or rail sections on the existing rail bed. Figure 3.9S-1 depicts the construction utilization plan, along with plant access roads, heavy haul roads, and other construction planning features.

3.9S.3.3 Security Construction

Security features will be installed during the early part of site preparation activities. Security structures will include access control points, fencing, lighting, physical barriers, and guardhouses.

3.9S.3.4 Temporary Utilities

Temporary utilities will include aboveground and underground infrastructure for power, communications, potable water, wastewater and waste treatment facilities, fire protection, and for construction gas and air systems. The temporary utilities will support the entire construction site and associated activities, including construction offices, warehouses, storage and laydown areas, fabrication and maintenance shops, the power block, the batch plant facility, measuring and testing equipment, and intake/discharge areas.

3.9S.3.5 Temporary Construction Facilities

Temporary construction facilities, including offices, warehouses (for receiving and storage), temporary workshops, sanitary toilets, change, training, and personnel access facilities (i.e., locker rooms) will be constructed. The site of the concrete batch plant will be prepared for aggregate unloading and storage, and the cement storage silos and the concrete batch plant will be erected.

3.9S.3.6 Laydown, Fabrication, Shop Area Preparation

Activities to support preparation of the laydown, fabrication, and shop areas include:

- Performing construction survey to establish local coordinates and benchmarks for horizontal and vertical control
- Grading, stabilizing, and gravel laydown areas
- Installing construction fencing
- Installing shop and fabrication areas including the concrete slabs for formwork laydown, module assembly, equipment parking and maintenance, fuel and lubricant storage, and rigging loft
- Installing concrete pads for cranes and crane assembly

3.9S.3.7 Clearing, Grubbing, and Grading

Temporary spoils, borrow, and topsoil storage areas will be established on the southwest parts of the STP site property (Figure 3.9S-1). Clearing and grubbing of the site will begin with the removal of vegetation. Topsoil will be moved to a storage area (for later use) in preparation for excavation. The general plant area, including the switchyard and Ultimate Heat Sink (UHS) areas will be brought to plant grade (approximate elevation of 30 feet above mean sea level) in preparation for foundation excavation. Existing buried utilities in the site area will be removed. The site utilization plans illustrates the areas to be cleared and graded.

3.9S.3.8 Underground Installations

Non-safety-related underground fire protection, water supply piping, sanitary system, compressed air and gas piping, and electrical power and lighting duct bank will be installed and backfilled.

3.9S.3.9 Unloading Facilities Installation

The existing rail line will be upgraded with adjacent construction laydown areas to support receipt of the bulk commodities. A spur into the batch plant area to support concrete materials unloading may also be installed during the upgrade. Concurrently, any crane foundations will be placed, and a heavy lift crane will be erected.

The existing barge slip will also require upgrades to accommodate roll-on and roll-off module receipt. Dredging of the river and slip area may also be required. Dredging of the barge slip and Colorado River will be coordinated with the U.S. Army Corps of Engineers under the existing permit (Section 1.2), and dredge material will be deposited in existing ~~dredge fill~~ dredged material disposal areas adjacent to the barge slip.

3.9S.3.10 Intake/Discharge Coffer Dams and Piling Installation

A permanent sheet pile cofferdam system will be installed on the east and west side of the intake/discharge ~~main cooling reservoir~~ Main Cooling Reservoir (MCR) north separation dike for the new circulating water intake structure and associated piping. A temporary cofferdam will also be driven on the interior of the ~~main cooling reservoir~~ MCR embankment to facilitate the installation of the discharge structure.

Excavation and dredging of the intake structure, pump house erection, and the installation of mechanical, piping, and electrical systems will follow the sheet pile installation, bracing system, and dewatering, and will continue through site preparation into plant construction. Excavated and dredged material will be transported to an onsite spoils area located outside the boundaries of designated wetlands in the southwest portion of the plant property.

