

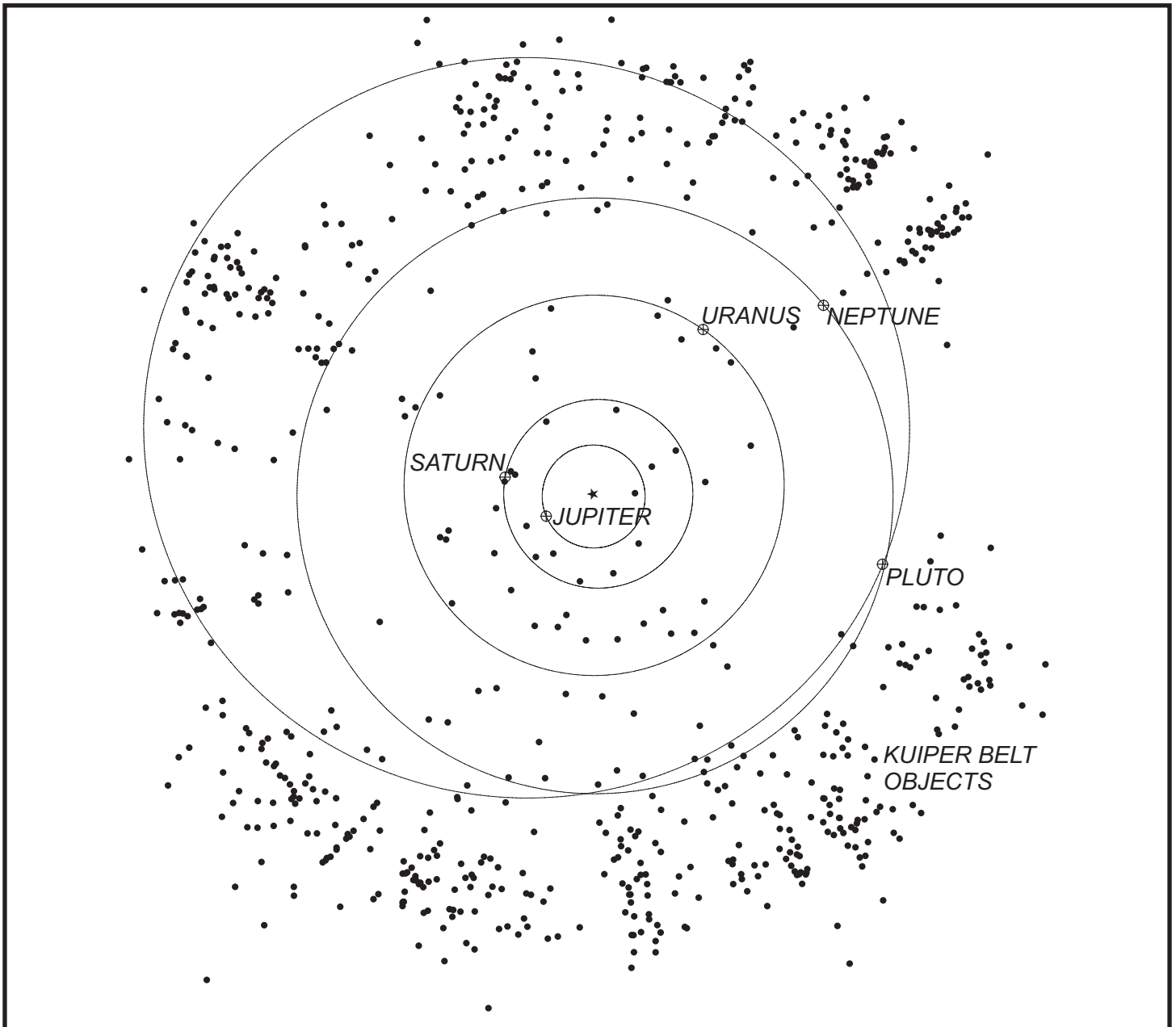


National Aeronautics and
Space Administration

Volume 2
Appendices A through E

July 2005

Final Environmental Impact Statement for the New Horizons Mission



**Cover graphic, *Map of the Outer Solar System*, courtesy of
Gareth V. Williams, Harvard-Smithsonian Center for Astrophysics.
Positions of the planets and Kuiper Belt Objects are shown as of June 2002.**

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE NEW HORIZONS MISSION

VOLUME 2 APPENDICES A THROUGH E

**Science Mission Directorate
National Aeronautics and Space Administration
Washington, DC 20546**

July 2005

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APPENDIX A
GLOSSARY OF TERMS

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APPENDIX A

GLOSSARY OF TERMS

- 99-th percentile**—An expression of an outcome that would not occur in more than 1 percent of all statistical samples (that is, 1 percent of the outcomes would be greater than the 99-th percentile level); the 99-th percentile is derived from the distribution of outcomes on which the mean value is based.
- accident environment**—Conditions resulting from an accident, such as blast overpressure, fragments, and fire.
- affected environment**—A description of the existing environment that could be affected by the Proposed Action or its alternatives.
- albedo**—the ratio of the amount of solar radiation reflected from an object to the total amount incident upon it.
- ambient air**—The surrounding atmosphere, usually the outside air, as it exists around people, plants, and structures. (It is not the air in the immediate proximity of an emission source.)
- aphelion**—The point on a planetary orbit farthest from the Sun.
- astronomical unit (AU)**—The average radius of Earth's nearly circular orbit around the Sun, about 149.6 million kilometers (93 million miles).
- Atlas**—A family of launch vehicles manufactured by the Lockheed Martin Space Systems Company.
- attainment**—An area is designated as being in attainment by the U.S. Environmental Protection Agency if it meets the **National Ambient Air Quality Standards (NAAQS)** for a given **criteria pollutant**. Non attainment areas are areas in which any one of the NAAQS have been exceeded, maintenance areas are areas previously designated non attainment and subsequently re-designated as attainment, and unclassifiable areas are areas that cannot be classified on the basis of available information as meeting or not meeting the NAAQS for any one criteria pollutant.
- background radiation**—Ionizing radiation present in the environment from cosmic rays and natural sources in the Earth; background radiation varies considerably with location.
- conditional probability**—Within the context of this Environmental Impact Statement, the probability that a release of radioactive material could occur given an initiating accident (that is, the accident has occurred).
- confidence level**—In statistics, the degree of desired trust or assurance in a given result. A confidence level is always associated with some assertion and measures the probability that a given assertion is true.

criteria pollutants—The Clean Air Act requires the U.S. Environmental Protection Agency to set air quality standards for common and widespread pollutants after preparing criteria documents summarizing scientific knowledge on their health effects. Currently, there are standards in effect for six criteria pollutants: sulfur dioxide (SO₂), carbon monoxide (CO), particulate matter equal to or less than 10 microns in diameter (PM₁₀), nitrogen dioxide (NO₂), ozone (O₃), and lead (Pb).

cultural resources—The prehistoric and historic districts, sites, buildings, objects, or any other physical activity considered important to a culture, subculture, or a community for scientific, traditional, religious, or any other reason.

cumulative impact—The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes other such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

curie (Ci)—A measure of the radioactivity level of a substance (that is, the number of unstable nuclei that are undergoing transformation in the process of radioactivity decay); one curie equals the disintegration of 3.7×10^{10} (37 billion) nuclei per second and is equal to the radioactivity of one gram of radium-226.

decibel—A logarithmic measurement unit that describes a particular sound pressure quantity compared to a standard reference value.

dose—The amount of energy deposited in the body by ionizing radiation per unit body mass.

essential fish habitat—The United States Congress defined essential fish habitat for Federally managed fish species as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 U.S.C. 1802(10)). The conservation of essential fish habitat is an important component of building and maintaining sustainable fisheries.

exposure to radiation—The incidence of radiation from either external or internal sources on living or inanimate material by accident or intent.

first stage—The launch vehicle stage that provides thrust at lift-off.

full stack intact impact (FSII)—For the purpose of this Environmental Impact Statement, a postulated accident in which the entire launch vehicle (that is, all stages, other vehicle elements, and the payload) impacts the ground in an intact configuration due to a failure at or very shortly after lift-off.

General Conformity Rule—The General Conformity Rule is applicable to non attainment or maintenance areas (see **attainment**) as designated by the U.S. Environmental Protection Agency (EPA), and ensures that Federal actions conform to each State Implementation Plan for air quality. These plans, approved by the EPA, are each State's individual plan to achieve the **NAAQS** as

required by the Clean Air Act. The EPA is required to promulgate a Federal Implementation Plan if a State defaults on its implementation plan. A conformity requirement determination for the action is made from influencing factors, including, but not limited to, non attainment or maintenance status of the area, types of emissions and emission levels resulting from the action, and local impacts on air quality.

General Purpose Heat Source (GPHS)—A passive device that produces heat from the radioactive decay of plutonium (in a ceramic form called plutonium dioxide consisting mostly of plutonium-238, a non-weapons grade isotope). This heat can then be converted into usable electrical power.

gravitational perturbation—a disturbance to the regular path of a celestial body caused by an external gravitational force.

gravity assist (flyby or swingby)—A technique used to significantly alter a spacecraft's trajectory without requiring a large amount of onboard propellant. A gravity assist occurs when a spacecraft flies past a massive body (Venus, Earth, or Jupiter, for example). The spacecraft receives a change in speed and direction by the gravitational action of the body. The angle and distance at which the spacecraft approaches the body determine the amount of this change. The technique is used to allow greater spacecraft mass at launch, reduce overall mission flight time, or aim the spacecraft toward another body.

health effects—Within the context of this Environmental Impact Statement, health effects are defined as the number of additional **latent cancer fatalities** due to a radioactive release (that is, the number of cancer fatalities resulting from this release that are in excess of those cancer fatalities which the general population would normally experience from other causes).

hydrazine—A toxic, colorless liquid fuel that is hypergolic (able to burn spontaneously on contact) when mixed with an oxidizer such as nitrogen tetroxide (N_2O_4) or placed in contact with a catalyst. Vapors may form explosive mixtures with air.

infrared radiation—Electromagnetic radiation of wavelengths that lie in the range from 0.75 micron (the long-wavelength limit of visible red light) to 1,000 microns (the shortest microwaves).

initiating probability—The probability that an identified accident and associated adverse conditions (accident environments) will occur.

ionosphere—An upper atmospheric region where ionization of atmospheric gases occurs.

isotope—Any of two or more species of atoms of a chemical element with the same atomic number and nearly identical chemical behavior, but with different atomic mass (number of neutrons) or mass number and different physical properties.

latent cancer fatalities—Estimation of latent cancer fatalities assumes that 1) exposures to the radioactive material released to the environment occur over a

50-year period, and 2) the internal **dose** resulting from such exposure are 50-year committed doses, meaning that following inhalation or ingestion of the radioactive material, the resulting internal doses are based on tracking the material in the body for a 50-year period. The time period over which latent cancer fatalities occur is undefined, and could occur well after 50 years following the release.

maximally exposed individual—A hypothetical person that would receive the maximum predicted dose.

mean—The outcome (**source term, dose, health effects**, or land contamination as used in this Environmental Impact Statement) that would be anticipated if an accident which released radioactive material were to occur; the mean is a statistical expression of probability-weighted values (source terms or radiological consequences).

National Ambient Air Quality Standards (NAAQS)— Section 109 of the Clean Air Act requires the U.S. Environmental Protection Agency to set nationwide standards, the NAAQS, for widespread air pollutants. Currently, six pollutants are regulated by primary and secondary NAAQS (see **criteria pollutants**).

occultation—The period of time during which the ability to see a celestial body is blocked by another body (for example, when a spacecraft's view of the Earth or Sun is blocked by a planet during a flyby).

oxides of nitrogen (NO_x)—Gases formed primarily by fuel combustion, which contribute to the formation of acid rain. Hydrocarbons and oxides of nitrogen combine in the presence of sunlight to form ozone, a major constituent of smog.

parking orbit—A temporary low-altitude Earth orbit in which a spacecraft with its second or third launch vehicle stage waits until it is in the proper position to continue toward its next or final destination.

payload—The element(s) that a launch vehicle or spacecraft carries over and above what is necessary for the operation of the vehicle. For a launch vehicle, the spacecraft being launched is the payload; for a scientific spacecraft, the suite of science instruments is the payload.

payload fairing (PLF)—The protective shell on a launch vehicle that encapsulates the spacecraft through atmospheric ascent.

radiation—The emitted particles (alpha, beta, neutrons) or photons (X-rays, gamma rays) from the nuclei of unstable (radioactive) atoms as a result of radioactive decay. Some elements are naturally radioactive; others are induced to become radioactive by bombardment in a nuclear reactor or other particle accelerator. The characteristics of naturally occurring radiation are indistinguishable from those of induced radiation.

radiation dose—The amount of energy from ionizing radiation deposited within tissues of the body; it is a time-integrated measure of potential damage to tissues from exposure to radiation and as such is related to health-based consequences.

radioactive half-life—The time required for one half of the atoms in a radioactive substance to decay.

radioisotope thermoelectric generator (RTG)—A power source that converts the heat from the radioactive decay of plutonium (in a ceramic form called plutonium dioxide consisting mostly of plutonium-238, a non-weapons grade isotope) into usable electrical energy.

refractivity—a measure of the ability of a medium (for example, glass or a planet's atmosphere) to alter or distort the path of light.

rem—The unit dose representing the amount of ionizing radiation needed to produce the same biological effects as one roentgen of high-penetration X-rays (about 200,000 electron volts). The biological effects of 1 rem are presumed to be independent of the type of radiation.

risk—Within the context of this Environmental Impact Statement, risk is defined as the expectation of **health effects** in a statistical sense (that is, the product of total probability times the mean health effects resulting from a release of plutonium dioxide, and then summed over all conditions leading to a release).

second stage—The launch vehicle stage that continues to provide thrust during ascent after the vehicle's first stage has depleted its propellant and been jettisoned.

source term—The quantities of materials released during an accident to air or water pathways and the characteristics of the releases (for example, particle size distribution, release height and duration); used for determining accident consequences.

specific impulse—A performance parameter of a rocket propellant, expressed in seconds, defined as the rocket's thrust, in pounds-force, divided by the propellant flow rate, in pounds per second.

stratosphere—An upper portion of the atmosphere above the troposphere reaching a maximum height of 50 kilometers (31 miles) above the Earth's surface. The temperature is relatively constant in the lower stratosphere and gradually increases with altitude. The stratosphere is the Earth's main ozone producing region.

third stage—The launch vehicle stage that provides the final thrust required to place a launch vehicle's payload into its proper trajectory or orbit.

tropopause—The boundary between the troposphere and stratosphere, usually characterized by an abrupt change of lapse rate; the change is in the direction of increased atmospheric stability from regions below to regions above the tropopause; its height varies from 15 kilometers (9 miles) in the tropics to about 10 kilometers (6 miles) in polar regions.

troposphere—The portion of the atmosphere next to the Earth's surface in which the temperature rapidly decreases with altitude, clouds form, and convection is active. The troposphere begins at ground level and extends to an altitude of 10 to 12 kilometers (6 to 8 miles) above the Earth's surface.

unavoidable adverse effects—Effects that can not be avoided due to constraints in alternatives. These effects must be disclosed, discussed and mitigated, if practicable.

ultraviolet (UV) radiation—Electromagnetic radiation of wavelengths that lie in the range from 0.35 micron (the short-wavelength limit of violet light) to 0.05 micron (the longest X-rays).

APPENDIX B
EFFECTS OF PLUTONIUM ON THE ENVIRONMENT

APPENDIX B
EFFECTS OF PLUTONIUM ON THE ENVIRONMENT
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APPENDIX B

EFFECTS OF PLUTONIUM ON THE ENVIRONMENT

B.1 INTRODUCTION

This appendix addresses the potential impacts from a radioactive source containing plutonium (Pu)-238 released to the environment, which could occur in any of the low-probability accidents described in Chapter 4 of this Environmental Impact Statement (EIS). The health and environmental risks associated with Pu-238 were previously addressed in the National Aeronautics and Space Administration's (NASA) EISs for the Galileo, Ulysses, Cassini, and Mars Exploration Rovers missions (NASA 1989, NASA 1990, NASA 1995, NASA 1997, NASA 2002).

The New Horizons spacecraft carries one general purpose heat source radioisotope thermoelectric generator (RTG) containing approximately 10.9 kilograms (24 pounds) of plutonium dioxide (PuO₂) (consisting mostly of Pu-238), with a total activity of about 132,500 curies.

The purpose of this appendix is to describe qualitatively the factors that influence the movement of PuO₂ through the environment and into the human body, together with the subsequent health effects, in the event that there is an accidental release of PuO₂ from the spacecraft's RTG.

B.2 CHEMICAL AND PHYSICAL PROPERTIES THAT ARE IMPORTANT FOR BEHAVIOR IN THE ENVIRONMENT AND THE HUMAN BODY

In this section, the following important characteristics are discussed:

- Chemical form;
- Particle size distribution;
- Solubility;
- Half life; and
- Decay modes.

