National Aeronautics and
Space Administration
Goddard Space Flight Center
Greenbelt, MD 20771

November 7, 2008

Reply to Attn of: 429

MEMORANDUM FOR THE RECORD

National Environmental Policy Act (NEPA) Compliance for National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP)

1.0 Introduction

The NEPA of 1969, as amended (42 U.S.C. 4321, *et seq.*), requires Federal agencies to consider the environmental impacts of a project in their decision making process. To comply with NEPA and associated regulations (the Council on Environmental Quality (CEQ)) Regulations for Implementing the Procedural Provisions of NEPA [40 CFR Parts 1500-1508] and NASA policy and procedures [14 CFR Part 1216 Subpart 1216.3]), NASA has prepared an Environmental Assessment (EA) for routine payloads launched on Expendable Launch Vehicles (ELV's) from Cape Canaveral Air Force Station (CCAFS) and Vandenberg Air Force Base (VAFB) (Ref: *Final Environmental Assessment for Launch of NASA Routine Payloads on Expendable Launch Vehicles from Cape Canaveral Air Force Station, Florida, and Vandenberg Air Force Base, California*, June 2002). The EA assesses the environmental impacts of missions launched from CCAFS and VAFB with spacecraft that are considered routine payloads.

Spacecraft defined as routine payloads would utilize materials, quantities of materials, launch vehicles and operational characteristics that are consistent with normal and routine spacecraft preparation and flight activities at VAFB, CCAFS, and the Kennedy Space Center. The environmental impacts of launching routine payloads from VAFB and CCAFS fall within the range of routine, ongoing and previously documented impacts that have been determined not to be significant. Spacecraft covered by this EA meet specific criteria ensuring that the spacecraft, its operation and decommissioning, do not present any new or substantial environmental or safety concerns.

To determine the applicability of a routine payload classification for a mission launch from VAFB and CCAFS and coverage under the NASA routine payload EA, the mission is evaluated against the criteria defined in the EA using the Routine Payload Checklist (RPC).

2.0 Mission Description

NPP is a joint mission implemented by the National Aeronautics and Space Administration (NASA) and the NPOESS Integrated Program Office (IPO). The NPP mission will collect and distribute remotely-sensed land, ocean, and atmospheric data to the meteorological and

global climate change communities as the responsibility for these measurements transitions from existing Earth-observing missions such as Aqua, Terra, and Aura to the NPOESS. It will provide atmospheric and sea surface temperatures, humidity sounding, land and ocean biological productivity, and cloud and aerosol properties.

The NPP mission serves as a bridge between the Earth Science Program and the NPOESS program. For NASA, NPP is part of the Earth Observing System (EOS) program, providing extended observations for key sustained systematic measurements. For the IPO, NPP provides risk reduction with an opportunity to demonstrate and validate new instruments and processing algorithms, as well as to demonstrate and validate aspects of the NPOESS command, control, communications and ground processing capabilities prior to the launch of the first NPOESS spacecraft. All five instruments being flown on NPP will be also be flying on NPOESS.

The NPOESS will consist of a series of satellites, and ground systems supporting the operational needs of the meteorological, oceanographic, environmental, climatic, and earth remote sensing programs. NPOESS is the follow-on and convergence of the National Oceanic and Atmospheric Administration (NOAA) Polar-orbiting Operational Environmental Satellites (POES) and the DoD Defense Meteorological Satellite Program (DMSP). Additionally, the NPOESS will provide global change data for systematic measurements used by NASA and the Earth Science research communities. The first NPOESS satellite flight availability is planned for January 2013.

The NPP mission is planned for launch in the summer of 2010. The NPP satellite is planned for an 824-km polar, sun-synchronous orbit with a 1:30 pm ascending node, equatorial-crossing time. This orbit provides a 16-day repeat cycle (8-day quasi-repeat) that is similar to the orbit of the Terra and Aqua satellites. Controlled reentry has been baselined.

The NPP satellite is comprised of the spacecraft and five instruments. NPOESS IPO is providing three instruments, the Visible-Infrared Imager Radiometer Suite (VIIRS), the Cross-Track Infrared Sounder (CrIS) and Ozone Mapper and Profiler Suite (OMPS). The ground system which will control the NPP satellite and process the sensor data is also being developed by the NPOESS program. NASA is providing the spacecraft bus along with the

Advanced Technology Microwave Sounder (ATMS) and the Clouds and the Earth's Radiant Energy System (CERES) instrument.