3.9S.3.11 Power Block Earthwork (Excavation)

The power block consists of an area footprint encompassing the Nuclear and Turbine Island Building areas, which include the following buildings for each unit:

- Reactor Building
- Control Building
- Radwaste Building
- Service Building
- Turbine Building

The mass excavation of the power block areas will occur in two stages (STP 3 followed by STP 4) as part of site preparation activities for STP 3 &4. The deepest excavations in the power block area are for the Reactor Buildings, approximately 95 feet below site grade. The Reactor Building will be over-excavated 10 feet deeper and 10 feet wider than the underside of foundation and replaced with structural fill. The next deepest excavations are for the Control Buildings at 77 feet below site grade. The Control Building will be over-excavated 2 feet and replaced with structural fill below the underside of foundation. The Radwaste Building will be excavated approximately 69 feet below site grade. The Radwaste Building will be over-excavated 15 feet deeper and 10 feet wider than the underside of foundation and replaced with structural fill. The Turbine Building excavation is approximately 34 feet below grade with 2 feet of over-excavation replaced with structural fill. The circulating water piping excavation areas are approximately 41 feet below grade. The UHS Basin and pump house areas are a stepped excavation down to 43 feet at the deepest point. The Service Building is a stepped excavation down to 48 feet at the deepest point. Other yard building and tank foundation excavations are relatively shallow (less than 6 feet).

An extensive well point dewatering system will be installed around the STP 3 & 4 excavation boundary before the mass excavation begins. The dewatering system is intended to route the extracted well water to the ~~main cooling reservoir~~ MCR in compliance with the Construction Environmental Plan. During the excavation, slope protection and retaining wall systems will be installed. Ditches and/or dikes will be constructed around the excavation areas to prevent surface water/runoff from entering the work area. Drainage sumps and/or well points will be installed at the bottom of the excavations from which surface drainage and/or accumulated groundwater will be pumped to a storm water discharge point that will route the water to collection delay basins to filter out turbidity and solids. Excavated material will be transferred to the spoils and backfill borrow storage areas. Acceptable material from the excavation will be stored and reused as structural backfill.

In accordance with Regulatory Guide 1.165 (Reference 3.9S-1), the open excavations will be geologically mapped and the NRC will be notified when the excavations are open for inspection.

3.9S.3.12 Module Assembly

The ABWR design requires a high degree of modularization. The steel module components in the nuclear island will be fabricated offsite, shipped to the site via rail, truck, or barge and will be assembled into complete modules prior to setting in the power block. The module component rail shipments will arrive in sections with dimensions up to 12 feet (H) x 12 feet (W) x 80 feet (L), weighing up to 80 tons. Shipment by truck over the road would arrive in sizes up to 8 feet (H) x 8 feet (W) x 40 feet (L), weighing up to 20 tons. Modules weighing up to 1000 tons will arrive by barge, be transported to the power block area, and offloaded in fabrication assembly areas. The assembly of the component panels into complete modules on site will begin during the site preparation phase. The Reactor Building base mat reinforcing module will be the first module assembled during site preparation. The setting of completed containment liner modules will occur upon receipt of the COL. The completion of early

module assembly is planned to coincide with the completion of STP 3 Reactor Building base mat foundation.

3.9S.3.13 Power Block Earthwork (Backfill)

The installation of safety-related Category 1 structural backfill material placed under safety-related structures or systems will occur as part of the site preparation activities under an LWA, if obtained from NRC. Backfill material will come from the concrete batch plant, qualified onsite borrow pits, or qualified offsite sources. The backfill will be installed up to the building's foundation grades in over-excavated areas, and would continue around foundations upward as the buildings rise from the excavation up to plant grade.

3.9S.3.14 Reactor Building Base Mat Foundation

Once the subsurface preparations are completed, the next sequential work operation is the installation of foundations. The deepest foundations in the power block are the Reactor Building base mat, which will be the first to be installed. The detailed steps include:

- Installing the grounding grid
- Mud-mat concrete work surface
- Reinforcing steel and civil, electrical, mechanical/piping embedded items (base mat module), forming, concrete placement and curing.

The activities associated with the Nuclear Island foundations are safety-related and could be performed as part of a LWA, if obtained from NRC, and in accordance with applicable requirements under 10 CFR 50, Appendix B.