B.2.1 Chemical Form

In the RTG for the New Horizons mission, the Pu-238 is present as the dioxide. The predominant risk pathways are those in which this material is released as the result of ground impact and fire. It is therefore assumed that the Pu remains oxidized. This is important because the chemical form influences the solubility, which in turn strongly influences such factors as bioaccumulation and uptake in the human body.

B.2.2 Particle Size Distribution

It is also important to understand the physical form of the material, in particular the particle size distribution, which influences, among other things: whether the material will fall to the ground in the immediate vicinity of the accident or will be transported over

long distances; the initial deposition and subsequent resuspension of particles in both air and water; solubility in water and in biological fluids; and whether or not the material can be inhaled and where it will be deposited and retained within the human respiratory system. Generally speaking, larger particles have less potential for suspension and resuspension; as the particle size decreases, particles are more easily kept in suspension.

The initial particle size distribution is a function of the conditions of the accident. For example, the launch area source terms could initially be in the form of vapor as a result of exposure to fire. The vapors would contain not only the radionuclides but also various structural materials. The radionuclides would tend to condense with and agglomerate with these other materials, which would then predominantly determine the characteristics of the aerosol. The potential for uptake of inhaled particles is critically dependent on the size of the particles (respirable particles are generally considered to be 10 microns or less, although larger sizes can be deposited in the upper respiratory tract).

B.2.3 Solubility

A number of factors affect the solubility of PuO_2 in water. Physical parameters most important to the solubility of PuO_2 are the reactive surface area and oxidation state of plutonium and the water chemistry, including pH, reduction/oxidation potential, and temperature. The mass to surface area ratios of particles affect the reactivity and solubility, with solubility being inversely related to particle size. In general, PuO_2 is insoluble.

Because PuO_2 is so insoluble, movement through the environment depends on physical processes. PuO_2 may be carried into the soil by a number of routes, including the percolation of rainfall and subsequent leaching of particles into the soil, animal burrowing activity, and plowing or other disturbance of the soil by humans. Migration of the PuO_2 into the soil column is of concern, primarily because of the potential for PuO_2 to reach groundwater aquifers used as drinking water supplies. Once deposited on soil, however, PuO_2 appears to be extremely stable. Soil profile studies have shown that generally more than 95 percent of the PuO_2 from nuclear weapons fallout remained in the top 5 cm (2 inches) of surface soil (in undisturbed areas) for 10 to 20 years following deposition (DOE 1987).

B.2.4 Half Life

The half-life of Pu-238 is 87.7 years. This half-life is particularly important for chronic exposure pathways. After a human lifetime (nominally 70 years), more than half of the Pu-238 will still be present.

B.2.5 Decay Modes

Pu-238 is an alpha particle emitter with decay energies of about 5 million electron volts. Its radioactive daughters are also alpha-emitters with about the same decay energy. These alpha particles are what predominantly determine the effects on the human body.

Pu-238 can also undergo spontaneous fission, but the branch probability is extremely small.

B.3 THE TRANSPORT OF PLUTONIUM OXIDES THROUGH THE ENVIRONMENT

Plutonium is one of the most widely studied elements in terms of chemistry and environmental behavior. Although its chemistry and oxidation states are quite diverse, the element's environmental mobility is very limited (INSRP 1989). The pathways and the generalized behavior of plutonium in the environment are described in the literature (e.g., Aarkrog 1977, Pinder and Doswell 1985, Pinder et al. 1987, Yang and Nelson 1984). The extent and magnitude of potential environmental impacts caused by PuO₂ releases depend on the mobility and availability of PuO₂ and are directly controlled by a number of physical and chemical parameters, including particle size, potential for suspension, deposition and resuspension, solubility, and oxidation state of any dissolved plutonium.

This Section discusses the various ways in which plutonium can be transported through the environment to the point at which it is taken into or irradiates the human body. The modeling for the New Horizons mission encompasses both short-term (during plume passage) and long-term (chronic exposure) pathways.

B.3.1 During Plume Passage

The predominant pathway during the passage of the airborne plume is inhalation. The important parameters in this calculation are the rate of dilution of the plume as it travels downwind, the deposition mechanisms that deplete the plume and leave radioactive material on the ground, and the rate of inhalation. All of these parameters and mechanisms are independent of the fact that the radionuclide in question is Pu-238. For example, the small particle sizes arising from agglomeration onto aluminum oxide particles (see Section B.1.2) mean that gravitational settling is not important. It is therefore appropriate to use a standard Gaussian model for the atmospheric dispersion. Similarly, the small particle size means that, once it is transported to a human receptor, it is inhaled. Work done for previous EISs shows that inhalation of the particles in the passing plume and of resuspended particles are the two most important contributors to the radiation dose accumulated by human receptors.

The other pathway that is potentially important during plume passage is cloudshine – the irradiation of the human body by neutrons and gamma rays emitted by the passing plume of radioactive material. However, because Pu-238 emits predominantly alpha particles, this irradiation pathway is not important for the New Horizons Mission.

B.3.2 Chronic Exposure Pathways

This section considers contributions due to resuspension, ingestion of vegetables, external exposure, seafood ingestion, and contamination of drinking water.

B.3.2.1 Resuspension

For launch area accidents, the resuspension model used in the analysis starts with an initial resuspension factor that decreases exponentially to a constant long term resuspension factor (Momeni et al. 1979, Strenge and Bander 1981). For materials deposited after traveling more than 100 km (62 mi) from the source of a release, or released high in the atmosphere, the resuspension factor is at all times typically similar to the long term resuspension factor (Bennett 1976, UNSCEAR 1982). The work done in previous EISs shows that resuspension is the most significant of the chronic exposure pathways and is comparable to or larger in its effects on humans than is the direct inhalation pathway.

B.3.2.2 Vegetable Ingestion

Parameters used for estimating the uptake from harvesting and consumption of agricultural products have been measured (Baes et al. 1984, Rupp 1980, Yang and Nelson 1984). These and similar agricultural and food consumption parameters and plutonium ingestion parameters (ICRP 1979) are used as the basis for estimating human doses via ingestion. For example, an analysis of Pu-238 contamination of orange trees shows that a total of only 1 percent of the plutonium actually aerially deposited on the plants would be transported on fruit from field to market during the 12 months following harvesting (Pinder et al. 1987). Most of this plutonium would adhere to the fruit's peel and would be removed prior to ingestion; uptake to the orange itself would be extremely small or nonexistent.

Four mechanisms of vegetable ingestion were taken into account, as described below.

- *Initial deposition immediately following the accident* – the amount initially deposited per curie released depends on non-PuO₂ specific factors such as particle size distribution and characteristics of the vegetation. The predicted amount of radioactive material ingested by humans then depends on assumptions about physical mechanisms and vegetable distribution, such as: the removal half-life for leaf-deposited material, a leaf interception factor, and a vegetable density. Additionally, harvesting (continuous after the accident, delayed harvesting, crop destruction) and consumption assumptions would affect the predicted amount of radioactive material ingested by humans.
- *Continuous redeposition on the vegetables due to resuspension over the first 50 years following the accident* – the amount ingested by individuals is controlled by the resuspension mechanism (see above), the assumed dry deposition velocity and assumptions about harvesting and distribution.
- *Root uptake* – this mechanism is in principle highly radionuclide and vegetable specific and depends on such factors as solubility, radionuclide chemistry and vegetable chemistry. In general, PuO₂ is insoluble and is poorly transported in terrestrial environments. Most forms of plutonium, including PuO₂, are removed from biological pathways by processes such as fixation in soil. Only small amounts of material would be concentrated by biological accumulation into grazing animals, and vegetables.

- *Rain splashup* – this mechanism depends in part on the characteristics of the soil and the rainfall.

For Pu-238, radiation doses arising via these pathways are a small fraction of those arising from the inhalation pathways.

B.3.2.3 External Radiation

External radiation from material deposited on the ground and resuspended material is calculated using standard methods for cloudshine and groundshine. Because Pu-238 is predominantly an alpha emitter, this exposure pathway is relatively unimportant.

B.3.2.4 Seafood and Fish Pathway

Radiation doses can result from the bioaccumulation of plutonium deposited on the surfaces of inland waters or oceans. The predicted radiation doses arising from this pathway depend on a number of assumptions and physical and chemical processes, including how the deposited radionuclides are diluted in the water, how the radionuclides are partitioned between water and sediment, and how radionuclides are accumulated in different types of fish, crustaceans and mollusks.

In marine and aquatic systems, larger particles would quickly settle to the bottom sediments; smaller silt-size particles may remain in suspension within the water column for extended periods of time. Smaller particles may not even break the water surface (due to surface tension), forming a thin layer on the water surface that is subsequently transported to the shoreline by wind and wave action. Resuspension of smaller particles from the bottom could occur due to physical disturbance of the sediments by wave action and recreational uses of the water bodies (e.g., swimming, boating, and fishing), as well as by the feeding activity of various marine and aquatic species. Particles of PuO₂, as a component of the bottom sediments, may also be transported toward and along the shoreline by wave action and currents in near-shore environments (NASA 1990).

Studies have indicated that bioaccumulation in marine organisms can vary widely depending on the type and population densities of seafood species impacted (e.g., freshwater fish, saltwater fish, mollusks), the amount and particle size distribution of radioactive material released, and the deposition area.

PuO₂ entering into a water/sediment system would be preferentially taken out of solution and bound in saturated sediments in amounts on the order of 100,000 times greater than the amounts that would remain in the associated water column (NASA 1990).

Clays, organics, and other anionic constituents tend to bind most of the PuO₂ particles in the sediment column. The binding of PuO₂ usually occurs in the first few centimeters of sediment, greatly reducing the concentration of this constituent with depth.

Overall, the seafood pathway is insignificant for PuO₂. This is due to a combination of considerable dilution in the water, overwhelming partition into sediment, and small bioaccumulation factors.

B.3.2.5 Contamination of Drinking Water

It is possible that surface water runoff containing PuO₂ could directly contaminate drinking water supplies that originate from surface water bodies, because this type of contamination is primarily due to suspended PuO₂ particles and not from dissolved PuO₂. Filtering the surface water before chemical treatment would reduce the concentration of total plutonium to very low levels (NASA 1990).

B.4 TRANSPORT AND DEPOSITION OF RADIONUCLIDES IN THE HUMAN BODY

The International Commission on Radiological Protection (ICRP) has developed accepted models for the distribution of inhaled and ingested radionuclides in the body. The ultimate fate of these radionuclides depends on such factors as particle size distribution, solubility, and chemistry. The ICRP models requires knowledge of numerous parameters, most of which are obtained empirically (e.g., there is no theoretical model for determining what fraction of ingested plutonium (say) enters the bloodstream). The required parameters are obtained from animal experiments and, if available, from human studies concerning the effects of nuclear weapons and of nuclear fallout. Of the transuranium elements, plutonium is by far the most widely studied.

PuO₂ that enters the human body by inhalation or ingestion has many possible fates, all of which have been studied in detail (ICRP 1979; ICRP 1986). The inhalation route is found to be approximately 1,000 times as effective as ingestion in transporting plutonium to the blood, due to the short time of residency, the chemical properties of plutonium, and the physiological environment of the gastro-intestinal (GI) tract (ICRP 1979).

Ingested PuO₂ would quickly pass through the digestive system and be excreted with only a small quantity being absorbed via the mucosa into the bloodstream. The fractional absorption of PuO₂ is estimated to average about 1 part in 100,000 ingested (ICRP 1979; ICRP 1986) – that is, in ICRP terminology, the f_1 factor for ingestion is 10^{-5} . The fractional absorption is based on the average individual. Note that PuO₂ in the environment could become more soluble with time due to the use of fertilizers in gardening, chlorination in drinking water, and conversion to soluble forms in seawater. Dietary and physiological factors, such as fasting, dietary calcium deficiency, disease or intake of medications, may also change the fractional absorption (ICRP 1986).

Inhaled PuO₂ would be transported to one or more portions of the respiratory system depending on the particle size. Generally, most particles larger than 5 to 10 microns would be intercepted in the nasopharyngeal region and either expelled or swallowed to pass through the digestive tract; what is not absorbed, would then be excreted. Particles smaller than about 5 microns would be transported to and remain in the trachea, bronchi, or deep lung regions. Particles reaching the deep lung would be cleared from the body much more slowly than those not entering the lung. For example, approximate micrometer-size PuO₂ particles would typically be cleared from the pulmonary area of the lung at the rate of 40 percent in the first day, and the remaining 60 percent cleared in 500 days (ICRP 1979). Particles captured in the mucous lining of the upper respiratory tract would be moved more rapidly to the pharynx, where they would be swallowed. Once swallowed, they would behave as if ingested.

Plutonium dioxide remaining in the lung would continuously irradiate lung tissue, and a small fraction would be transported over time directly to the blood or to lymph nodes and then to the blood. The estimated fraction of plutonium transferred directly from pulmonary lung tissues to the blood would be about 1 percent of the amount retained in the lungs, depending on the size distribution of ultra-fine particles. Smaller particles are likely to form over time from larger particles due to the natural fragmentation processes associated with radioactive decay and may also be transferred to the blood. Over a period of years, approximately 15 percent of the PuO₂ initially deposited in the lungs would be transferred to the lymph nodes. Of that, up to 90 percent would likely be retained in the lymph node with a 1,000 day half-life before being transferred to the blood (ICRP 1986). Overall, the PuO₂ f₁ factor for inhalation is the same as that for ingestion, 10⁻⁵.

Once PuO₂ has entered the blood via ingestion or inhalation, it would circulate and be deposited primarily in the liver and skeletal system. It is currently accepted that plutonium transported by the blood is distributed to the following organs: 45 percent in the liver, 45 percent in the skeletal system, 0.035 percent in the testes and 0.011 percent in ovaries with a non-measurable amount crossing the placenta and available for uptake by the fetus. The remaining 10 percent of the activity in the blood is excreted through the kidneys and colon or deposited in other tissues (ICRP 1979, ICRP 1986).

The estimated residence times in the liver, skeletal system, and gonads are quite long. Current estimates for 50 percent removal times for plutonium are 20 years for the liver, 50 years for the skeleton, and permanent retention for the gonads.

B.5 CANCER INDUCTION AND GENETIC EFFECTS

The relationship between dose received and the probability of cancer induction is described by the Linear, No-Threshold (LNT) model. For low-level doses such as those predicted for potential accidents involving the New Horizons mission, the LNT model states that for a collective dose of 10,000 person-rem accumulated by a given population, it is expected that 5 to 6 cancers will develop (EPA 2002). Equivalently, for low levels of radiation dose, the probability of cancer induction in an individual is 5x10⁻⁴/rem to 6x10⁻⁴/rem (where the radiation dose in question is the Effective Dose Equivalent (EDE) to the whole body) no matter how small the dose. LNT is frequently extrapolated to doses as low as one ten thousandth of those for which there is direct evidence of cancer induction by radiation (Cohen 2000).

The validity of the LNT model has been questioned by, among others, the Health Physics Society, which has issued a position statement (HPS 2001) that declares "In accordance with current radiation knowledge of health risks, the Health Physics Society recommends against quantitative estimation of health risks below an individual dose of 5 rem in one year or a lifetime dose of 10 rem in addition to background radiation. There is substantial and convincing evidence for health risks at high dose. Below 10 rem (which includes occupational and environmental exposures) risks of health effects are either too small to be observed or non-existent."

In the past decade, there have been numerous studies worldwide on the effects of low dose radiation. One particularly comprehensive program has been initiated by the U.S. Department of Energy, the Low Dose Radiation Research Program (LDRRP), the goal of which is to support research that will help determine health risks from exposures to low levels of radiation. Progress in these areas is documented on the LDRRP web site at <http://www.er.doe.gov/production/ober/lowdose.html>. The LDRRP began in 1999 and is currently planned to last 10 years.

Some of the issues that need to be considered are as follows: a nearby cell may be affected in several ways by the ejection of an alpha particle from a decaying Pu-238 nucleus.

- The alpha particle entirely misses the cell and has no damaging effect.
- The alpha particle strikes the cell nucleus and kills it.
- The alpha particle strikes the cell nucleus, damaging the DNA, but the cell survives with one of the following results:
 - The damaged DNA is correctly repaired before cell division with no lasting effects.
 - The damaged DNA is not correctly repaired and the cell lives but does not reproduce and dies at the end of its life cycle (common for highly differentiated cells).
 - The damaged DNA is not correctly repaired and the cell lives to pass on defective genes to future generations of cells (common for undifferentiated stem cells).

Recent in vitro cellular-level irradiation studies have indicated that undifferentiated cells (including human epithelial cells of the type commonly involved in many cancers and leukemias) can survive intact not just single but also multiple alpha particle tracks (Nagasawa and Little 1992, Kadhim et al. 1992, Evans 1992, Kadhim et al. 1994, Hei et al. 1997, Little 1997, Riches et al. 1997, Pugliese et al. 1997, Miller et al. 1999). There is also evidence that low level radiation stimulates biological defense mechanisms. Cohen (2000) reviews the evidence for this, including reference to a report of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR 1994).

