KSC EXTERIOR LIGHTING REQUIREMENT

SECTION 1.0 REQUIREMENT AND REGULATIONS

Kennedy Space Center (KSC) is required to protect marine turtle nesting habitat by the National Environmental Policy Act (NEPA) and the U.S. Fish and Wildlife Service (FWS) through the Endangered Species Act (ESA). The NEPA of 1969, as amended (42 U.S.C. 4321-4370d), and according to the procedures of implementation of NEPA for NASA [Title 14, Code of Federal Regulations, part 1216 subparts 1216.1 and 1216.3], requires federal agencies to assess how programs and associated actions may affect the environment. As part of this assessment, KSC has coordinated with the FWS on the effects of exterior lighting on protected species. The FWS has issued an interim biological opinion (BO) based on their review of historical and anticipated future light management activities by KSC, and the associated effects on the loggerhead (*Caretta caretta*), green (*Chelonia mydas),* leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), and Kemp's ridley (*Lepidochelys kempii*) sea turtles in accordance with Section 7 of the ESA of 1973, as amended (16 U.S.C. 1531 *et seq*).

SECTION 2.0 PURPOSE

The purpose of this Requirement is: 1) to insure that KSC is compliant with the special conditions of the BO (Attachments 1 and 2) to provide clear guidance to project and/or facility managers who are required to comply with the KSC exterior lighting requirements.

Light Management Plans (LMPs) will be developed in accordance with this light management policy at KSC for all new facilities that are in close proximity to the beach, have lighting directly visible from the beach, and/or may cause significant sky glow. LMPs will be submitted to the Environmental Management Branch (EMB) for review and approval.

SECTION 3.0 IMPLEMENTATION

3.1 All projects that will be installing exterior lighting or lighting that is visible from outside the building must submit an environmental checklist to EMB (KSC Form 21-608V2 NS) (KDP-P-1727). The checklist is submitted by the project manager, facility manager, or the equivalent (PM) to EMB.

3.2 Within seven days of submittal of the checklist, the PM will receive either a request for further information or a record of environmental consideration (REC) from EMB.

3.2.1 If the REC determines that there will be no adverse affect on the sea turtles no further action will be required. However, if the REC determines that there may be an adverse affect on sea turtles (i.e. a violation of the BO) a LMP will be required.

3.3 The PM will be responsible for the development of a LMP that meets the criteria set forth in Section 5.0 of this Requirement. EMB will have a subject matter expert (SME) available to assist the PM with the plan.

3.4 The PM will submit the proposed lighting plan to EMB for review and comment.

3.4.1 If the LMP meets the guidelines, then a memorandum of acceptance will be generated by EMB and sent to the PM.

3.4.2 If the LMP does not meet the guidelines, EMB will provide comments for plan revision by the PM.

3.5 In some cases, safety for employees and/or the program assets may supersede the FWS BO requirements; and a variance from the LMP requirements must be requested (see Section 6.0 of this policy).

3.5.1 LMPs that include variances from the guidelines established herein will be reviewed by both the EMB and the FWS. This review cycle will continue until the EMB has satisfied its reporting requirements to the FWS.

3.5.2 Notification of approval will be sent to the PM by EMB.

3.6 The final approved plan will be cataloged in the EMB Light Plan Compliance electronic data file and the PM should retain a copy for future reference.

3.7 Any modifications to the project site/structure(s) that result in exterior lighting changes must go through the process again as outlined above.

SECTION 4.0 COMPLIANCE COORDINATION

4.1 Once every two years, the appropriate personnel, including but not limited to, engineers, facility managers, and any other representatives that design and/or enforce lighting at KSC, will attend a sea turtle lighting workshop conducted by EMB or its agent.

4.2 These same personnel will allow EMB and/or agents of EMB to post educational data and notices related to sea turtle nesting season at their facilities as indicated in the BO.

4.3 Affected facilities will be inspected annually by EMB, their agents, or FWS. EMB is required to conduct periodic compliance inspections and report all findings to FWS on an annual basis.

4.4 Currently, hatchling or adult sea turtle disorientation rates cannot exceed 3%, as described in the BO. If that occurs, the FWS will require reinitiating consultation and a review of the reasonable and prudent measures KSC has taken. Any changes that result from the consultation will be incorporated into this Requirement and will affect all existing and future projects.

SECTION 5.0 GENERAL EXTERIOR LIGHTING DESIGN GUIDELINES

5.1 The LMP must, at a minimum, identify on a plan drawing all exterior lighting fixtures and other lights that may be visible at night. The plan must include details of each type of fixture to be used, such as lamp type, wattage, installation height, and proposed operation schedule.

5.2 Facilities that are in close proximity to the beach, have lighting directly visible from the beach, and/or may cause significant sky glow will prohibit use of exterior lights between 9 p.m. and dawn from May 1 through October 31. If night activities that are essential to safety/security, support launch-related activities at active launch complexes, or night operations training require exterior lighting at night the PM may apply for a variance from these lighting restrictions as described in Section 6.0.

5.3 Lights with wavelengths from 585 - 590 nm and lowest wattage possible should be used for all exterior lighting applications. Lights with wavelengths between 320 and 560 nm, such as metal halide and mercury vapor lights, should not be used in any exterior lighting applications. Low-pressure sodium (LPS) lights are preferred if LPS can meet operational requirements. In cases where there are specific requirements calling for the discernment of colors, the PM may apply for a variance from the LMP as described in Section 6.0 below.

5.4 Energy conservation standards will be incorporated into all lighting designs.

5.5 All exterior light fixtures should be positioned so that:

5.5.1 The point source of light or any reflective surface of the light fixture is not directly visible from the beach.

5.5.2 Areas seaward of the frontal dune are not illuminated. Frontal dune is defined as the first natural or manmade mound of sand that is located landward of the beach and has sufficient vegetation, height, continuity, and configuration to offer protective value.

5.5.3 Light is directed downward and away from the beach at beachfront facilities and downward and in the direction of the task being performed at non-beachfront facilities.

5.5.4 All lights should be shielded and/or recessed.

5.5.5 Photocells should only be used to support security or other mission-specific requirements that occur on a regular schedule each night (e.g., parking lots will not routinely utilizephotocells unless mission operations occur 24 hours a day, 7 days a week). Automatic tiers can be used instead of, or in addition to, photocells to control lighting during actual hours of operation. Timers can also be used in locations where personnel are not readily available to manually extinguish lights. Where random security

monitoring is required, motion detector switches that keep lights off except when approached can be used. Such switches should turn lights on for the minimum duration possible.

5.6 Task lighting should be used for temporary operational activities rather than permanent light fixtures. Task lighting must conform to the same restrictions as permanent lighting. Switches should be used rather than timers or photocells.

5.7 Exceptions to the guidelines will be evaluated on a case-by-case basis through the variance process described in Section 6.0 below.

SECTION 6.0: VARIANCE PROCESS

6.1 Exceptions to the guidelines in Section 5.0 above will be evaluated by EMB and FWS.

6.2 The PM will submit a narrative documenting the necessity for using a light source that does not meet the requirements of the KSC Exterior Lighting Guidelines. The documentation of the variance request will include, but not be limited to, the regulation, Requirement, protocol requirement for the light source, and description of the specific circumstances surrounding the need.

6.3 The PM, with the assistance of EMB, will be responsible for mitigating any negative effects that may result from light use approved through the variance process. Corrective actions for negative effects will be determined by the EMB throughout consultation with the FWS.

6.4 EMB will concur/non-concur with variance request via email notification to PM.