3.9S.4 COL Construction Activities

Major power plant construction of safety-related structures, systems and components will begin after issuance of the COL by the NRC. Each ABWR unit is a series of buildings and structures with systems installed within the structures. Power plants are constructed from the "bottom up" with elevations remaining open until the major mechanical and electrical equipment and piping are placed on each elevation as the civil construction continues upward. The five major buildings in each power block, along with a brief description of finished elevation (above plant grade), follow:

- The Reactor Building has eight major floor elevations and rises approximately 124 feet above plant grade.
- The Control Building has six main floor elevations and rises approximately 35 feet above plant grade.
- The Turbine Building has five main floor elevations and rises approximately 141 feet above grade.

- The Radwaste Building has three main floor elevations and rises approximately 40 feet above grade.
- The Service Building rises about 25 feet above grade.

Much of the commodity installation will consist of the setting of prefabricated civil/structural, electrical, mechanical, and piping modules with field connections. The balance of the field installations consists of bulk commodity installation. The estimated construction duration for STP 3 & 4 from COL issuance to commercial operation of STP 4 is approximately 66 months. The descriptions of major activities for the power block buildings construction are discussed in the following subsections. Table 3.9S-1 summarizes the estimated construction durations for major power block construction activities.

3.9S.4.1 Power Block Construction Descriptions

3.9S.4.1.1 Reactor Building

The Reactor Building has the longest construction duration. The Reactor Building, which includes the containment vessel as an integrated structure, is a steel and concrete structure with three floor elevations below plant grade, and five elevations above grade with a footprint of approximately 195 feet by 185 feet. The major activities associated with the Reactor Building construction following the base-mat foundation placement include:

- Erecting the reactor concrete containment vessel shell modules
- Placing walls and slabs, and reactor pedestal
- Installing the reactor pressure vessel, drywell and pool modules
- Setting the polar crane
- Setting the upper Reactor Building roof structure.

The mechanical, piping, HVAC, and electrical installations begin in the lower elevations and continue to the upper elevations, as is also the case with each of the other buildings.

Control Building

The Control Building is a concrete and steel structure with four floor elevations below plant grade, and two floor elevations above plant grade with a footprint of approximately 185 feet by 80 feet. The mechanical, piping, HVAC, and electrical installations begin in the lower elevations and continue to the upper elevations.

Turbine Building

The Turbine Building is a concrete and steel structure with a footprint of approximately 285 feet by 360 feet. The turbine building has one floor below grade and three floor elevations above grade. The turbine building construction begins with the pedestal

base mat and buried circulating water piping installation. Installation of the pedestal columns, condenser modules, and pedestal deck would then proceed. The building exterior to the turbine pedestal would be erected, installation of the turbine building crane and the exterior walls and roof installation would then occur. The mechanical, piping, HVAC, and electrical installations begin in the lower elevations and continue to the upper elevations. Construction then proceeds through the turbine/generator erection.

Radwaste Building

The Radwaste Building is a concrete and steel structure with a footprint of approximately 124 feet by 214 feet with two elevations below grade and three levels above grade. Construction of the Radwaste Building begins with base mat installation and civil work will follow. After an initial period of civil work, installation of equipment, piping, cable, and instrumentation occurs in parallel with the remaining civil work.

3.9S.4.2 Service Building

The Service Building is a steel and concrete structure with insulated metal siding and a brick exterior above grade. It will have a footprint of approximately 168 feet by 156 feet with three elevations below grade and two levels above grade. Construction of the Service Building begins with base mat installation. Civil work will follow. After an initial period of civil work, installation of equipment, piping, cable, and instrumentation occurs in parallel with the remaining civil work.

3.9S.4.3 Other Facilities

Other facilities to be constructed include:

- The switchyard and installation of the main transformers
- The simulator and training facility buildings
- The circulating water intake and discharge structures
- Safety-related tunnels
- The UHS cooling tower
- Basin and pump houses
- Machine shop
- Sewage treatment facility
- Fire protection pump house
- Makeup water treatment building
- Various yard tanks

The common yard area construction occurs over a 57-month duration from the start of site preparation. STP will acquire the necessary permits and authorizations to ensure compliance with all applicable rules and regulations (see Section 1.2).