Such biological defense mechanisms would tend to support the view that LNT is conservative. However, the latest research as documented on the above-referenced LDRRP web site suggests that it is premature to come to any definitive conclusion. For example, it is now possible to detect “bystander effects” in cells that do not have direct deposition of energy in them. These effects have been detected in model tissue systems by the Gray Laboratory. The past tendency has been to use localized dose to predict effects. However, this may not now be valid since there is a marked response in non-exposed cells and tissues. With bystander effects, especially for high-LET radiation, the use of dose as a common currency to predict risk may no longer be acceptable. The biological impact of such observations on radiation risk require a continuing reevaluation.

The use of gene chip technology makes it possible to look more deeply into the mechanisms of action of low dose radiation exposure. The influence of dose, dose rate, tissue type and time on the level of gene expression is creating some very interesting postulates about extrapolation from high doses to low doses. Such data demonstrate that different mechanisms may be involved in radiation-induced changes at high doses as compared to the actions of low doses.

In conclusion, it is premature to consider changes in the cancer induction risk relationships used in this EIS.

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APPENDIX C
ENVIRONMENTAL JUSTICE ANALYSIS

**APPENDIX C
ENVIRONMENTAL JUSTICE ANALYSIS**

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APPENDIX C

ENVIRONMENTAL JUSTICE ANALYSIS

C.1 INTRODUCTION

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs Federal agencies to identify and address, as appropriate, the disproportionately high and adverse health or environmental effects of their programs, policies, and activities on minority populations and low-income populations.

The Council on Environmental Quality (CEQ) has oversight responsibility for documentation prepared in compliance with the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321 et seq.). In December 1997, the CEQ released its guidance on environmental justice (CEQ 1997). The CEQ's guidance was adopted as the basis for the information provided in this Final Environmental Impact Statement (FEIS).

This appendix provides data necessary to assess the potential for disproportionately high and adverse human health or environmental effects that may be associated with implementation of the New Horizons mission. The area examined in this appendix is the land area within 100 kilometers (km) (62 miles (mi)) of Space Launch Complex 41 (SLC-41) at Cape Canaveral Air Force Station (CCAFS), Florida.

C.2 DEFINITIONS AND APPROACH

C.2.1 Minority Populations

During the Census of 2000, the U.S. Bureau of the Census (USBC) collected population data in compliance with guidance adopted by the Office of Management and Budget (OMB) (62 FR 58782-58790). The OMB published its guidelines on aggregation of multiple race data in March 2000 (OMB 2000). Modifications to the definitions of minority individuals in the CEQ's guidance on environmental justice (CEQ 1997) were made in this analysis to comply with the OMB's guidelines issued in March 2000. The following definitions of minority individuals and population are used in this analysis of environmental justice:

Minority Individuals: Persons who are members of any of the following population groups: Hispanic or Latino of any race, American Indian or Alaska Native, Asian, Black or African-American, Native Hawaiian or Other Pacific Islander, or Multiracial (and at least one race which is a minority race under CEQ guidance of 1997).

Minority Population: The total number of minority individuals residing within a potentially affected area.

Persons self-designated as Hispanic or Latino are included in the Hispanic or Latino population regardless of race. For example, Asians self-designated as Hispanic or Latino are included in the Hispanic or Latino population and not included in the Asian Population. Data used to characterize minority populations in the year 2000 were

extracted from Table P4 of Summary File 1 published by the USBC on their Internet web site (DOC 2001). Data used for the projection of minority populations in Florida for the year 2006 was projected from the USBC's 1990 (DOC 1992) and 2000 census data for the area surrounding CCAFS.

C.2.2 Low-Income Populations

Poverty thresholds are used to identify "low-income" individuals and populations (CEQ 1997). The following definitions of low-income individuals and population are used in this analysis:

Low-Income Individuals: Persons whose self-reported income is less than the poverty threshold for the year 2000.

Low-Income Population: The total number of low-income individuals residing within a potentially affected area.

C.2.3 Disproportionately High And Adverse Human Health Effects

Disproportionately high and adverse health effects are those that are significant (as employed by NEPA at 40 CFR Part 1580 Subpart 1508.27) or above generally accepted norms, and for which the risk of adverse impacts to minority populations or low-income populations appreciably exceeds the risk to the general population.

C.2.4 Disproportionately High And Adverse Environmental Effects

Disproportionately high and adverse environmental effects are those that are significant (as employed by NEPA), and that would adversely impact minority populations or low-income populations appreciably more than the general population.

C.3 METHODOLOGY

C.3.1 Spatial Resolution

For the purposes of enumeration and analysis, the USBC has defined a variety of areal units (DOC 1992, DOC 2001). Areal units of concern in this document include (in order of increasing spatial resolution) states, counties, census tracts, block groups, and blocks. The block is the smallest of these entities and offers the finest spatial resolution. This term refers to a relatively small geographical area bounded on all sides by visible features such as streets and streams or by invisible boundaries such as city limits and property lines. During the 2000 census, the USBC subdivided the United States and its territories into 8,269,131 blocks. For comparison, the 2000 census used 3,232 counties, 66,304 census tracts, and 211,267 block groups. In the analysis below, block-level spatial resolution is used in the analysis of minority impacts (DOC 2001). Data that describes low-income status is not available at the block level. Therefore, block group spatial resolution is used in the analysis of low-income populations (DOC 2002).

C.3.2 Projections of Populations

Projections of population groups living in the area of interest surrounding SLC-41 in CCAFS for the year 2006 are shown in Table C-1. With three exceptions, populations living within distances of 10 km (6 mi), 20 km (12 mi), and 100 km (62 mi) of SLC-41 in 2006 were obtained as linear projections of resident populations for the years 1990 and 2000.

The three exceptions are: the minority groups “Native Hawaiian or Other Pacific Islander” and “Multiracial Minority” and the non-minority group “White and Some Other Race”. No data for these groups are available from the 1990 Census. During the 1990 Census, the category “Native Hawaiian or Other Pacific Islander” was included in the single category “Asian or Pacific Islander”. The Native Hawaiian population surrounding SLC-41 in 2006 was estimated by assuming that the percent change in the Native Hawaiian population from 2000 to 2006 will be identical to the percent change in the Asian population in the same area for the same years. Similarly, the multiracial minority population surrounding SLC-41 in 2006 was obtained under the assumption that the percent change in the multiracial minority population from 2000 to 2006 will be identical to the percent change in the combined Asian, Native Hawaiian, Black or African American and American Indian or Alaska Native populations in the same area for the same years. The “White and Some Other Race” population surrounding SLC-41 in 2006 was obtained under the assumption that the percent change in that population from 2000 to 2006 will be identical to the percent change in the combined White population and “Some Other Race” population in the same area for the same years.

C.3.3 Environmental Justice Assessment

The purpose of this analysis is to (1) identify minority populations and low-income populations residing that would be potentially affected by implementation of the Proposed Action or Alternatives and (2) determine if implementation of the Proposed Action or Alternatives would result in disproportionately high and adverse effects on these populations. In the event that radiological or other human health risks resulting from the implementation of the Proposed Action or Alternatives are found to be significant, then the health risks to minority populations and low-income populations will be evaluated to determine if they are disproportionately high.

C.4 CHARACTERIZATION OF POTENTIALLY AFFECTED POPULATIONS

Figure C-1 shows the prominent features in the area within a distance of 100 km (62 mi) of the CCAFS boundary. The land area within 100 km (62 mi) of the CCAFS boundary includes approximately 13,000 square km (5,000 square mi) of central Florida’s eastern coast. Nearly 2.4 million persons lived within 100 km (62 mi) of SLC-41 in the year 2000 (Table C-1). Minorities comprised approximately 29 percent of the total population. By the year 2006, the total population is projected to increase to approximately 2.7 million persons, and minorities are projected to comprise almost one-third of the total population.

As illustrated in Figures C-2 and C-3, approximately one-half of the total and minority populations lived in urban areas of Orange, Seminole and Volusia Counties. Ten

percent of the minority population lived within 62 km (45 mi) of SLC-41, while ten percent of the non-minority population lived within 40 km (25 mi) of SLC-41.

Hispanic or Latino and Black or African-American American populations were the largest minority groups living within 100 km (62 mi) of SLC-41 in the year 2000. Moving outward from the CCAFS boundary, Blacks or African-Americans are the largest resident minority group until approximately the outskirts of the City of Orlando. Due to the relatively large concentration of Hispanics or Latinos in the Orlando Metropolitan Area, Hispanics or Latinos comprise the largest group of minority residents in the total area. Only 23 persons lived within 10 km (6 mi) of SLC-41 in 2000, although 21 (over 90 percent) were members of a minority group.

During the 1990 Census, eight to ten percent of the residents living within 100 km (62 mi) and 20 km (12 mi) of SLC-41 reported incomes below the 1990 poverty threshold (Table C-1). Data from Census 2000 (DOC 2002) shows that the low-income population living within 100 km (62 mi) of SLC-41 increased from 10.1 percent to 10.7 percent of the total population. At the same time, the percentage of the population living within 20 km (12 mi) of SLC-41 and reporting incomes below the poverty threshold declined from over eight percent to seven percent.

C.5 IMPACTS ON MINORITY AND LOW-INCOME POPULATIONS

As discussed in Chapter 4 of this FEIS, accidents during the New Horizons mission could result in human exposure to radioactive and other hazardous materials. Plutonium-238 is the primary radioactive material of concern. Potential radiological releases could affect populations residing both within and beyond 100 km (62 mi) of the launch site. As shown in Table 4-4 of Chapter 4, if the Proposed Action is implemented, and if an accidental release of radioactive material were to occur during any mission phase, on average no latent cancer fatalities would be expected to occur.

Mission risks (consequences that would occur in the event of a radioactive release multiplied by the probability of a release) are also small. As shown in Table 4-3, the likelihood of an accident resulting in a release of radioactive material during the pre-launch and early launch phases combined is approximately 1 in 620. The corresponding risk to the local population (persons residing within 100 km (62 mi) of the launch facilities at CCAFS) and to the average local individual of a latent cancer fatality resulting from an accident in pre-launch or early launch is approximately 1 in 5,300 (population risk) and 1 in 2.2 billion (individual risk) (Table 4-8). The risk to the global population (persons residing more than 100 km (62 mi) from the launch site at CCAFS) and to the average individual of a latent cancer fatality resulting from an accident during the New Horizons mission is approximately 1 in 2,600 (population risk) and less than 1 in 2.3 trillion (individual risk) (Table 4-8).

As discussed in Section 4.1.3, non-radiological accidents also pose no significant risks to the public. Toxic effects that could result from a liquid propellant spill during fueling operations would not extend beyond the immediate vicinity of the launch pad. Members of the public are excluded from the area at risk during fueling operations. A fuel explosion on the launch pad or during the first few seconds of flight could temporarily increase carbon monoxide (CO), hydrochloric acid (HCl), and aluminum oxide (Al₂O₃)

levels near the CCAFS boundary. One-hour average concentrations of hazardous emissions from such an explosion are less than the emergency response guidelines recommended by the American Industrial Hygiene Association and the National Research Council for the Department of Defense.

Thus, implementation of the Proposed Action would pose no significant radiological or non-radiological risks to the public, including minority and low-income groups within the potentially affected population.

C.6 REFERENCES FOR APPENDIX C

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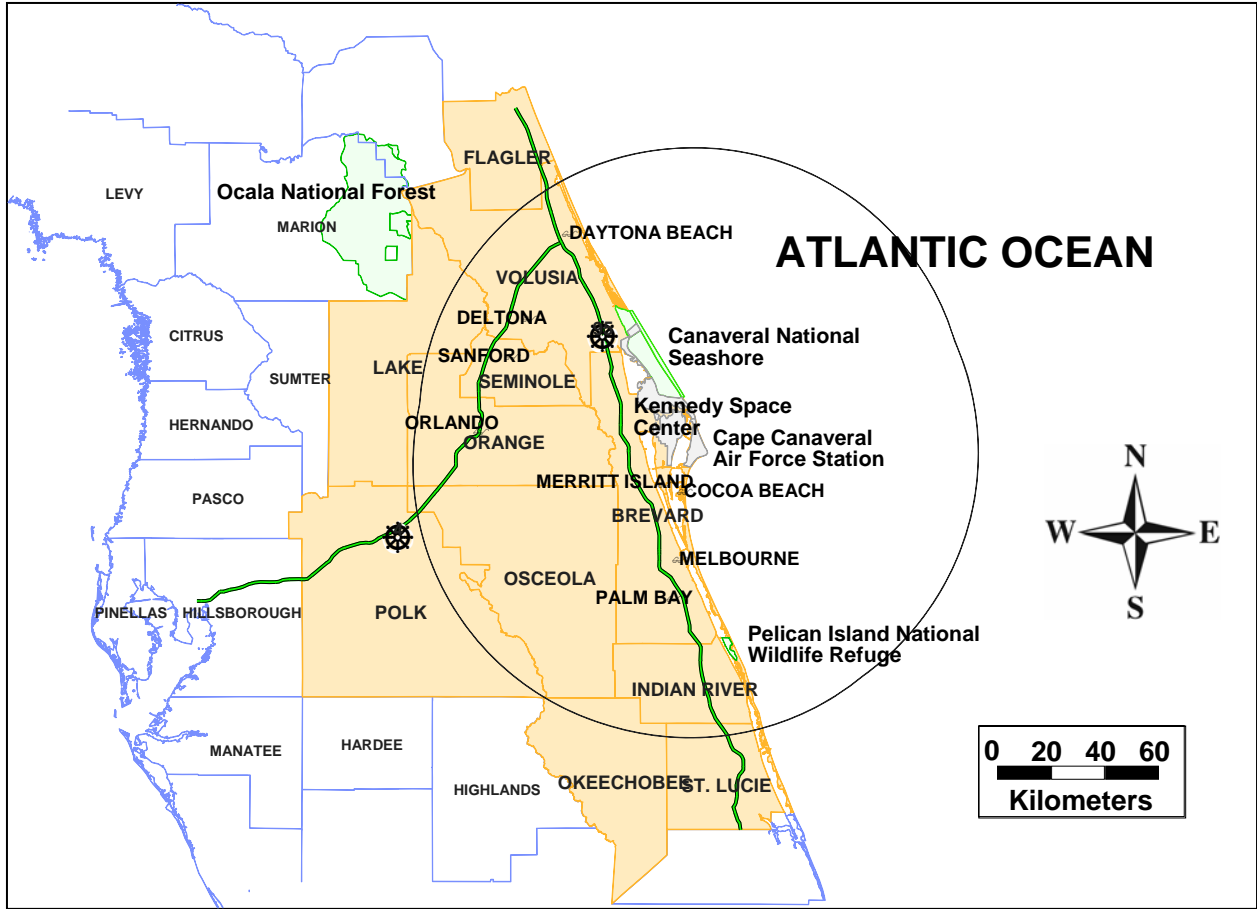