Instrument data will be acquired continuously, stored onboard and subsequently down-linked to the Svalbard, Norway polar ground station for capture, preprocessing, and routing to the processing sites within the United States. Additionally, a continuous, real-time direct broadcast capability is planned for transmitting most of the instrument and auxiliary data to users equipped to receive these data.

The NPP spacecraft bus is being built by Ball Aerospace & Technology Corporation (BATC), of Boulder, Colorado. The NPP bus is procured through a delivery order via Rapid Spacecraft Development Office (RSDO) RAPID II contract. The bus is a tailored BCP-2000 spacecraft. The NPP primary structure is made of aluminum honeycomb sandwich panels on a machined aluminum frame.

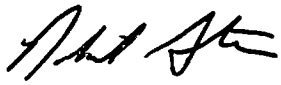
The NPP satellite will be launched from the Western Range at VAFB from SLC-2, by a Boeing Delta II-7920-10 launch vehicle. Kennedy Space Center Range Services at VAFB will provide the integration facilities, launch pad services, electrical power, communication links, and range commanding required to process, erect, fuel, and launch the NPP satellite and its associated launch vehicle.

The components utilized in the NPP satellite are made of materials normally encountered in the space industry. NPP will not use any lasers or radioactive materials. NPP will not carry any pathogenic organisms, nor will the NPP mission pose any substantial hazards or environmental concerns.

3.0 NASA Routine Payload Determination

The NPP mission has been evaluated against the NASA routine payload EA for launches from CCAFS and VAFB, using the RPC (see enclosed Evaluation Recommendation Package). The evaluation indicates that the mission meets the criteria for a routine payload. The mission does not present any unique or unusual circumstances that could result in new or substantial environmental impacts. Based on this review, it is determined that the NPP mission qualifies as a routine payload and falls within the scope of the reference routine payload EA.

At this point no additional NEPA action or documentation is required. However, NASA is in the process of updating the NASA Routine Payload EA. Once the Agency issues the final updated EA, NASA will review the potential environmental impacts of the proposed NPP mission in the context of the new analysis and information contained in the updated EA. If NASA determines that there are substantial new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, NASA will formally reopen the NEPA process for this mission.



Robert Strain
Director

Enclosure

EVALUATION RECOMMENDATION PACKAGE

Record of Environmental Consideration
Routine Payload Checklist
NEPA Environmental Checklist

Enclosure

RECORD OF ENVIRONMENTAL CONSIDERATION

1. Project Name: National Polar Orbiting Environmental Satellite System (NPOESS) Preparatory Project (NPP)

2. Description/location of proposed action: Mission to provide NASA with continuation of global change observations and to provide risk reduction for the NPOESS Program.

   Date and/or Duration of project: Launch 6/2010

3. It has been determined that the above action:

__X__ a. Is adequately covered in an existing EA or EIS.
   Title: *Final Environmental Assessment for Launch of NASA Routine Payloads on ELVs from CCAFS, Florida and VAFB, California*
   Date: June 2002

___ b. Qualifies for Categorical Exclusion and has no special circumstances which would suggest a need for and Environmental Assessment.
   Categorical Exclusion:

___ c. Is exempt from NEPA requirements under the provisions of:

___ d. Is covered under EO 12114, not NEPA.

___ e. Has no significant environmental impacts as indicated by the results of an environmental checklist and/or detailed environmental analysis.
   (Attach checklist or analysis as applicable)

___ f. Will require the preparation of an Environmental Assessment.

___ g. Will require the preparation of an Environmental Impact Statement.

___ h. Is not federalized sufficiently to qualify as a major federal action.

Beth Montgomery — NEPA Coordinator, Code 250 — 10/10/08
Beth Montgomery — Date

K.O. Schwer — Project Manager, Code 429 — 10/15/08
Kenneth Schwer — Date

GSFC Routine Payload Checklist

PROJECT NAME:		DATE OF LAUNCH:
NPOESS PREPARATORY PROJECT (NPP)		JUNE 2010
PROJECT CONTACT: KENNETH O. SCHWER KOS	PHONE NUMBER: 301-286-3225	MAILSTOP: 429
PROJECT START DATE: MAY 2000	PROJECT LOCATION: NASA GODDARD SPACE FLIGHT CENTER, BLDG 16 BRICK	