3.9S.5 Activities Associated with Construction

Construction activities will involve the movement of workers and construction equipment. Construction shifts will commute to and from the site on local roads. Deliveries to the construction site will be by truck, rail, or barge, and will normally occur during daylight hours.

The installation contractors will have procedures in place for spill prevention, control, and countermeasures to include the control of potential petroleum product leaks from construction equipment, and remedial actions in the event of such a leak. Response to major spills from construction equipment will also be addressed. Measures will be put in place to control storm water discharges associated with construction activity. An erosion, sedimentation, and pollution prevention plan specific to the construction activities will be prepared.

During STP 3 & 4 site preparation and plant construction, air quality protection procedures as discussed in Subsection 3.9S.2.2 are used to minimize and control the generation of fugitive dust from construction activities and vehicular traffic. Fugitive dust control measures such as watering of roads, covering truck loads and material stockpiles, reducing material handling activities and limiting vehicle speed are anticipated to effectively control fugitive dust generation during construction. The power block construction area, laydown, and spoils storage areas, concrete batch plants, and large parking lots are approximately 7000 feet from the site meteorological towers. A heavy haul road is located within 1600 feet of the primary meteorological tower and approximately 500 feet from the backup meteorological tower. Fugitive dust generation from the aggregate surface of this roadway is expected to be minimal based on the infrequent traffic, slow transportation speeds, and air quality protection procedures discussed above. Therefore, no adverse impacts on the site meteorological measurements due to plant construction generated dust are anticipated.

Peak and attenuated noise (in dBA) levels are expected to be generated from operations of construction equipment including earthmoving equipment, trucks, cranes, portable generators, pile-drivers, pneumatic equipment, and hand tools. Table 3.9S-2 summarizes the expected noises from several types of anticipated construction equipment to be used at STP.

3.9S.6 References

3.9S-1 "Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion," Regulatory Guide 1.165, March 1997.

3.9S-2 "Environmental Impact Data Book, Chapter 8: Noise," Golden, J., Ouellette, R. P., Saari S., and Cheremisinoff, P. N., 2nd Printing, Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan, 1980.

Table 3.9S-1 Construction Activity Durations

Construction Activity	Approximate Duration
Preconstruction Activities	
Installation and Establishment of Environmental Controls	4 months (after the acquisition of required permits and authorizations)
Road and Rail Construction	5 months
Security Construction	3 months
Temporary Utilities	6 months
Temporary Construction Facilities	9 months
Lay-down, Fabrication, Shop Area Preparation	5 months
Clearing, Grubbing, and Grading	9 months
Underground Installations	8 months
Unloading Facilities Installation	9 months
Intake/Discharge Coffer Dams and Piling Installation	5 months
Power Block Earthwork (Excavation)	10 months
Module Assembly	15 months
LWA Construction Activities	
Power Block Earthwork (Backfill)	5 months
Reactor Building Base Mat Foundation	5 months
Control Building Foundation	4 months
Radwaste Building Foundation	4 months
Turbine Building Foundation	4 months
COL Construction Activities	
Containment Building	45 months
Control Building	36 months
Turbine Building	44 months
Radwaste Building	30 months
Switchyard and Installation of the Main Transformers	9 months
Administration, Simulator and Training Facility Buildings	12 months (each building)
Circulating water intake and pump house	24 months
Ultimate Heat Sink Cooling Tower and UHS Pump House	12 months
Yard Tanks	12 months

Table 3.9S-2 Peak and Attenuated Noise (in dBA) Levels Expected from Operations of Construction Equipment

Source	Noise Level (peak)	Distance from Source			
		50 feet	100 feet	200 feet	400 feet
Heavy trucks	95	84–89	78–83	72–77	66–71
Dump trucks	108	88	82	76	70
Concrete mixer	105	85	79	73	67
Jackhammer	108	88	82	76	70
Scraper	93	80–89	74–82	68–77	60–71
Dozer	107	87–102	81–96	75–90	69–84
Generator	96	76	70	64	58
Crane	104	75–88	69–82	63–76	55–70
Loader	104	73–86	67–80	61–74	55–68
Grader	108	88–91	82–85	76–79	70–73
Dragline	105	85	79	73	67
Pile driver	105	95	89	83	77
Forklift	100	95	89	83	77