FIGURE C-1. THE AREA WITHIN 100 KM (62 MI) OF CCAFS

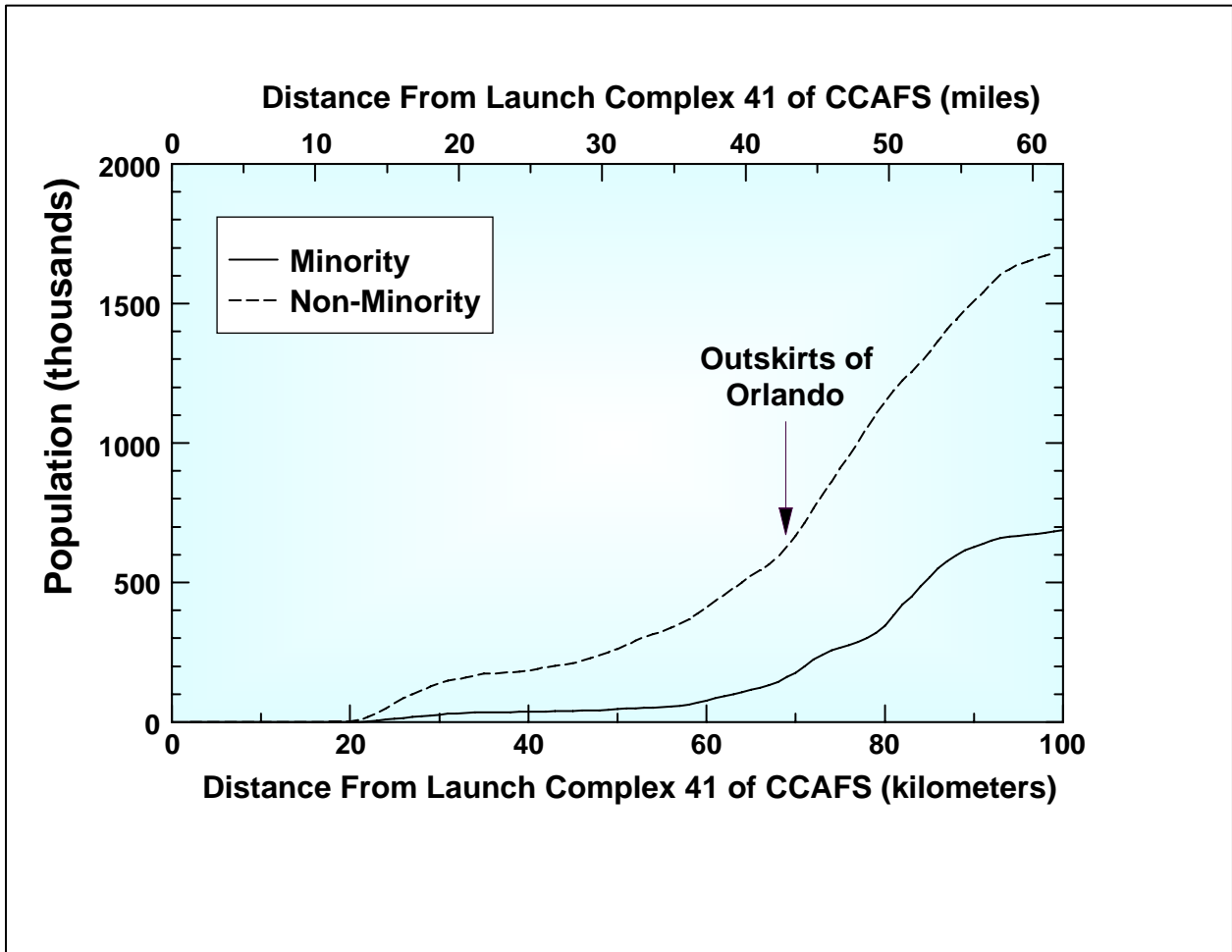


FIGURE C-2. MINORITY AND NON-MINORITY POPULATIONS LIVING WITHIN 100 KM (62 MI) OF SLC-41 OF CCAFS IN 2000

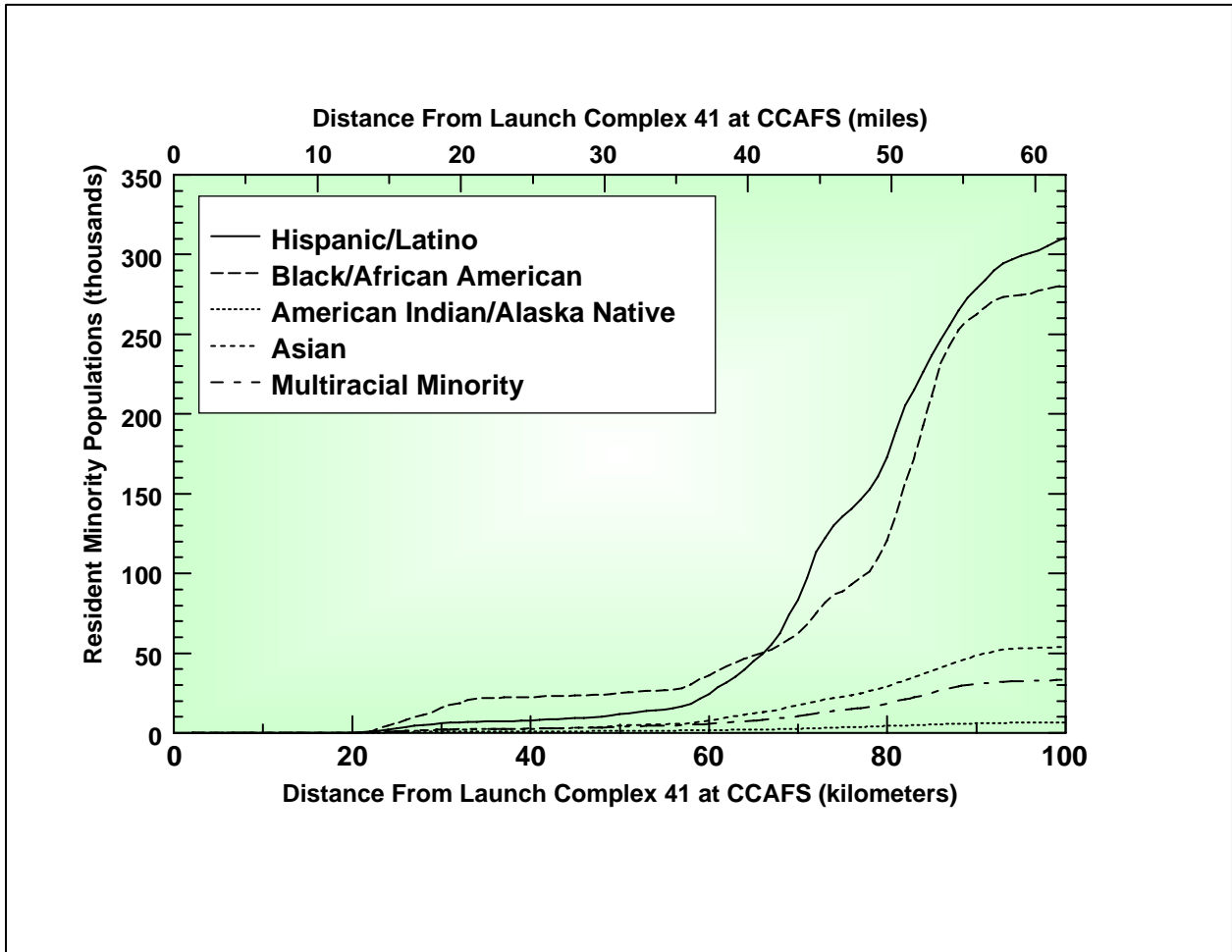


FIGURE C-3. MINORITY POPULATIONS LIVING WITHIN 100 KM (62 MI) OF SLC-41 OF CCAFS IN 2000

TABLE C-1. RACIAL AND ETHNIC COMPOSITION OF THE POPULATION AT VARYING DISTANCES FROM SLC-41 AT CCAFS FOR 1990, 2000, AND 2006

Population	100 km (62 mi)			20 km (12 mi)			10 km (6 mi)		
	1990	2000	2006 ^(a)	1990	2000	2006 ^(a)	1990	2000	2006 ^(a)
Asian	26,998	53,857	69,972	38	36	35	0	1	2
Native Hawaiian	No Data	1,355	1,760	No Data	3	3	No Data	0	0
Black/African American	192,622	281,143	334,256	36	74	97	0	11	18
American Indian/Alaska Native	6,183	6,507	6,701	26	18	13	0	0	0
Hispanic/Latino	118,831	310,636	425,719	67	121	153	0	7	11
Multiracial Minority	No Data	33,301	40,083	No Data	45	51	No Data	2	3
Some Other Race	1,187	5,382	7,899	1	3	4	0	0	0
White	1,508,431	1,678,429	1,780,428	2,944	3,101	3,195	0	2	3
White and Some Other Race	No Data	6,292	6,683	No Data	3	3	No Data	0	0
Minority	344,634	686,799	878,491	167	297	352	0	21	34
Total	1,854,253	2,376,902	2,673,501	3,112	3,403	3,554	0	23	37
Percent Minority	18.6%	28.9%	32.9%	5.4%	8.7%	9.9%	—	91.3%	91.9%
Percent Low Income	10.1%	10.7%	—	8.3%	7.0%	—	—	3.7%	—

(a) Projected population

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APPENDIX D
RESPONSES TO PUBLIC REVIEW COMMENTS

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APPENDIX D

RESPONSES TO PUBLIC REVIEW COMMENTS

NASA published a Notice of Availability (NOA) of the Draft Environmental Impact Statement (DEIS) for the New Horizons Mission in the Federal Register on February 25, 2005 (70 FR 9387). The U.S. Environmental Protection Agency published its NOA for the DEIS in the Federal Register on February 25, 2005 (70 FR 9306). The DEIS was mailed by NASA to 102 potentially interested Federal, State and local agencies, organizations and individuals. In addition, the DEIS was publicly available in electronic format on NASA's web site. NASA sent electronic mail (e-mail) notifications to 34 potentially interested individuals who had submitted scoping comments via e-mail but who had not provided a mailing address. The public review and comment period closed on April 11, 2005. Six comment submissions (letters and e-mails) were received from Federal, State and local agencies: one from the U.S. Environmental Protection Agency, one from the U.S. Department of the Interior, two from the State of Florida, one from Brevard County, Florida, and one from the City of Titusville, Florida. No comment letters were received from private organizations, and three comment letters were received from private individuals. A total of 956 comment submissions were received via e-mail from individuals, and two comment submissions were received via e-mail from private organizations.

This appendix provides specific responses to the comment submissions received from the agencies, organizations, and individuals. Table D-1 lists the six comment submissions (letters and e-mails) received from Federal, State and local agencies, and the three comment letters received from individuals. Copies of each of these submissions are presented following Table D-1. The relevant comments in each submission are marked and numbered for identification. The comments received included "no comment" and requests for clarification of specific sections of text. NASA's response to each identified comment is presented in Table D-2, which follows the submissions.

The 958 comments submitted by private organizations and individuals via e-mail are presented in Table D-3. Of these e-mailed comment submissions, 867 consist of three nearly identical form submissions, differing only in the text of the e-mail's Subject line. These three form e-mails are listed only once each at the end of Table D-3 followed by the names of the individuals submitting the e-mail. The relevant comments in each submission are numbered for identification. The comment submissions presented in Table D-3 include objections to the use of nuclear material for space missions, a suggested alternative launch system and launch site for the proposed New Horizons mission, and general support for the proposed New Horizons mission. NASA's response to each relevant comment is included in Table D-3.

In addition to soliciting comments for submittal by letter and e-mail, NASA held two meetings during which the public was invited to provide both oral and written comments on the New Horizons DEIS. The meetings were held on March 29 and 30, 2005, at the Florida Solar Energy Center in Cocoa, Florida. More information on these meetings,

including transcripts of the public comments and NASA's responses, can be found in Appendix E.

TABLE D-1. COMMENT SUBMISSIONS FROM AGENCIES AND INDIVIDUALS

Submission Number	Agency or Individual
1	U.S. Environmental Protection Agency Region 4 Office of Policy and Management
2	U.S. Department of the Interior Region 4 Office of Environmental Policy and Compliance
3	State of Florida Department of Environmental Protection
4	State of Florida Department of State Division of Historical Resources
5	Brevard County, Florida Planning and Zoning Office
6	City of Titusville, Florida Titusville Environmental Commission
7	Steven C. Buttgereit Los Angeles, California
8	Serge J. Uccetta Inverness, Illinois
9	Michal Snyder Great Barrington, Massachusetts



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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ATLANTA, GEORGIA 30303-8960

MAR 29 2005

Mission and Systems Management Division
Science Mission Directorate
NASA Headquarters
Washington, D.C. 20546
Attention: Mr. Kurt Lindstrom

Subject: **Draft Environmental Impact Statement (DEIS) for the New Horizons Mission [NHM] at the John F. Kennedy Space Center [KSC] in Brevard County, Florida CEQ #050074; ERP Number NAS-E12007-FL; [dated February 2005]**

Dear Mr. Lindstrom:

Pursuant to Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA), EPA, Region 4 has reviewed the subject document, an evaluation of the consequences of launching an expendable vehicle [Atlas V551] into a trajectory towards Pluto. The Atlas rocket is scheduled to depart in January 2006 from the Space Launch Complex #41. The spacecraft will collect data on Pluto, Charon, and nearby Kuiper Belt objects upon its arrival in their vicinity around 2015.

The environmental impacts of a normal launch are adequately examined in the document. Specifically, they include the adverse air quality effects resulting from engine exhaust emission along the route of flight [from surface/atmospheric], potential for acidic deposition on vegetation/water bodies, and ozone depletion as the rocket passes through the stratosphere. The effects [radiological/non-radiological] attendant to launch accidents both the likely and unlikely scenarios are also competently assessed to include calculations of risk profiles to individuals and that of the landscape around the impact of part/all of the launch vehicle and/or its payload.

As a result of its review, EPA assigned a rating of LO to this proposal. That is, we have no significant environmental concerns regarding this launch. Thank you for the opportunity to comment on the DEIS. If you wish to discuss this matter in greater detail, feel free to call Dr. Gerald Miller of my staff at [REDACTED].

-1-1

Sincerely,

Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management

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**Comment Submission #1: U.S. Environmental Protection Agency
Region 4 Office of Policy and Management**



United States Department of the Interior

OFFICE OF THE SECRETARY
OFFICE OF ENVIRONMENTAL POLICY AND COMPLIANCE

Richard B. Russell Federal Building
75 Spring Street, S.W.
Atlanta, Georgia 30303

ER 05/168

April 12, 2005

Mr. Kurt Lindstrom
Mission and Systems Management Division
Science Mission Directorate
NASA Headquarters
Washington, DC

Subject: Review of the Draft Environmental Impact Statement (EIS) for the New Horizons Mission, Cape Canaveral Air Force Station (CCAFS), Brevard County, Florida (ER 05/168)

Dear Mr. Lindstrom:

As requested, the U.S. Department of the Interior has reviewed the Draft Environmental Impact Statement (EIS) for the New Horizons Mission, Cape Canaveral Air Force Station (CCAFS), Brevard County, Florida.

The Department has no comments to offer at this time. We remain interested in the project as it moves forward. We appreciate the opportunity to review this material.

|-2-1
|

Sincerely,

Gregory Hogue
Regional Environmental Officer
Office of Environmental Policy and Compliance
Region 4

cc:
OEPC, WASH
FWS Region 4

**Comment Submission #2: U.S. Department of the Interior
Region 4 Office of Environmental Policy and Compliance**



Jeb Bush
Governor

Department of Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Colleen M. Castille
Secretary

February 21, 2005

Mr. Kurt Lindstrom, Program Executive
Mission and Systems Management Division
Science Mission Directorate
NASA Headquarters
Washington, DC 20546-0001

RE: National Aeronautics and Space Administration – Draft Environmental Impact Statement for the New Horizons Mission – Cape Canaveral Air Force Station, Brevard County, Florida.
SAI # FL200502210493C

Dear Mr. Lindstrom:

Florida State Clearinghouse staff, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has reviewed the referenced Draft Environmental Impact Statement (DEIS).

Based on the information contained in the subject DEIS, the state has determined that the proposed project is consistent with the Florida Coastal Management Program.

|-3-1
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Thank you for the opportunity to review this project. If you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at [REDACTED].

Yours sincerely,

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm

"More Protection, Less Process"

Printed on recycled paper.

**Comment Submission #3: State of Florida
Department of Environmental Protection**



FLORIDA DEPARTMENT OF STATE
Glenda E. Hood
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Kurt Lindstrom
Mission and Systems Management Division
Science Mission Directorate
NASA Headquarters
Washington, DC 20546-0001

March 17, 2005

RE: DHR Project File Number: 2005-1837
Received by DHR February 21, 2005
National Aeronautics and Space Administration
Draft Environmental Impact Statement for the New Horizons Mission

Dear Mr. Lindstrom:

Our office received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties* and the *National Environmental Policy Act of 1969*, as amended. The State Historic Preservation Officer is to advise Federal agencies as they identify historic properties (listed or eligible for listing in the *National Register of Historic Places*), assess effects upon them, and consider alternatives to avoid or minimize adverse effects.

We have reviewed Sections 3.1.7.5 and 4.1.2.10 both dealing with Cultural/Historical/Archaeological Resources, of the referenced draft environmental impact statement (DEIS). Based on the information provided, this office concurs with the finding that the proposed undertaking will have no effect on historic properties. **-4-1**

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail [redacted], or at [redacted] or [redacted].

Sincerely,

Laura L. Kammerer, Deputy SHPO
for Frederick Gaske, Director, and
State Historic Preservation Officer

500 S. Bronough Street • Tallahassee, FL 32399-0250 • <http://www.flheritage.com>

- Director's Office (850) 245-6300 • FAX: 245-6436
- Archaeological Research (850) 245-6444 • FAX: 245-6436
- Historic Preservation (850) 245-6333 • FAX: 245-6437
- Historical Museums (850) 245-6400 • FAX: 245-6433
- Southeast Regional Office (954) 467-4990 • FAX: 467-4991
- Northeast Regional Office (904) 825-5045 • FAX: 825-5044
- Central Florida Regional Office (813) 272-3843 • FAX: 272-2340

**Comment Submission #4: State of Florida
Department of State, Division of Historical Resources**

From: Robin Sobrino [REDACTED]

Sent: Wednesday, March 30, 2005 12:24 PM

To: osspluto@hq.nasa.gov

Subject: DEIS--New Horizons Mission

Kurt Lindstrom
Program Executive
Mission and Systems Management Division
Science Missions Directorate

Subject: DEIS for New Horizons Missions

Dear Mr. Lindstrom:

The Brevard County Planning & Zoning Office has reviewed the above captioned document and offers no comments. Thank you for the opportunity to participate. | -5-1

Sincerely,

Robin M. Sobrino, AICP
Director, Brevard County Planning & Zoning Office
2725 Judge Fran Jamieson Way
Viera, FL 32940

e-mail: [REDACTED]

**Comment Submission #5: Brevard County, Florida
Planning and Zoning Office**

From: Bledsoe, Laura [REDACTED]
Sent: Monday, April 18, 2005 9:45 AM
To: 'osspluto@hq.nasa.gov'
Cc: Cunningham, Keith
Subject: Draft Environmental Impact Statement for the New Horizons Mission

The City of Titusville(Florida) - Titusville Environmental Commission (TEC) was given a copy of the Draft Environmental Impact Statement (DEIS) to review and make comments. After review of the document and an opportunity to attend the public comment meetings to participate in an open exchange of information and submission of comments on the DEIS, the TEC motioned at the April 6, 2005 meeting to take no action, the motion passed 6-0.