PROJECT DESCRIPTION:

THE NPP MISSION IS A JOINT PROGRAM BETWEEN NASA AND THE NPOESS INTEGRATION PROGRAM OFFICE (IPO). THE NPP SATELLITE WILL PROVIDE NASA WITH CONTINUATION OF GLOBAL CHANGE OBSERVATIONS BY EXTENDING THE MEASUREMENT SERIES INITIATED WITH EOS TERRA AND AQUA. THE NPP SATELLITE IS BEING DEVELOPED AS PART OF THE RISK REDUCTION OF THE NPOESS PROGRAM. FOUR OF THE FIVE SENSORS BEING FLOWN ON NPP WILL BE FLYING ON NPOESS. THE GROUND SYSTEM WHICH WILL CONTROL THE NPP SATELLITE AND PROCESS THE SENSOR DATA WILL BE DEVELOPED BY THE NPOESS PROGRAM. THE SPACECRAFT IS AN RSDO/RAPID II BALL BCP-2000 COMMERCIAL BUS WITH MODIFICATIONS. INSTRUMENTS INCLUDE THE GSFC-MANAGED ATMS INSTRUMENT BUILT BY NORTHROP-GRUMMAN, IPO/NGST-MANAGED CRIS INSTRUMENT BUILT BY ITT, THE IPO/NGST-MANAGED VIIRS INSTRUMENT BUILT BY RAYTHEON, THE IPO/NGST-MANAGED OMPS INSTRUMENT BUILT BY BALL, AND THE NASA LANGLEY CERES INSTRUMENT.

A. SAMPLE RETURN:	YES	NO
1. Would the candidate mission return a sample from an extraterrestrial body?	☐	☒
B. RADIOACTIVE SOURCES:	**YES**	**NO**
1. Would the candidate spacecraft carry radioactive materials?	☐	☒
2. If yes, would the amount of radioactive sources require launch approval at the NASA Associate Administrator level or higher according to NPG 8715.3 (NASA Safety Manual)?	☐	☒

Provide a copy of the Radioactive Materials Report as per NPG 8715.3 Section 5.5.2.

C. LAUNCH AND LAUNCH VEHICLES:	YES	NO
1. Would the candidate spacecraft be launched using a launch vehicle/launch complex combination other than those indicated in Table 1 below?	☐	☒
2. Would the proposed mission cause the annual launch rate for a particular launch vehicle to exceed the launch rate approved or permitted for the affected launch site?	☐	☒

Comments:

D. FACILITIES:	YES	NO
1. Would the candidate mission require the construction of any new facilities or substantial modification of existing facilities?	☐	☒
2. If yes, has the facility to be modified been listed as eligible or listed as historically significant?	☐	☒

Provide a brief description of the construction or modification required:

E. HEALTH AND SAFETY:	YES	NO
1. Would the candidate spacecraft utilize any hazardous propellants, batteries, ordnance, radio frequency transmitter power, or other subsystem components in quantities or levels exceeding the Envelope Payload Characteristics (EPC's) in Table 2 below?	☐	☒

2. Would the candidate spacecraft utilize any potentially hazardous material as part of a flight system whose type or amount precludes acquisition of the necessary permits prior to its use or is not included within the definition of the Envelope Payload (EP)?	☐	☒
3. Would the candidate mission release material other than propulsion system exhaust or inert gases into the Earth's atmosphere or space?	☐	☒
4. Would launch of the candidate spacecraft suggest the potential for any substantial impact on public health and safety?	☐	☒
5. Would the candidate spacecraft utilize a laser system that does not meet the requirements for safe operation (ANSI Z136.1-2000 and ANSI Z136.6-2000)? For Class III-B and IV laser operations, provide a copy of the hazard evaluation and written safety precautions (NPG 8715.3).	☐	☒
6. Would the candidate spacecraft contain pathogenic microorganisms (including bacteria, protozoa, and viruses) which can produce disease or toxins hazardous to human health?	☐	☒
Comments:		

F. OTHER ENVIRONMENTAL ISSUES:	YES	NO
1. Would the candidate spacecraft have the potential for substantial effects on the environment outside the United States?	☐	☒
2. Would launch and operation of the candidate spacecraft have the potential to create substantial public controversy related to environmental issues?	☐	☒
Comments:		