Source: Reference 3.9S-2

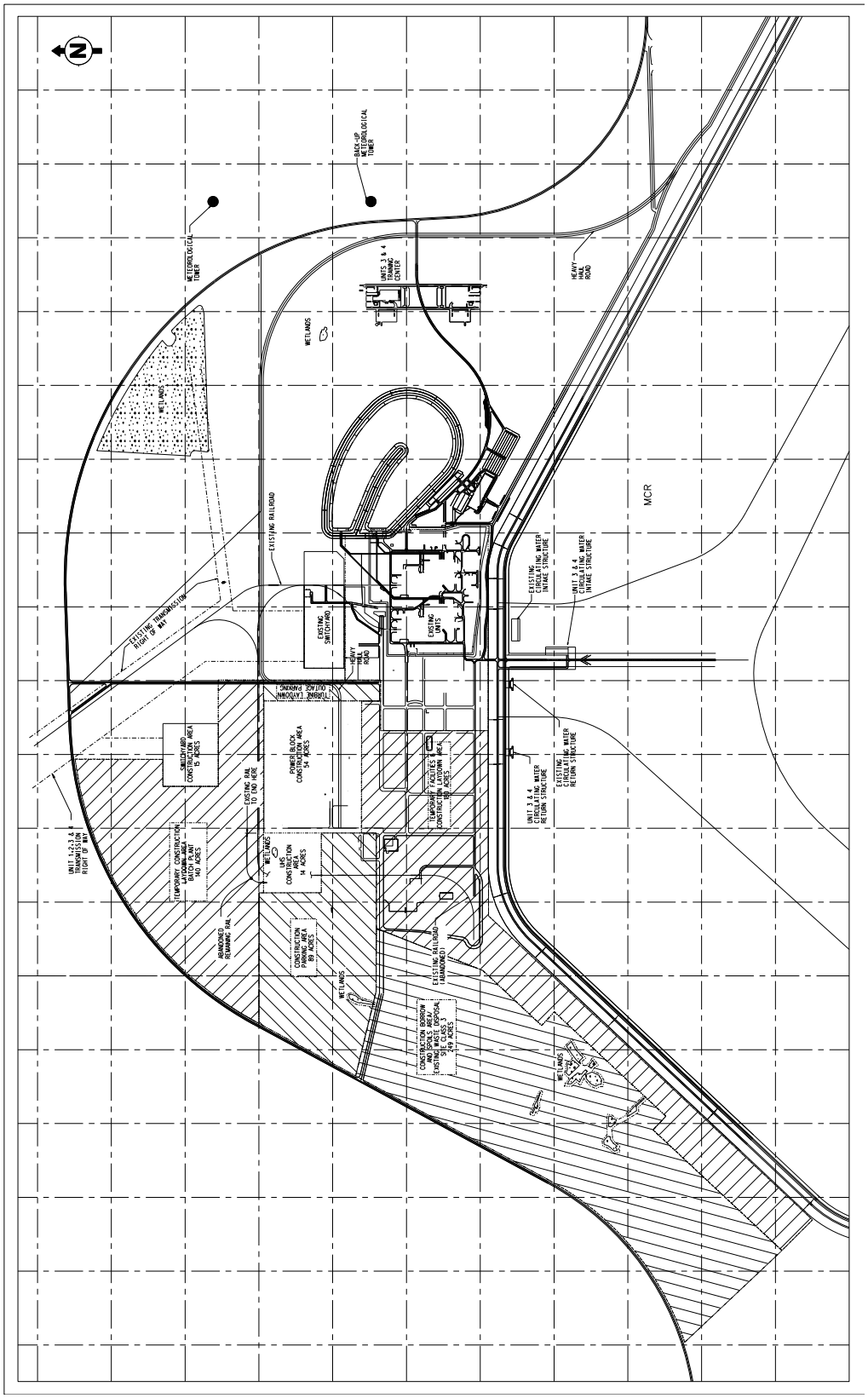

Figure 3.9S-1 Construction Utilization Plan