Laura L. Bledsoe
Administrative Secretary
Planning Department
[REDACTED]

| -6-1
|

**Comment Submission #6: City of Titusville, Florida
Titusville Environmental Commission**

March 30, 2005

In regards to: New Horizons Draft Environmental Impact Statement

Kurt Lindstrom
Mail Stop 3K39-A
Mission and Systems Management Division
Science Mission Directorate
NASA Headquarters
Washington, DC 20546-0001

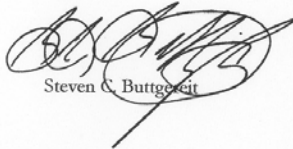
Dear Mr. Lindstrom,

I am writing to express my support of the New Horizons mission, the use of Radioisotope Thermoelectric Generators during the mission, and the conclusions of the New Horizons Draft Environmental Impact Statement. The difficulty of providing probes such as the New Horizons a reliable power source that work over long periods of time and at great distances from the Sun is a primary challenge for missions reaching to the outskirts of our solar system. Technologies such as the Radioisotope Thermoelectric Generator are essential as we reach out into space for science and exploration.

|-7-1
|

As an average citizen I share a concern for the environment in which we live with my fellow citizens and believe that we should do all we can to protect our environment from unnecessary risk. Projects such the New Horizon mission are essential, not only for the scientific understanding of our universe, but as a focal point for our national pride and prestige. These missions capture the imagination of the young and give us a common purpose as we strive to achieve that which has never been achieved before. These reasons, in my mind, far outweigh the miniscule risk posed by the use of Radioisotope Thermoelectric Generators.

Sincerely,



Steven C. Buttgerit

Enclosure

Enclosure
[Redacted]
LOS ANGELES, CA 90035
UNITED STATES

Comment Submission #7: Steven C. Buttgerit

SERGE J. UCCETTA

Inverness, Illinois 60067

April 7, 2005

Mr. Kurt Lindstrom
Mission and Systems Management Division
Science Mission Directorate
NASA Headquarters
Washington, DC 20546

Re: Comment on Draft Environmental Impact Statement for New Horizons Mission

Dear Mr. Lindstrom:

I'm writing to comment on the draft environmental impact statement report for the New Horizons Mission to explore Pluto.

First of all, I'd like to state that I am very much in favor and support this NASA mission. I believe we should take advantage of the specific opportunity that we now have to launch a mission to explore Pluto and Kuiper Belt objects.

| -8-1

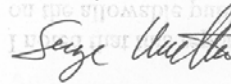
I noted that this report in section 4.1.3.2, Launch Failures, does not include a statement on the allowable public risk limit as was stated in the same section of the Environmental Impact Statement draft for the Mars Exploration Program. Specifically, in the similar section on Launch Failures, the Mars Program Impact Statement draft report states: "The allowable collective public risk limit at CCAFS and VAFB is 30×10^{-6} with an individual risk of 1×10^{-6} over the varying population densities." This particular reference is not included in the New Horizons report.

Can you tell me why the New Horizons Mission report does not include this statement? I would think that with similar launch profiles that the impact and risk analysis should be the same for both programs.

| -8-2

I appreciate the opportunity to comment on these draft reports and I commend NASA on the comprehensiveness of the impact statements. Again, I fully support these missions and look forward to continuing successes in planetary exploration.

Sincerely,



Serge Uccetta

Comment Submission #8: Serge J. Uccetta

April 11, 2005

Michal Snyder

Great Barrington, MA 01230

Kurt Lindstrom
Program Executive
Mission and Systems Management Division
Science Mission Directorate
NASA Headquarters
Washington, DC 20546-0001

Dear Mr. Lindstrom,

I am writing in response to the Draft Environmental Impact Statement regarding the New Horizons mission to Pluto, Charon and the Kuiper Belt. I believe that a particular oversight prevents proper evaluation of the mission and whether or not the risks of going are greater or lesser than the knowledge that may be gained by the mission. Table 4-6: SUMMARY OF HEALTH EFFECT MISSION RISKS, Table 4-7: HEALTH EFFECT MISSION RISK CONTRIBUTIONS BY AFFECTED REGIONS and Table 4-8: AVERAGE INDIVIDUAL RISK BY AFFECTED REGION, are all based on probabilities that are not available. The source, DOE 2005 is listed as being under ITAR restriction from dissemination pending completion of review. What does that mean? The numbers in these tables are difficult to comprehend and without a source to refer to, the information is incomplete. Given that a few of the main issues addressed in response to the original scoping period are concerns surrounding the use of radioactive materials for the spacecraft electrical power source and the global impacts in the event of a launch accident, I would expect these data to be clearer at this time.

|-9-1

Your research into the use of alternative (radioactive and non-radioactive) sources for electrical power proved to be valid. It is clear that using a conventional radioisotope thermoelectric generator (RTG) is the best option for this mission, should it be carried out.

|-9-2

At this point I cannot support or reject the New Horizons mission given my reason listed above. I hope you will consider what a hindrance this poses to anyone reading this DEIS from making accurate and informed decisions.

Thank you for your consideration to this matter.

Sincerely,
Michal Snyder

Comment Submission #9: Michal Snyder

TABLE D-2. RESPONSES TO COMMENT SUBMISSIONS LISTED IN TABLE D-1

Comment Number	Response
1-1	Thank you for your comments.
2-1	Thank you for your comments.
3-1	Thank you for your comments.
4-1	Thank you for your comments.
5-1	Thank you for your comments.
7-1	Thank you for your comments.
8-1	Thank you for your comments.
8-2	<p>Exclusion in this EIS of the allowable collective public risk limit of 30×10^{-6} at CCAFS with an individual risk of 1×10^{-6} over the varying population densities was an oversight. Please note that these allowable risk limits refer to public risk of exposure to toxic gases, blast overpressure, and debris in the event of a launch accident, and not to public risk of exposure to accidental release of radioactive material. On July 1, 2004, the U.S. Air Force's Range Safety requirements manual <i>Eastern and Western Range Safety Requirements</i> (EWR 127-1) was superseded by <i>Range Safety User Requirements Manual</i> (AFSPCMAN 91-710). This document, which further defines these allowable risk limits, is available at http://www.e-publishing.af.mil/.</p>
9-1	<p>"Currently under ITAR restriction from dissemination pending completion of review" for the cited reference documents indicates that the documents may contain technical data as defined in the International Traffic in Arms Regulations. Export of such material is restricted by the Arms Export Control Act (22 U.S.C. 2751 et seq.), requiring that such material cannot be exported to foreign persons without appropriate export authority. Since publication of the DEIS, the two reference documents (ASCA 2005 and DOE 2005) have been reviewed and approved for public release.</p>
9-2	Thank you for your comments.

TABLE D-3. COMMENTS FROM ORGANIZATIONS AND INDIVIDUALS SUBMITTED VIA E-MAIL

Submission Number	Comment Submission	Responses to Comments
<p>E1</p> <p>E1-1</p> <p>E1-2</p>	<p>From: Rich [mailto: [REDACTED]] Sent: Thursday, March 10, 2005 1:33 PM To: osspluto@hq.nasa.gov Subject: New Horizons</p> <p>NASA:</p> <p>I oppose the launch of nuclear power on the New Horizons mission. Nuclear power in space is unsafe, especially with the significant failure rate of previous rocket missions. Thank you for your time.</p> <p>- Richard M. Bianculli Jr. [REDACTED] Providence, RI 02906</p>	<p>Thank you for your comments.</p> <p>E1-1) NASA and DOE place the highest priority on assuring the safe launch and use of RTGs in space. Safety and public protection is one of NASA's and DOE's top priorities. Thorough and detailed safety analyses are performed prior to launching spacecraft with RTGs, and such analyses are subject to an independent review process. Steps are taken where possible to reduce the potential risks involved with such space missions by implementing mission-specific launch vehicle safety enhancements. As discussed in Section 4.1.4 of this EIS, NASA and DOE have conducted a number of safety assessments of launching and operating spacecraft using RTGs. These assessments include an experience base that involves safety testing and analysis of the RTG and its components under simulated launch accident environments, and evaluation of the probabilities of launch-related accidents based in part on actual launch histories.</p> <p>E1-2) For the risk assessment presented in this EIS, the launch success probability for the New Horizons Atlas V was estimated to be 94 percent. This is an estimate for the vehicle to</p>

Submission Number	Comment Submission	Responses to Comments
		<p>successfully complete all pre-launch operations, first stage flight, Centaur second stage flight, third stage flight, and conclude with successful insertion of the spacecraft into the proper trajectory to Pluto. The methodology used to calculate this estimate utilized the flight histories (both successes and failures for any reason) of all relevant United States and Russian launch vehicles flown since 1988. This analytical approach for estimating the overall mission launch reliability is considered by NASA to be conservative, and NASA continues to evaluate the mission's launch reliability analysis.</p>
<p>E2</p> <p>E2-1</p> <p>E2-2</p> <p>E2-3</p>	<p>From: Don Ross [mailto: [REDACTED]] Sent: Thursday, March 10, 2005 5:16 AM To: osspluto@hq.nasa.gov Subject: Nuclear Power in Space.</p> <p>Dear NASA:</p> <p>It would appear that like so many government public comment processes that plans are already formulated and this a pro forma exercise.</p> <p>Given the history of accidents from rocket launches and the harm that would come to all of us from the release of nuclear materials into space it is difficult to understand the rationale for pursuing this as a viable alternative for space propulsion or weaponry. We need to keep space for peace and free of weaponry. Our technology will destroy us all if we continue down this road to disaster.</p> <p>What impels a project with known risks to the health of the planet when rocket accidents are a fact of life. Sooner or latter an accident will occur. Is no one willing to stand up an say no not on my watch? Is it job security that impels silence in the face of known risks?</p>	<p>Thank you for your comments.</p> <p>E2-1) NASA is in compliance with the procedures of the National Environmental Policy Act (NEPA) as amended (42 U.S.C. 4321 et seq.), Council on Environmental Quality (CEQ) Regulations (40 CFR parts 1500–1508), and NASA policies and procedures at 14 CFR part 1216. Because implementing a mission such as New Horizons requires considerable lead time, planning for the proposed mission has, by necessity, already begun. However, a final decision by NASA on whether or not to continue to implement the proposed mission has not been made. In addition, under Presidential Directive/National Security Council</p>

Submission Number	Comment Submission	Responses to Comments
	<p>Who in the final analysis has the courage to say no, this is not the way we should be going, let's look at less risky alternatives. Let's keep space for peace.</p> <p>Let us keep space free of nuclear power and not risk fouling our own nest. Who will say no?</p> <p>Sincerely,</p> <p>Don Ross</p>	<p>Memorandum 25, a separate nuclear launch safety review of the New Horizons mission is being conducted by NASA, DOE, the Department of Defense (DOD), the U.S. Environmental Protection Agency (EPA), and the Nuclear Regulatory Commission.</p> <p>E2-2) Please see responses to submission E1.</p> <p>E2-3) NASA is the nation's civil space agency, established by the National Aeronautics and Space Act of 1958 (Pub. L. No 85-568, as amended). NASA space missions and related research programs such as the proposed New Horizons mission are conducted for peaceful, scientific purposes. The objectives of the mission are addressed in Section 1.2 of this EIS. NASA and the DOD may at times have a common interest in and work together on the development of a particular technology. For example, DOD developed a technology called <i>adaptive optics</i> that is used for scientific studies at ground-based astronomical observatories to correct telescopic images for distortions caused by Earth's atmosphere.</p>
<p>E3</p> <p>E3-1</p>	<p>From: David Gontar [mailto: [REDACTED]] Sent: Thursday, March 10, 2005 2:40 PM To: osspluto@hq.nasa.gov Subject: nuclear power in space</p> <p>Please note my objection to the proliferation of nuclear power mechanisms in space. There is no charter in NASA to permit the contamination of the larger universe. Worse, you risk an accident exposing human beings on earth to deadly radiation. Are the profits of fascism so alluring that you would jeopardize life itself? How do you sleep at night?</p>	<p>Thank you for your comments.</p> <p>E3-1) NASA strives to minimize to the extent practicable the potential risks to the public and its workforce from any of its missions. In the unlikely event of an accident during launch of the proposed New Horizons mission the risk of</p>

Submission Number	Comment Submission	Responses to Comments
	D.P.Gontar	radiological health consequences has been estimated to be small; see Section 4.1.4.5 of this EIS for further information.
E4 E4-1	<p>From: Dawn Greenfield [mailto:████████████████████] Sent: Thursday, March 10, 2005 4:07 PM To: osspluto@hq.nasa.gov Subject: Opposed</p> <p>Dear NASA, I am completely opposed to nuclear power in space. I am sure you don't pay any attention to what the American people truly want but I had to send this email regardless. Dawn Greenfield Manchester, CT</p>	<p>Thank you for your comments.</p> <p>E4-1) In complying with the provisions of NEPA, CEQ regulations, and NASA's own policies and procedures, NASA has prepared this environmental impact statement to fully disclose its plans for the proposed New Horizons mission to the public and to seek the public's review and comments on those plans.</p>
E5 E5-1 E5-2	<p>From: Glenn [mailto:████████████████████] Sent: Thursday, March 10, 2005 11:31 PM To: osspluto@hq.nasa.gov Subject: Nuclear materials in space</p> <p>For obvious safety reasons I oppose the launch from Earth of any dangerous radioactive materials, including "Prometheus" and "New Horizon".</p> <p>Because 10 to 20 percent of all launches fail to achieve orbit, it is a very bad bet to send nuclear materials into space, to be distributed randomly worldwide when the launch burns up on reentry.</p> <p>Sitting at the bottom of a gravity well it makes no sense to launch poison into the skies.</p>	<p>Thank you for your comments.</p> <p>E5-1) The claim that "10 to 20 percent of all launches fail to achieve orbit" is not supported by the historical launch record of U.S. robotic spacecraft, including civil, military, and commercial payloads. Defining "ability to achieve Earth orbit or Earth escape" as the broad criterion for success or failure for this discussion, then from 1957 through September 2003 only 9.3 percent of launched payloads failed to achieve orbit or escape. Furthermore,</p>

Submission Number	Comment Submission	Responses to Comments
	<p>Gladys Tiffany Arkansas USA</p>	<p>RTG design reflect how nuclear safety has been an inherent part of this process. See Sections 2.1.3.2 and 4.1.4 of this EIS for further information on the design and safety features of the RTG.</p>
<p>E7</p>	<p>From: DBP91044 [mailto:] Sent: Thursday, March 10, 2005 9:29 PM To: osspluto@hq.nasa.gov Subject: INSANE</p> <p>The profit driven moves to place nuclear power in space is simply insane! - Don Pratt, Lexington, Ky.</p>	<p>Thank you for your comment.</p>
<p>E8</p> <p>E8-1</p>	<p>From: Maxine Caron & Gareth Smith [mailto:] Sent: Thursday, March 10, 2005 6:47 PM To: osspluto@hq.nasa.gov Cc: [redacted] Subject: Oppose NASA's Military Nuclearisation of Space</p> <p>Dear Sir</p> <p>We are appalled to learn of NASA's New Horizons project which will launch plutonium into space as part of a RTG power plant and, in addition, of the increased militarisation of NASA as evidenced by then director Sean O'Keefe's statement that from now on every NASA mission will be "dual use". In concert with concerned scientists worldwide we have watched with horror the creeping militarisation of NASA and the way that the civilian exploration of the Cosmos is being compromised. We are well aware of the military's goal of powering space-based laser weapons with nuclear energy and of the profound risks to us all that this entails. We want you to register our total opposition to these developments.</p>	<p>Thank you for your comments.</p> <p>E8-1) Please see response to comment E2-3.</p>

Submission Number	Comment Submission	Responses to Comments
	<p>Gareth Smith & Maxine Caron [REDACTED] Byron Bay NSW 2481 Tel&Fax: [REDACTED] MOB: [REDACTED] Alternate Email: [REDACTED]</p>	
<p>E9</p> <p>E9-1</p> <p>E9-2</p>	<p>From: Ann Link [mailto:[REDACTED]] Sent: Thursday, March 10, 2005 5:29 PM To: osspluto@hq.nasa.gov Subject: comments on nukes in space</p> <p>Please do not send nukes into space! There must be a safer technology developed. So we don't add radioactive material to the garbage that's already floating around out there. It also creates a very serious danger to us on earth during lift-off. Sincerely, Ann Link [REDACTED], Brooklyn NY 11231 [REDACTED]</p>	<p>Thank you for your comments.</p> <p>E9-1) Most NASA missions currently rely primarily on solar energy for electrical power to operate spacecraft, and NASA continues to conduct research and development to further improve solar technology. However, the amount of sunlight at Pluto is about 1/1000th of that at Earth, and technology does not exist for a solar powered system that can harness the required energy at that distance.</p> <p>E9-2) Please see response to comment E1-1.</p>
<p>E10</p> <p>E10-1</p>	<p>From: drafferty [REDACTED] [mailto:[REDACTED]] Sent: Friday, March 11, 2005 11:38 AM To: osspluto@hq.nasa.gov Subject: Plutonium Use</p> <p>The current NASA plan to use Plutonium fuel for rocket launches is potentially dangerous to the future of life on this planet. NASA will endanger its own mandate from the citizens of the US if this program is allowed to continue, and the future of NASA and space exploration will be threatened.</p>	<p>Thank you for your comments.</p> <p>E10-1) The plutonium dioxide in the RTG for the proposed New Horizons mission is used only to provide electrical power for the spacecraft. The spacecraft itself would be</p>