Table 1: Launch Vehicles and Launch Pads

Launch Vehicle	Eastern Range (CCAFS Launch Complexes)	Western Range (VAFB Space Launch Complexes)
Atlas IIA & AS	LC-36	SLC-3
Atlas IIIA & B	LC-36	SLC-3
Atlas V Family	LC-41	SLC-3
Delta II Family	LC-17	SLC-2
Delta III	LC-17	N/A
Delta IV Family	LC-37	SLC-6
Athena I & II	LC-46 or -20	California Spaceport
Taurus	LC-46 0r -20	SLC-576E
Titan II	N/A	SLC-4W
Pegasus XL	CCAFS skidstrip KSC SLF	VAFB airfield

Table 2: Summary of Envelope Spacecraft Subsystems and Envelope Payload Characteristics (EPC)

Structure	**Unlimited:** aluminum (honeycomb sandwich panels, machined aluminum frame), magnesium
Propulsion	Subsystem designed to carry 400 kg of propellant. Monopropellant Hydrazine in 40-inch oblate spheroid tank of 6AI-4V titanium

Communications	10 W X-band transmitters (qty 4) – 2 HRD, 2 SMD 10 W S-band transmitters (qty 2)
Power	2 Nickel Hydrogen (NiH_2) batteries. Each are rated at 85 Ahr. Total capacity is 170 Ahr. Triple Junction Gallium Arsenide (GaAs) solar array cells is capable of supplying 2700 Watts of power.
Science instruments	ATMS sounder CrIS spectrometer VIIRS radiometer OMPS CERES
Other	Satellite Dimensions: X 4.2 m Y 2.2 m Z 2.6 m Satellite Weight: NTE 2270 kg TiNi frangibolt actuators to deploy solar array 23 kg Beryllium in CrIS instrument 2.5 kg Beryllium in ATMS instrument 0.9 kg Beryllium in VIIRS instrument Less than 1 kg of Beryllium in CERES FM5 Instrument **Class C EEDs for mechanical systems deployment** **Propulsion system exhaust and inert gas venting;** **CrIS instrument has frangibolts for isolation system**

GODDARD SPACE FLIGHT CENTER
ENVIRONMENTAL CHECKLIST
FOR FLIGHT PROJECTS

1. PROJECT/PROGRAM

National Polar Orbiting Environmental Satellite System (NPOESS) Preparatory Project (NPP)

2. POINTS OF CONTACT

Project Manager: Kenneth Schwer, Code 429; Telephone: 6-3225
Observatory Manager: Lisa Shears; Code 429; Telephone: 6-3975
Systems Engineering Manager: Janice Smith; Code 599; Telephone: 6-9977
Chief Safety & Mission Assurance Officer (S/C): Naveed Quraishi; Code 323; Telephone: 6-6252
Chief Safety & Mission Assurance Officer (Instruments): Tim Bowser; Code 323; Telephone: 6-2477

3. SCHEDULE

Formulation Process (Phase A/B): Mission Confirmation Review 10/03 Implementation Process (Phase C/D): 10/03 - 6/10	Launch Date: June 2010

4. CURRENT STATUS

Mar 08 – Mission is in implementation phase. Spacecraft is complete, ATMS PFM is completed and has integrated onto the spacecraft; CrIS and VIIRS EDUs have been integrated onto the spacecraft and 1394 risk reduction / over temperature testing have been conducted. Additional 1394 (ambient only) planned for spring of 08. CERES FM5 was approved to be added to the NPP mission in January 08. CrIS, OMPS, and CERES FMs are due to be integrated late summer / early fall. The VIIRS FM instrument delivery is set for April 09, resulting in a launch date of June 2010. Updated Level 1 NPP Schedule to Launch signed in Feb 08 reflecting the new launch date.