Submission Number	Comment Submission	Responses to Comments
<p>E12-1</p> <p>E12-2</p>	<p>As an American taxpayer I feel obliged to state my concern about nuclear power in space. I have listened to the debate for years and conclude that the cost and dangers of nuclear devices in space overshadow possible gains. There have been eight accidents with space nuclear power already. Accidents DO happen and an accident resulting in the release of plutonium would undoubtedly result in severe health consequences.</p> <p>I strongly oppose NASA's plans to militarize space at the expense of the public.</p> <p>Sincerely yours, Ruth Zalph [REDACTED] Chapel Hill, N. C. 27516</p>	<p>Thank you for your comments.</p> <p>E12-1) Radioisotope power sources were used on three U.S. space missions which experienced malfunctions (see Table 2-2 of this EIS). In all three cases the device performed as designed and was never the cause of the accident. Should an unlikely accident leading to release of plutonium dioxide occur during launch of the New Horizons mission, NASA and the DOE estimate that the risk of health consequences would be small; see Section 4.1.4 of this EIS. In addition, NASA and DOE are developing contingency plans to prepare for and respond to any potential accident in the unlikely event that one would occur during the New Horizons mission. These contingency plans are being prepared in coordination with the State of Florida and other Federal agencies involved in emergency planning and response; see Section 4.1.5 of this EIS for more information.</p> <p>E12-2) The New Horizons mission is for peaceful scientific purposes. Please see response to comment E2-3.</p>
<p>E13</p>	<p>From: Celia Ramirez [mailto:[REDACTED]] Sent: Sunday, March 13, 2005 7:52 PM To: osspluto@hq.nasa.gov Subject: Re: Possibility of Polluting Space</p> <p>The use of nuclear power in a space craft is a danger 2 all, we have enough contamination here on Earth, we don't need to pollute the whole galaxy.</p> <p>Sincerely, Celia Santowski</p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
E14	<p>From: Ben Wolf [mailto: [REDACTED]] Sent: Sunday, March 13, 2005 11:01 AM To: osspluto@hq.nasa.gov Subject: Prometheus</p> <p>Good luck with the mission, and as a citizen I fully support your efforts. GO NUCLEAR!!!!</p> <p>Ben Wolf</p>	<p>Thank you for your comments.</p>
E15 E15-1	<p>From: Sally Breen [mailto: [REDACTED]] Sent: Sunday, March 13, 2005 10:15 AM To: osspluto@hq.nasa.gov Subject: Nuclear Power in Space</p> <p>Nuclear power must NOT be used for space exploration. It is much too dangerous and there are other reliable sources of energy for this exploration. Accidents can and have happened at launch time. Protect the public and the workers.</p>	<p>Thank you for your comments.</p> <p>E15-1) Alternative power systems for the proposed New Horizons mission have been assessed and were found to be technically not feasible; see Section 2.3.1 of this EIS for more information.</p>
E16	<p>From: Carl Carlsson [mailto: [REDACTED]] Sent: Saturday, March 12, 2005 10:17 PM To: osspluto@hq.nasa.gov Subject: Space Nuclear Power</p> <p>Dear Sirs,</p> <p>I am an avid supporter of nuclear power for space applications including propulsion. I believe it is safe, and is the only way we will reach Mars and beyond. Please keep up the good work, ignore the luddites, and we will support you.</p> <p>Carl Carlsson</p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
	jgw	
<p>E19</p> <p>E19-1</p> <p>E19-2</p>	<p>From: Andrea [mailto:] Sent: Friday, March 11, 2005 11:15 PM To: osspluto@hq.nasa.gov Subject: Leadership and Good listening</p> <p>In 1996 a Russian Mars mission, carrying plutonium on-board, failed to achieve proper orbit and burned up as it reentered Earth orbit spreading deadly plutonium over the mountains of Chile and Bolivia. The plutonium production process is also dangerous. Between 1994-1996, while fabricating the plutonium RTG's for the 1997 Cassini mission at Los Alamos Labs in New Mexico, the DoE reported 244 cases of worker contamination. Why do you think the inhabitants of the earth should accept the risk of more nuclear disasters are you listening democratically?</p> <p>Yours, Stephen Johnson NY</p>	<p>Thank you for your comments.</p> <p>E19-1) There is no indication that any of the plutonium contained in the radioisotope heat sources used on the Russian Mars-96 mission was released to the environment.</p> <p>E19-2) Although some external worker contamination did occur at Los Alamos National Laboratory (LANL) during the activities associated with plutonium dioxide production and fabrication for the Cassini mission, the contaminations did not result in any measurable dose to the workers. The workers were not adversely impacted by the contamination due to DOE's stringent requirements for protective clothing. Furthermore, the number of reported cases were for all operations at the Plutonium Facility at LANL, which includes plutonium-239 operations in addition to the plutonium-238 operations that supported Cassini. DOE has and will continue to protect its workers, the environment, and the public.</p>
E20	<p>From: Murray Kiok [mailto:] Sent: Monday, March 14, 2005 1:34 PM To: osspluto@hq.nasa.gov Subject:</p> <p>Weapons in space is danderous to the world population. We can't control existing weapons on the ground, the thought of launching these weaponds in space makes no sense at all.</p>	<p>Thank you for your comments. The New Horizons mission is for peaceful scientific purposes.</p>

Submission Number	Comment Submission	Responses to Comments
E21	<p>From: Brian Dunbar [mailto: [REDACTED]] Sent: Monday, March 14, 2005 3:19 PM To: osspluto@hq.nasa.gov Subject: space nuclear power</p> <p>I myself am in favor of 'space nuclear power'. Please pay as little attention as possible to Luddites blathering on about nuclear rockets and so forth.</p> <p>My comments are my own and might not reflect policy and current group think of Liftport Group, the Space Elevator Companies.</p> <p>-- Brian Dunbar System Administrator Liftport</p> <p>brian.dunbar [REDACTED] aim: [REDACTED]</p> <p>Remember. But move forward, too. Light a candle, yes. But also drive a rivet. ~Lileks</p>	Thank you for your comments.
E22	<p>From: Wilfred Phillips [mailto: [REDACTED]] Sent: Tuesday, March 15, 2005 10:53 AM To: osspluto@hq.nasa.gov Subject: Nuclear Rockets oin Space</p> <p>I write to protes your plans to send Nuclear powered space vehicles into space. We should keep space free from nuclear debris as Plutonium contammination will never be cleared. this policy is totally irresponsible and no doubt soon there will be an accident and then it will be too late. Whilst the problems of how to clear up Nuclear waste remain your proposals can not be justified Wilfred Phillips</p>	Thank you for your comments.
E23	<p>From: Mjhfos [REDACTED] [mailto: [REDACTED]] Sent: Wednesday, March 16, 2005 4:41 PM</p>	





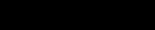
Submission Number	Comment Submission	Responses to Comments
E23-1	<p>To: osspluto@hq.nasa.gov Subject: Pluto Probe</p> <p>To Whom It May Concern:</p> <p>As a U.S. citizen, I am opposed to NASA plans for using a radioisotope thermoelectric generator (RTG) to power the New Horizon's spacecraft's instruments for the Pluto Probe mission. We have no moral or ethical business even contemplating putting any more plutonium or other nuclear materials in space. It is time for NASA and the government to be more open and honest about its plans and to allow those of us paying for your programs to be heard.</p> <p>Thank you for allowing me to comment.</p> <p>Sincerely, Jane Hanna</p>	<p>Thank you for your comments.</p> <p>E23-1) Please see response to comment E4-1.</p>
E24	<p>From: pnoreens [redacted] [mailto:[redacted]] Sent: Thursday, March 17, 2005 9:37 AM To: osspluto@hq.nasa.gov Subject: Nuking space</p> <p>have you all gone stark raving mad? Arm space with nuclear shit? send it into the higher heavens? What is wrong with you people? Noemy Sanchez Costa Rica</p>	<p>Thank you for your comments.</p>
E25	<p>From: Nicholas Blackwell [mailto:[redacted]] Sent: Wednesday, March 16, 2005 5:50 PM To: osspluto@hq.nasa.gov Subject: Support for space nuclear power</p> <p>As a graduate student in Aerospace Engineering, I would like to voice my support for the continuing development of space nuclear power, and I hope that NASA is not swayed by the pseudo-scientific opposition to this technology. Nuclear power is, in the long run, absolutely necessary for us to become a spacefaring civilization, and the scare tactics used by those against nuclear technology in all forms does not stand up to scientific scrutiny. Please continue to develop this essential technology.</p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
	<p>Sincerely, Nicholas Blackwell</p> <p>Department of Aeronautics and Astronautics Stanford University MS, December 2005 [REDACTED]</p>	
E26	<p>From: Tracy McLellan [mailto:[REDACTED]] Sent: Thursday, March 17, 2005 11:40 AM To: osspluto@hq.nasa.gov Subject: Draft Environmental Impact Statement for the New Horizons Mission</p> <p>No nuclear power in space!</p> <p>Tracy McLellan Lansing, IL USA</p>	Thank you for your comment.
E27 E27-1	<p>From: Judy Hogan [mailto:[REDACTED]] Sent: Sunday, March 20, 2005 2:32 PM To: osspluto@hq.nasa.gov Subject: nuclear materials in space</p> <p>NASA needs to take a good look at the proposition of launching nuclear material into space. An accident on these missions will result in major harm to our atmosphere and the world's people. Where are your impartial scientists? When does the health of the world's population take its rightful place as the leading consideration in these matters. Are we hell bent on destroying ourselves?</p>	Thank you for your comments. E27-1) Please see response to comment E1-1.
E28	<p>From: Nlooney3 [mailto:[REDACTED]] Sent: Saturday, March 19, 2005 9:08 PM To: osspluto@hq.nasa.gov Subject: Nuclear power in space</p> <p>I want to voice my strong opposition to nuclear-powered missions in space. I urge you to develop solar-powered technology for your missions. We already know about past nuclear accidents. In the 1960s, one nuclear-powered</p>	Thank you for your comments.

Submission Number	Comment Submission	Responses to Comments
<p>E28-1</p> <p>E28-2</p>	<p>satellite fell back to earth and over two pounds of plutonium burned up in the atmosphere if I remember right. I'm from Oregon. I know my opinion probably does not matter, but I want you to know that you do not have my support for nuclear power in space. Nuclear power does not belong in space. The dangers are too great. I will try to spread the word about the folly of nuclear power in space. NASA should cease doing all this work that has dual military purposes. Thank you.</p> <p>Sincerely, Nate Looney</p>	<p>E28-1) Please see response to comment E12-1.</p> <p>E28-2) Please see response to comment E2-3.</p>
<p>E29</p> <p>E29-1</p>	<p>From: mark k lee [mailto: [REDACTED]] Sent: Wednesday, March 23, 2005 12:06 AM To: osspluto@hq.nasa.gov Subject: Re New Horizons</p> <p>I am opposed to New Horizons. Do not use nuclear power in space or launch such material. All of my closest family members live in the Titusville-Orlando area & the risks associated with an accident are just too high. We cannot jeopardize our health or the health of our planet. There are alternative power sources & I insist you explore them.</p> <p>Miriam Welly Elliott, [REDACTED], Gainesville, FL 32641</p>	<p>Thank you for your comments.</p> <p>E29-1) Please see response to comment E15-1.</p>
<p>E30</p> <p>E30-1</p>	<p>From: cheryl niccoli [mailto: [REDACTED]] Sent: Wednesday, March 23, 2005 10:51 PM To: osspluto@hq.nasa.gov Subject: New Horizons Mission</p> <p>Ladies and Gentlemen:</p> <p>I am writing to comment on NASA's New Horizons Mission set to launch in early 2006. It is my understanding that this mission to Pluto will use decaying plutonium to power the spacecraft's instruments. I question the wisdom of launching plutonium into space. What happens if there is an accident and the plutonium is released to fall back to earth. Would this not be the worst hazardous waste incident imaginable? In fact, I read that there was such an</p>	<p>Thank you for your comments.</p> <p>E30-1) NASA and DOE have estimated that a launch accident leading to release of plutonium dioxide from the New Horizons RTG would be</p>

Submission Number	Comment Submission	Responses to Comments
	<p>accident in 1996 involving a Russian Mars mission which contaminated Chile and Bolivia with plutonium plus several other accidents involving space nuclear power over the years. In my opinion, increasing our knowledge of worlds beyond the Earth which would be gained by these dangerous missions is not worth these terrible risks. Perhaps the brightest of science devotes itself to the stars, fabulous cures and creations because the serious problems of Earth such as global warming, resource degradation, hunger and poverty are complicated and definitely not sexy. Better to shoot a rocket to Pluto and dazzle and amuse the public with lots of full color close-up photos. No nukes in space.</p> <p>Very truly yours, Cheryl Niccoli Santa Barbara, California</p>	<p>unlikely, but that if such an accident were to occur the potential effects to human health and the environment would be small; see Section 4.1.4 of this EIS for more information. Please also see responses to comments E1-1, E12-1 and E19-1.</p>
E31	<p>From: Kyger, Timothy [redacted] [mailto:[redacted]] Sent: Thursday, March 24, 2005 2:33 PM To: 'osspluto@hq.nasa.gov' Subject: The New Horizons mission to Pluto, and its RTG power source -- an EIS comment</p> <p>Tim Kyger [redacted]</p> <p>Burke, VA 22015 [redacted]</p> <p>It would be the height of human folly to *not* approve the use of an RTG power source for the proposed New Horizons flyby mission to Pluto. It would be the height of human folly *squared* if some sort of brouhaha over this spacecraft's electrical power source were to keep it from being launched this coming January, 2006, letting it thus make a Jupiter gravity assist, saving two years of flight time to Pluto.</p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
	<p>It has been my general impression that the people who are in opposition to the use of RTGs on spaceflight science missions have no idea what they are talking about with respect to the risks to human health or to Earth's biosphere from the PuO2 contained a working RTG. These RTGs are extremely safe -- they have been engineered and *tested* to be so. If this mission were to have some sort of launch mishap I would be much more worried about the fact that the spacecraft had not been put into trajectory toward Pluto than from some putative problem with the budget of plutonium dioxide carried in its nearly impervious RTG.</p> <p>Let the final action to complete the first total reconnaissance of the Solar System commence. Let this first reconnaissance be completed by the generation that started it. Let this generation see Pluto. In short, let this mission *FLY!*</p>	
<p>E32</p> <p>E32-1</p> <p>E32-2</p>	<p>From: Laurence Kirby [mailto:██████████] Sent: Thursday, March 24, 2005 10:10 PM To: osspluto@hq.nasa.gov Subject: Public comment on New Horizons mission.</p> <p>To NASA:</p> <p>This is a comment in response to NASA's Draft environmental Impact Statement on the New Horizons mission. I oppose the launch of nuclear power on the New Horizons or any other mission. Any accident at launch would be catastrophic, as the plutonium in the RTG would contaminate the surface of the Earth and its atmosphere over a wide area. And explosions upon launch are hardly unknown, as shown by the two tragic Shuttle disasters as well as many other launch failures of rockets. There have already been several accidents involving nuclear material in US and Russian space missions, with considerable radioactive contamination of the biosphere. If the New Horizons mission were to be the next accident, the health consequences worldwide could be extremely severe.</p> <p>In addition, the environmental harm caused by the production and processing of plutonium is unacceptable. In particular, the DoE reported 244 cases of worker contamination during the fabrication of the plutonium RTGs for the 1997 Cassini mission at Los Alamos Labs in New Mexico.</p>	<p>Thank you for your comments.</p> <p>E32-1) Please see response to comment E30-1.</p> <p>E32-2) Please see response to comment E19-2.</p>

Submission Number	Comment Submission	Responses to Comments
<p>E32-3</p> <p>E32-4</p>	<p>Nuclear power is not needed for space exploration. The European Space Agency's Rosetta mission will go far from the Sun and use advanced solar power technology. NASA should be in the forefront of developing safe solar power for its exploratory missions.</p> <p>NASA's scientific missions should not be a cover for the development of nuclear power by the discredited nuclear industry with its terrible safety and environmental record. And the possibility of military uses for nuclear power in space must as a matter of urgency be closed off, as it would lead to further environmental harm to space.</p> <p>Thank you for your attention.</p> <p>Sincerely,</p> <p>Laurence Kirby  Woodstock NY12498</p>	<p>E32-3) ESA's Rosetta mission, launched March 2, 2004, will indeed "go far from the Sun and use advanced solar power technology." However, while Rosetta is at its furthest distance from the Sun near the orbit of Jupiter (July 2011 through January 2014), the spacecraft will be placed in hibernation because even with its advanced solar technology there will not be sufficient power generated by the solar arrays to fully operate all spacecraft systems. Please also see response to comment E9-1.</p> <p>E32-4) The New Horizons mission is for peaceful scientific purposes.</p>
<p>E33</p>	<p>From: Daryl Cockburn [mailto:] Sent: Monday, April 04, 2005 7:43 AM To: osspluto@hq.nasa.gov Subject:</p> <p>In my view the risks outweigh the benefits</p> <p>please stop the spread of nuclear technology into space</p> <p>thanks</p> <p>Daryl Cockburn Cockburn Architects & Planners  Wellington tel.  fax </p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
E34	<p>From: adam [redacted] [mailto:[redacted]] Sent: Monday, April 04, 2005 5:19 AM To: osspluto@hq.nasa.gov Subject: Nuclear power in space</p> <p>Please register my opposition to your plans to send a nuclear arsenal to space. You're a bunch of warmongering scum.</p> <p>-- Adam Pope</p>	<p>Thank you for your comments. The New Horizons mission is for peaceful scientific purposes.</p>
E35	<p>From: Stacey Gasson [mailto:[redacted]] Sent: Sunday, April 03, 2005 11:32 PM To: osspluto@hq.nasa.gov Subject: New Horizons mission</p> <p>To whom it may concern,</p> <p>I am writing to express my opposition to your use of nuclear power in space; and specifically, your intent to employ plutonium in the New Horizons mission.</p> <p>E35-1 As a New Zealander, I believe strongly in my country's anti-nuclear stance. I believe that the risks and dangers associated with nuclear power make it an unacceptable energy source anywhere on Earth, let alone in space. I expect that you would argue that the risks of an accident are low, but I would say that the horrible consequences of any such accident are more than sufficient to make your gamble unacceptable.</p> <p>E35-2 I am not in the position to argue the technical aspects of using nuclear power for energy or in a military situation. What I do know is this: I am the parent of two young children and I fear for their future in the world we are creating. It's disturbing enough when entities such as yourself contaminate and destroy your own land, but to extend the fallout (no pun intended) of your activities to the rest of the world is unthinkable. I remember growing up convinced that we were all going to die in a nuclear war; maybe you did too? It hasn't happened to date, but disaster areas like Chernobyl and the Marshall Islands do little to</p>	<p>Thank you for your comments.</p> <p>E35-1) Please see response to comment E1-1.</p> <p>E35-2) The New Horizons mission is for peaceful scientific purposes.</p>

Submission Number	Comment Submission	Responses to Comments
	<p>reassure me of the virtues of nuclear power.</p> <p>I would ask that you do not proceed with this mission. Please realise that you do not have the right to impose your own ill-considered risks upon the rest of the world.</p> <p>Yours sincerely,</p> <p>Stacey Gasson</p>	
<p>E36</p> <p>E36-1</p> <p>E36-2</p> <p>E36-3</p>	<p>From: William Peltz [mailto:████████████████████]] Sent: Sunday, April 03, 2005 11:07 PM To: osspluto@hq.nasa.gov Subject: EIS comment/New Horizons Mission</p> <p>The New Horizons mission to Pluto, with its plutonium-238-based power generator, poses unnecessary and unacceptable dangers to all the inhabitants of our planet. As a grandfather of five children under the age of 10, I am greatly concerned about the many environmental threats that they will be facing throughout their lives. We don't need these extra risks.</p> <p>In addition to the dangers coming from the possibility of yet another nuclear accident in space, the plutonium production and fabrication processes will also increase the danger of environmental contamination.</p> <p>Furthermore, this mission has dire implications for the militarization of space which is a project that further endangers us all both directly and, through its encouragement of a space arms race, indirectly.</p> <p>For all these reasons, the launch of New Horizons should be canceled. The use of nuclear fuels in in space explorations is not a good idea and should be ruled out for future probes.</p> <p>William I. Peltz</p>	<p>Thank you for your comments.</p> <p>E36-1) Please see responses to comment E1-1.</p> <p>E36-2) Please see response to comment E11-1.</p> <p>E36-3) The New Horizons mission is for peaceful scientific purposes. Please see response to comment E2-3.</p>

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		<p>million for the New Horizons mission.</p> <p>The maximum dose received by an individual within the exposed population would vary and is estimated to have a mean value of about 0.3 rem, which is the equivalent of about 80 percent of the normal annual background dose received by each member of the U.S. population during a year. The collective dose that would be received by all individuals within the potentially exposed local and global populations is estimated to be about 718 person-rem, which would result in about 0.4 latent cancer fatalities over a long-term period within the entire group of potentially exposed individuals.</p>
E38	<p>From: paul.winkler [redacted] [mailto:[redacted]] Sent: Friday, April 01, 2005 9:48 PM To: osspluto@hq.nasa.gov Subject: Public Comment on New Horizons Mission</p> <p>Dear Sirs:</p> <p>I hope that you will proceed with this very important mission without being unduly delayed or concerned by safety issues related to the Radioisotope Thermoelectric Generator aboard.</p> <p>Laws of physics and the state of Man's technology dictate the use of RTG's for all outer system missions at present. Until some major advance arrives, the RTG will open the outer planets and Kuiper Belt to scientific discovery. Contrariwise, banning the RTG will condemn us all to decades of stultified science and further ignorance. Ignorance is an item with which we are presently oversupplied.</p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
	<p>The track record of the RTG is remarkable in terms of safety over many years and many missions. Past successes indicate the exact measures we require to ensure launch phase safety on the ground. After that, the RTG's passive approach to power generation continues to be exceedingly safe.</p> <p>This mission will be a first in many ways. Let us hope it successfully scales the hurdles between concept and inception.</p> <p>Paul Winkler, FBIS ██████████ Gananoque, Ontario, Canada K7G 1C9 ██████████</p>	
E39	<p>From: Byron Winchell [mailto:██████████] Sent: Thursday, March 31, 2005 11:54 PM To: osspluto@hq.nasa.gov Subject: comment New Horizons Draft Environmental Impact Statement</p> <p>Byron R. Winchell ██████████ Frankfort OH 45628-9569 ██████████</p> <p>Dear Mr. Linstrom:</p> <p>Speaking as a tax-payer financier of NASA, I am personally at ease with the safety record of plutonium-powered radioisotope thermoelectric generators in space. I do not think it is possible to launch such a mission without some kind of RTG power source so if the environmental purists have their way, there won't be a mission. It is better for the RTGs to be used well beyond earth's orbit in any event.</p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
	<p>Please add this email to the public comments section.</p> <p>Thank you.</p> <p>Byron R. Winchell</p>	
E40	<p>From: [REDACTED] [mailto:[REDACTED]] Sent: Thursday, March 31, 2005 7:25 PM To: osspluto@hq.nasa.gov Subject: Pluto Mission</p> <p>Progress often requires some risk. The time is now to explore Pluto and beyond. This citizen certainly supports the mission. And many more like it. William T. Dixon</p>	Thank you for your comments.
E41	<p>From: Jim Licari [mailto:[REDACTED]] Sent: Friday, April 01, 2005 9:39 AM To: osspluto@hq.nasa.gov Subject: New Horizons Mission--EPS Comments</p> <p>I fully support the New Horizons mission to Pluto as it is currently designed. Hence, I feel that it is well worth the risk to launch the spacecraft with the plutonium-powered radioisotope thermoelectric generator.</p> <p>Our country needs to take at least some level of risk if we are going to be able to maintain our world leadership position in technology.</p> <p>Sincerely,</p> <p>James P. Licari</p> <p>James P. Licari, Ph.D. University of Minnesota Rochester Digital Technology Center Liaison [REDACTED] Rochester, MN 55904</p>	Thank you for your comments.

Submission Number	Comment Submission	Responses to Comments
E42	<p>From: [REDACTED] [mailto:[REDACTED]] Sent: Thursday, March 31, 2005 6:44 AM To: osspluto@hq.nasa.gov Subject: (no subject)</p> <p>Why do you even raise questions about using radioisotope power systems for a Pluto mission when NASA has used such power units oiver many years safely, including in the Apollo landed missions, Cassinin and many much earlier missions? The question implies that NASA has questions on the safety of these systems and there is no justification for that.</p> <p>If the mission is scientifically valuable, then there is no question that nuclear power supplies are required to make it possible to perform the mission. So why raise doubts about all of that by such a public question thaqt implies that NASA has concerns about performing such deep space missions? I am astounded and disturbed by this request for public reaction.</p> <p>H.B. Finger</p>	<p>Thank you for your comments. Because the proposed New Horizons mission will use a single RTG, NASA is required by law to comply with the provisions of NEPA, CEQ regulations, and NASA's own policies and procedures, and prepare an environmental impact statement. This process includes soliciting input from Federal, state and local agencies, organizations, and individuals, i.e., members of the general public. The process must be followed for each such mission that NASA proposes to implement.</p>
E43	<p>From: Bart Dias [mailto:[REDACTED]] Sent: Thursday, March 31, 2005 10:41 PM To: osspluto@hq.nasa.gov Subject: Public comment regarding Pluto mission</p> <p>Use whatever means, including nuclear power, to get the Pluto mission going already. Space research is moving along too slowly as it is. I'm getting old and I want to see my tax money accomplish something more in my life time than terrestrial politics.</p> <p>-Thanks for being here Bart Dias (Seattle, WA)</p>	<p>Thank you for your comments.</p>
E44	<p>From: Vince Murphy [mailto:[REDACTED]] Sent: Wednesday, March 30, 2005 11:12 PM</p>	

Submission Number	Comment Submission	Responses to Comments
	<p>To: osspluto@hq.nasa.gov Subject: pluto probe public comments</p> <p>Sounds exciting! Go for it! In other words this private citizen fully approves of the mission as planned.</p> <p>Vincent Robert Murphy [REDACTED] Lincoln, Nebraska 68504-2064</p>	<p>Thank you for your comments.</p>
E45	<p>From: Wgekler [REDACTED] [mailto:[REDACTED]] Sent: Wednesday, March 30, 2005 8:09 PM To: osspluto@hq.nasa.gov Subject: Pluto and Pu-238</p> <p>Being familiar with the Cassini mission and the construction and use of the Pu-238 RTGs, I wish to state that I fully support the New Horizon's mission to Pluto. I believe the Cassini probe established the safety of this type of mission and it is a useful activity for NASA pursue.</p> <p>Bill Gekler [REDACTED] Los Alamitos, CA 90720 [REDACTED]</p>	<p>Thank you for your comments.</p>
E46	<p>From: Chris Bailey [mailto:[REDACTED]] Sent: Wednesday, March 30, 2005 5:00 PM To: osspluto@hq.nasa.gov Subject: Public Comments</p> <p>Let's spend our money on a nuclear mission to the moon or Mars not Pluto which in my mind gets us no where closer to manned exploration of the solar system.</p> <p>Chris Bailey Texas A&M University</p>	<p>Thank you for your comments.</p>
E47	<p>From: Jonathan Hendler [mailto:[REDACTED]]</p>	

Submission Number	Comment Submission	Responses to Comments
E47-1	<p>Sent: Thursday, March 31, 2005 4:01 PM To: osspluto@hq.nasa.gov Subject: Pluto Mission Safety</p> <p>To whom it may concern,</p> <p>I believe that government operates under the consent and trust of the public.</p> <p>There is no level of acceptable risk with radiation.</p> <p>The public request for comments needs to not be a CYA (Cover Your Ass) PR campaign. Political reality, in the end, is not reality.</p> <p>Make it safe, make it work, and hold the ground for the highest standards to protect the public interest.</p> <p>Thanks,</p> <p>Jonathan Hendler</p>	<p>Thank you for your comments.</p> <p>E47-1) Please see response to submission E42.</p>
E48	<p>From: CLARENCE A BOLIN [mailto:] Sent: Thursday, March 31, 2005 3:13 AM To: osspluto@hq.nasa.gov Subject: Comments</p> <p>We seem to be falling into a mindset that everything must be absolutely safe. However, we all should know that everything involves risk. We now know that the risk involved in the atomic testing in the forties, fifties, and sixties was at least a million times higher than the risk involved here, yet we did not hesitate to take it. When the risk is very small, such as it is here, and the potential rewards are great, such as they are here, we should not hesitate to take that risk.</p> <p>Clarence A. Bolin</p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
	<p>Boise ID 83702</p>	
E49	<p>From: Betsy McCall [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 3:32 PM To: osspluto@hq.nasa.gov Subject: new Horizon's Project comment</p> <p>I just wanted to send along to my confidence that NASA has done everything it can to protect public safety in the use of the radiological material in the project and that the risk to the public is reasonable. Going to Pluto is extremely important scientifically, and I wish the project the best of luck.</p> <p>Betsy McCall, M.A., M.S.</p>	<p>Thank you for your comments.</p>
E50	<p>From: Jeanne Christensen [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 10:10 PM To: osspluto@hq.nasa.gov Subject: mission</p> <p>Dear Kurt Lindstrom:</p> <p>Please be aware that I don't want a possible radioactive fallout cloud coming down on my two children because of a space mission.</p> <p>I oppose launching radioactive materials into space.</p> <p>Thanks, Jeanne Christensen [REDACTED] Vancouver WA 98685</p>	<p>Thank you for your comments.</p>
E51	<p>From: Jack Clark [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 3:00 PM To: osspluto@hq.nasa.gov Subject: Nuclear-Powered Pluto Mission</p>	

Submission Number	Comment Submission	Responses to Comments
	I say go for it	Thank you for your comment.
E52	<p>From: Helm, Keith B [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 4:34 PM To: osspluto@hq.nasa.gov Subject: Pluto Space Probe</p> <p>Kurt Lindstrom, NASA, I'm sorry I can't comment any other way but by email. I'm an old timer with aerospace. My first real job was with Rockwell's Rocketdyne division in 1957 working on the Atlas program. Since then I have worked for many different company and many different programs. My comment is on the propulsion your using for the probe and it's safety factor. As we all know we have a habit of being complacent with successful missions like the space launches we've had in the past. Each time an accident happens when we least expect it because we have had so many good safe launches. I would like to suggest in the future to launch</p> <p>Keith B. Helm Systems Engineering Analyst [REDACTED] Boeing Company</p>	Thank you for your comments.
E53 E53-1	<p>From: Helm, Keith B [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 5:06 PM To: osspluto@hq.nasa.gov Subject: Pluto spce probe</p> <p>Kurt Lindstrom, NASA, I have a suggestion to move possibly sensitive space probes using plutonium as a fuel source to a more remote location. Possibly using Boeing's Sea Launch or even Vandenberg for launch sites. The cost would be not much more if any. My reasoning is that all the accidents we have had in the space program has come from complacency from to many good launches and the belief that nothing</p>	<p>Thank you for your comments.</p> <p>E53-1) Boeing's Sea Launch facility and launch system simply do not have the necessary payload processing and launch energy capabilities to launch the proposed New Horizons mission to Pluto. While an</p>

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E53-2	<p>could go wrong. When that happens something does go wrong. No matter how careful we think we are. I speak from a lot of experience in aerospace. My first real job being with Rocketdyne in 1957 on the Atlas Program. Since then I have worked with many companies on many different programs. Through good times and some bad times but all of them were memorable and the people that made those programs happen. We also made a lot of people famous with the work we did. Ducth Kindleburger, old man Douglas, Howard Huges and some companies too, like TRW, Bunker Ramo, Atomics International, Huges Space Division, McDonald Douglas, Northrup, Ratheon, Bendix and Boeing. I've seen the mess that we can leave behind and later have to clean up such as Hanford. When I worked for Atomics International in 1978 and 1979 on the Clinch River Breeder Reactor Program. At the same time Rockwell had the contract for the Hanford clean up. Rockwell sent their Managers who had not measured up to Hanford as punishment and as a way of earning their way back into good graces. Very few ever did. Most left the company after they realized it was a lost cause program. And a danger to them and their families to live there.</p> <p>I hope you will have a greater insight to future probes. One accident of the worst kind could make use of Cape Canveral impossible for our children's life time and possibly the end of any space exploration in the future.</p> <p>Keith B. Helm Systems Engineering Analyst [REDACTED] Boeing Company</p>	<p>Atlas V can be launched from Vandenberg Air Force Base, California, the proposed New Horizons mission could not be launched from that site due to both launch energy and launch azimuth constraints.</p> <p>E53-2) Please see responses to submission E1.</p>
E54	<p>From: Salo, Paul [mailto:[REDACTED]] Sent: Wednesday, March 30, 2005 3:29 PM To: osspluto@hq.nasa.gov Subject: Input sought on nuclear Pluto mission</p>	