5. PROJECT DESCRIPTION

a. Purpose: The NPP Mission is a joint Program, between the National Aeronautics and Space Administration (NASA) and NPOESS IPO. The NPP Satellite will provide NASA with continuation of global change observations by extending the measurement series being initiated with EOS Terra (MODIS) and EOS Aqua (AIRS, AMSU, HSB). The NPP Satellite is also being developed as part of the risk reduction of the NPOESS program. The five sensors being flown on NPP will be flying on NPOESS. The ground system which will control the NPP satellite and process the sensor data will be developed by the NPOESS program.

b. Spacecraft: Ball BCP-2000 commercial bus with modifications

c. Instruments: GSFC-managed ATMS instrument built by NGES; NOAA IPO (NGST-managed) CrIS instrument built by ITT, VIIRS instrument built by Raytheon, OMPS instrument built by BATC; and LaRC-managed CERES instrument built by NG (formally known as TRW).

d. Launch Vehicle: Delta II

e. Launch Site: Vandenberg Air Force Base (VAFB)

f. NASA's Involvement/Responsibility: See a.

g. Participants/Locations: NASA - GSFC; NASA - LaRC ; NASA - KSC; NOAA - IPO (Contractors) ; BATC ;

h. End of Mission, Re-entry: 5 years required; Controlled reentry

6. Is there anything controversial about the mission?

No

7. Is there anything unique, unusual, or exotic about the mission, spacecraft, and instruments?

No
8. Is there any environmental documentation for spacecraft, launch vehicle (NEPA or EO12114)?
No
9. Is the mission (s/c and LV) compliant with NASA policy and guidelines for orbital debris (NPD 8710.3 and NSS 1740.14)? Explain non -compliances.
Orbital Debris Assessment was performed but will be revised with the recent addition of CERES FM5

10. Has an Air Force Form 813 been completed? *(Please attach copy)*	☐ YES ☒ NO

11. During any phase, does the mission/project include or involve: Check all that apply. If uncertain, indicate with a "?" For all that apply, provide an explanation. Use the additional space below if needed.

A	Fuels (Hydrazine)
B	Ionizing Radiation Devices/Sources
C	Explosives (Class C EEDs for mechanical systems deployments)
D	Hazardous Materials/Substances/Chemicals (Beryllium, IPA, KOH electrolytes (Battery cells))
E	Lasers (Class, Earth Pointing) (
F	Disease Producing Pathogenic Microorganisms
G	Discharges of any Substances into Air, Water, or Soil
H	Hazardous Wastes (Cleaning waste)
I	High Noise Levels
J	Sample Return to Earth
K	Radio Frequency Communications (X-band, S-band)
L	Construction/Modification/Demolition of a Facility
M	Land Disturbance, Tree Clearing, Removal of Vegetation
N	Impact on Threatened or Endangered Species
O	Impact/Destruction of Sensitive Wildlife Habitat
P	Impact on/near Areas of Cultural Significance
Q	Impact on Local Social or Economic Conditions (Traffic, Employment, etc)
R	Impact on Minority or Low Income Populations
S	New or Foreign Launch Vehicle
T	Other Issues of Potential Environmental Impact
U	Require any Environmental Permit

Additional Information

N/A

12. What Safety hazards are associated with the mission?
Lifting and Handling, transportation (shipping); Pressurized equipment operations; Propellant loading; Battery Conditioning and Charging; Radiation; Deployable Solar Arrays;

13. Summary of subsystem components

Structural Materials	Aluminum honeycomb sandwich panels Machined aluminum frame
Propulsion	Subsystem designed to carry 400 kg of propellant.

	Monopropellant Hydrazine in 40-inch oblate spheroid tank of 6AI-4V titanium
Communications	10 W X-band transmitters (qty 4) – 2 HRD, 2 SMD 10 W S-band transmitters (qty 2)
Power	2 Nickel Hydrogen (NiH_2) batteries. Each is rated at 85 Ahr. Total capacity is 170 Ahr. Triple Junction Gallium Arsenide (GaAs) solar array cells.
Science Instruments	ATMS sounder CrIS spectrometer VIIRS radiometer OMPS CERES
Hazardous Components (radioactive materials, lasers, chemicals, etc.)	23 kg Beryllium in CrIS instrument 2.5 kg Beryllium in ATMS instrument 0.9 kg Beryllium in VIIRS instrument <1 kg Beryllium in CERES instrument RF from C & DH;
Other (include dimensions and weight of s/c)	Satellite Dimensions: X 4.2 m Y 2.2 m Z 2.6 m Satellite Weight: NTE 2270 kg TiNi frangibolt actuators to deploy solar array

PROJECT MANAGER NAME	KEN SCHWER	DATE
PROJECT MANAGER SIGNATURE	K.O. Schwer	10/15/08