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<p>E54-1 E54-2 E54-3</p>	<p>I have just read the article in "Florida Today" (see below) regarding the risk of public exposure to radiation and request for public comment for the planned mission to Pluto.</p> <p>I have complete confidence in the ability of NASA to successfully launch this mission to Pluto. Success of such a mission will provide a wealth of scientific information and inspire a new generation of scientists and engineers. Public response to a successful mission will be on par with the Voyager Fly-By's and current exploration by the Mars rovers.</p> <p>Of course, any release of radioactive material is disastrous. It is probably too late for design modifications to reduce the 1 in 250 chance (0.4%) of that happening. More effort is needed in this area for future missions. Additional preparation for responding to an accident is probably merited to mitigate the risk of exposure to released radioactive material.</p> <p>I am very much looking forward to the launch of this mission.</p> <p>Best regards,</p> <p>Paul Salo</p> <p>CAPE CANAVERAL - NASA is offering people a chance to comment today on a planned mission to Pluto that will carry nuclear fuel.</p> <p>The New Horizons mission will use a plutonium-powered radioisotope thermoelectric generator for power in deep space, where sunlight isn't intense enough to run the spacecraft. It's like the generators that flew in the Cassini mission to Saturn -- in fact, it's a spare from</p>	<p>Thank you for your comments.</p> <p>E54-1) The mean probability of an accident leading to a release of plutonium dioxide for the overall mission is estimated to be approximately 1 in 300 (see Tables ES-1 and 4-3 of this EIS).</p> <p>E54-2) The DOE continues to design and implement safety enhancements to the components of radioisotope power sources. This includes on-going development of advanced radioisotope power sources to be made available for NASA's use.</p> <p>E54-3) Prior to launch, a comprehensive set of plans would be developed by NASA to ensure that any launch accident could be met with a well-developed and tested response; please see Section 4.1.5 of this EIS for further details.</p>

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	<p>that probe.</p> <p>"RTGs have a proven track record and safety record," Kurt Lindstrom, NASA's executive for the mission, said during a press conference Tuesday at Kennedy Space Center.</p> <p>"We will not launch this mission unless it is safe to fly," Lindstrom said.</p> <p>Several safety reviews and opportunities for public comment remain before the planned January launch.</p> <p>The agency has released a draft environmental impact statement, a document outlining the risk to the public in the event of a launch explosion or some other disaster. The public can learn about the mission and comment at a hearing at the Florida Solar Energy Center in Cocoa, at Brevard Community College, today at 1 p.m.</p> <p>About 15 people attended a similar hearing Tuesday evening at the Florida Solar Energy Center, where NASA officials and scientists presented a 90-minute program on the mission. But no one offered any comment for the record when the floor was open to the public.</p> <p>"It could be that the public understands that there is really no alternative way to power the mission," said Kenneth Kumor, the Washington, D.C., based coordinator of the National Environmental Policy Act.</p> <p>"The only alternative is not to fly the mission," Kumor said.</p> <p>Lindstrom said that he received a couple dozen e-mails from the public that will be logged into the record.</p> <p>Ultimately, the mission must receive President Bush's approval.</p>	

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	<p>Pluto is the last planet humans have not studied with a spacecraft. This probe will not only study Pluto and its moon, Charon, as it flies by, but will continue on to the mysterious ring of icy objects known as the Kuiper Belt.</p> <p>New Horizons will get there sooner, with a chance to see more of the Kuiper Belt, if it launches in the early part of its Jan. 11 to Feb. 14, 2006, launch window and can take advantage of a gravity assist from Jupiter.</p> <p>Security problems at the Los Alamos National Laboratory halted production of plutonium, threatening the mission. But project scientist Hal Weaver, from Johns Hopkins' Applied Physics Laboratory, said the mission will get enough fuel to reach at least one Kuiper Belt object, even if it must wait until 2007 to launch.</p> <p>The schedule has been challenging, said Orlando Figueroa, a deputy associate administrator in NASA's science directorate, but Lindstrom said there's a good chance of launching in 2006. New Horizons will launch on a Lockheed Martin Atlas 5 rocket from Cape Canaveral Air Force Station.</p> <p>According to the draft environmental impact statement, individuals have less than a one in a million chance of getting cancer from a catastrophic accident. There's a 93.8 percent chance of a successful launch, the statement says; a 5.8 percent chance of an accident with no release of radiological material; and 0.4 percent chance of a mishap with a radiological release.</p> <p>Weaver said he's not a risk expert, but he's familiar with the study.</p> <p>"I'm going to be there with my family at the launch site to watch New Horizons go off," he said. "And we live in a</p>	

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	<p>world of risks. I'm more concerned about teaching my 16-year-old how to drive and being in the car with him . . . than the risks associated with the New Horizons launch."</p>	
E55	<p>From: Morgan I [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 12:54 PM To: osspluto@hq.nasa.gov Subject: New Horizons comment.</p> <p>I think the New Horizons mission to Pluto is a great thing. It uses a generator with a proven track record so there will be minimal danger of something going wrong. It is also going to a planetary body tha has never before been visited. This alone outweighs what little risk there is. I say: Go for it. -Morgan Todd</p>	<p>Thank you for your comments.</p>
E56	<p>From: Hans Edsberg [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 1:58 PM To: osspluto@hq.nasa.gov Subject: Use of nuclear power in space</p> <p>There is no <i>reliable, long lived</i> alternative to nuclear powered energy on spaceflights to the outer planets! Period. The challenge, however, is to make it as safe as possible...</p>	<p>Thank you for your comments.</p>
E57	<p>From: Chris Rempel [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 1:17 AM To: osspluto@hq.nasa.gov Subject: Environmental impact of Pluto mission.</p> <p>According to what I have read in the report, the risk is very low and the mission to Pluto should proceed as planned. We need to continue to explore our solar system and beyond.</p> <p>Chris Rempel</p>	<p>Thank you for your comments.</p>
E58	<p>From: Tracy Eckels [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 12:07 AM To: osspluto@hq.nasa.gov</p>	

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E58-1	<p>Subject: Nuclear-Powered Pluto Mission</p> <p>I think that the choice to use nuclear fuel for this and future deep space research missions is an obvious choice. Clearly we cannot depend on solar powered vehicles not only for their limited distance but for their positioning requirements and complicated mechanical apparatuses that are prone to failure.</p> <p>I strongly encourage further development of new energy sources for spacecraft to include insuring the safety of nuclear fuel cells.</p>	<p>Thank you for your comments.</p> <p>E58-1) Please see response to comment E54-2.</p>
E59	<p>From: D. Scott Kee [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 9:56 AM To: osspluto@hq.nasa.gov Cc: [REDACTED]; [REDACTED] Subject: New Horizons Mission</p> <p>Mr Lindstrom,</p> <p>As a resident of Cocoa Beach, FL and big fan of exploration, especially space exploration, I want to convey my support for NASA's Pluto-Kuiper Express Mission. Business travel will keep me from attending any of the community comment meetings, so please accept this e-mail in lieu of public comment on the Draft Environmental Impact Statement.</p> <p>D. Scott Kee [REDACTED] Cocoa Beach, FL 32932-1499 [REDACTED], Fax</p>	<p>Thank you for your comments.</p>
E60	<p>From: basscast [mailto: [REDACTED]]</p>	

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	<p>Sent: Tuesday, March 29, 2005 10:17 PM To: osspluto@hq.nasa.gov Subject: go to pluto</p> <p>heard about the public hearing, I can not be in florida for it go to pluto, it is worth the effort</p> <p>Mike Giardini Freeport, IL</p>	<p>Thank you for your comments.</p>
E61	<p>From: Greg Nielsen [mailto: [REDACTED]] Sent: Tuesday, March 29, 2005 11:24 PM To: osspluto@hq.nasa.gov Subject: Comment on the Pluto mission.</p> <p>I want to state that I am completely for the mission to pluto. There being no other adequate means of propulsion to make the trip, the already proven method (via Cassini) should be allowed to continue as planned.</p> <p>I am sure there will be opposition, just as there was to Cassini itself, but other than those opposing it being allowed to voice their concerns, I do not believe they are of sufficient numbers in comparison to the members of the Planetary Society (and other such public organizations) to have the right to shut down such an exciting once-in-millenia type of research.</p> <p>Sincerely,</p> <p>Gregory B Nielsen A Michigan Taxpayer</p>	<p>Thank you for your comments.</p>
E62	<p>From: TheDickinsons [mailto: [REDACTED]] Sent: Wednesday, March 30, 2005 12:39 AM To: osspluto@hq.nasa.gov Subject: FULL SPEED TO PLUTO !!</p> <p>I want to express my full support of NASA's proposal to use Plutonium fuel for the new Horizons mission.</p>	<p>Thank you for your comments.</p>




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	<p>There is no such thing as a foolproof rocket, I feel confident the risk to the public is negligible for this launch. I also feel that should a mishap occur, one would practically have to be hit by the probe to suffer significant damage. When you consider the probabilities of first, there first being a launch accident, then of the plutonium fuel being spread during the accident, then of the fuel being spread over land (or over watercraft at sea) and then of any one person's chance of being outside or inhaling the particles, one can see that an extraordinary set of unlikely events must occur for there to be any likelihood of personal injury.</p> <p>I'm guessing that the residents of Florida over ten years time stand a much higher chance of being hit by a plane falling out of the sky than the risk posed by this mission.</p> <p>Warp speed ahead, Mr. Sulu !!!</p> <p>V/R, T. Dickinson Virginia</p>	
E63	<p>From: Samsworld [mailto: [REDACTED]] Sent: Tuesday, March 29, 2005 8:16 PM To: osspluto@hq.nasa.gov Subject: go for it Importance: High</p> <p>Good Evening.</p> <p>My name is Mr S. Trentacoste from new jersey. I am an avid space enthusiast and i think it would be ashame to wast of this tecknoligy on a no go apporach. I believe that the information that we will gain is of the upmost importance.</p> <p>I send my support to this endever. space exploration should</p>	<p>Thank you for your comments.</p>

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	<p>not be curtailed beacuse nucular power is required to power the craft on it's mission to ploto abd beyond</p> <p>Mr Salvatore Trentacoste Kearny NJ 07032</p> <p>Vote for me at my one stop voting page</p> <p style="text-align: center;">http://www.sam9537.com/voting</p> <p>Win My Awards at</p> <p style="text-align: center;">http://www.sam9537.com</p> <p>thank you</p> <p>Sam</p> <p>Samsworld</p>	
E64	<p>From: Michael G. Montague [mailto:████████████████████] Sent: Tuesday, March 29, 2005 5:24 PM To: osspluto@hq.nasa.gov Subject: Nuclear power is a good technology for space exploration</p> <p>I'm writing to voice my support of nuclear power being employed in the New Horizons probe to Pluto specifically and Space Exploration, both manned and unmanned in general.</p>	Thank you for your comments.

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	<p>Nuclear thermal cells are safe, reliable and well tested. Further, space based nuclear reactors of the type that would have been used in the JIMO mission should also be developed and used.</p> <p>Our nation's exploration agenda is too important to be held hostage to the uneducated and irrational fears of a few in the environmental movement.</p> <p style="text-align: center;">--Michael Montague [REDACTED]</p> <p>Home= [REDACTED] Work= [REDACTED] Cell= [REDACTED]</p> <p style="text-align: center;">[REDACTED] Chapel Hill, NC 27514</p>	
E65	<p>From: O'Connor, Patrick [mailto:[REDACTED]] Sent: Tuesday, March 29, 2005 3:48 PM To: 'osspluto@hq.nasa.gov' Subject: Pluto(nium)</p> <p>Hello Kurt Lindstrom--</p> <p>Regarding the environmental impact hearings:</p> <p>There has been a great deal of hand-wringing in the past about the plutonium-thermal energy sources used to supply energy for missions in the outer solar system, where solar panels are not an effective source of power. I think the anxiety is drastically misplaced, and would like to suggest a few arguments to counter the "risk is too high" point of view.</p> <p>In the 2002 Columbia re-entry disaster, there were survivors. A small biological experiment canister containing C. elegans nematode worms survived the re-entry</p>	Thank you for your comments.

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	<p>with all of its inhabitants alive and intact, even after spending some additional weeks on the ground before their canister was discovered. The canister that held these biological specimens was far less robust than the canister that contains the plutonium oxide. If these small creatures could survive re-entry unharmed, the likelihood that the plutonium container would fail, given the same re-entry circumstances, is negligible.</p> <p>I hope that analogy can be used to counter the 'chicken little' syndrome.</p> <p>Cheers!</p> <p>Patrick J. O'Connor Associate Dean Electronics and Computer Technology Program DeVry University, Chicago</p>	
E66	<p>From: David Martin [mailto: [REDACTED]] Sent: Tuesday, March 29, 2005 6:53 PM To: osspluto@hq.nasa.gov Subject: pluto-kuiper mission</p> <p>Go for it David Martin DMD</p>	Thank you for your comment.
E67	<p>From: jimvela [mailto: [REDACTED]] Sent: Tuesday, March 29, 2005 5:08 PM To: osspluto@hq.nasa.gov Subject: Comments about New Horizons mission</p> <p>I would like to take a moment of your time to make the following comments about the New Horizons mission, specifically with respect to the usage of nuclear power on this or other space missions.</p> <p>I strongly believe that despite some small risks associated with the handling and use of nuclear materials that the overall benefit vastly outweighs the risk. The</p>	Thank you for your comments.

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	<p>dramatic increases in power generation and propulsion capabilities brought about with the use of nuclear power and propulsion systems so substantially enhances the capability of the mission that NASA would be truly foolish to bend to the raving rants of a handful of chicken littles who fear the "N word".</p> <p>Further, if we ever intend to solve the many problems facing modern society related to the consumption of fossil fuels then our only true hope is to embrace and perfect next generation nuclear technologies including newer generations of fission based power, and in the long term fusion power applications. That directed problem solving for the advancement of 'truly hard' missions represents the most compelling purpose for having an agency like NASA in the first place.</p> <p>Please press on, and at maximum possible speed.</p> <p>Respectfully submitted,</p> <p>James Velasquez</p>	
E68	<p>From: richard schumacher [mailto: [REDACTED]] Sent: Tuesday, March 29, 2005 2:52 PM To: osspluto@hq.nasa.gov Cc: [REDACTED] Subject: Comment on Pluto mission</p> <p>I whole-heartedly and without reservation endorse and support the Pluto - Kuiper Belt mission. I urge that, if possible, it be launched with the full originally-planned complement of plutonium fuel in it's RTGs.</p> <p>regards and best wishes, Richard Schumacher [REDACTED] Dallas, TX 75248-4940</p>	Thank you for your comments.
E69	From: Patten, Jeff [mailto: [REDACTED]]	

Submission Number	Comment Submission	Responses to Comments
	<p>Sent: Tuesday, March 29, 2005 3:11 PM To: osspluto@hq.nasa.gov Subject: New Horizons nuclear-powered spacecraft Importance: High</p> <p>I strongly support the New Horizons mission. I want to make it clear that you are hearing this from a member of a dying species – I am a liberal Democrat. I have, in the past, picketed outside the Palo Verde Nuclear Power Plant in Arizona, and I still think nuclear power is a poor choice for generating electricity here on Earth. However, I am also a space fanatic and amateur astronomer, and I know that there is really no alternative to using nuclear power on a mission like this one. As is not the case with nuclear power plants, the risk created by launching a spacecraft with a nuclear-powered is of relatively short duration, and the risks, while not non-existent, can be minimized.</p> <p>Knowing more about Pluto, Charon and the many other KBO's out there will tell us more – perhaps as much as we already know – about how the Solar System formed, and consequently how stars, particularly stars with planetary systems, form. This mission is essential – and it also will have that positive PR effect on the public when it gets to Pluto and we see what no one has ever seen before. Please regard me as one loud vote in favor of the nuclear power system on board New Horizons, and in favor of the New Horizons mission in general.</p> <p>Jeffrey L. Patten  Sahuarita, AZ 85629  </p>	<p>Thank you for your comments.</p>

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<p>E70</p> <p>E70-1</p> <p>E70-2</p>	<p>From: chris heller [mailto: [REDACTED]] Sent: Sunday, March 27, 2005 2:23 PM To: osspluto@hq.nasa.gov Subject: No to nuclear launches</p> <p>NASA</p> <p>To whom it may concern;</p> <p>As a concerned citizen of the US, I would like to state my disappointment and my strong opposition to any space launch that could endanger the earth and its inhabitants. As you know there is always a possibility of a failed launch that can be disastrous. Why don't you come up with a way to use solar energy and other less dangerous energy sources to power these rockets? All the billions of dollars for NASA's space missions are not being used in an environmentally and financially responsible manner. Billions of dollars are assigned to NASA while millions of Americans are being deprived of health care, proper education and what have you. What's it going to take for someone to start considering the safety and welfare for the people of this country?</p> <p>Sincerely,</p> <p>Christine Heller, Traverse City, MI</p>	<p>Thank you for your comments.</p> <p>E70-1) NASA and DOE have estimated that a launch accident leading to release of plutonium dioxide from the New Horizons RTG would be unlikely and that the risks to human health and the environment would be small; see Section 4.1.4 of this EIS for more information. Please also see responses to comments E1-1, E10-1, and E12-1.</p> <p>E70-2) Alternative power systems for the proposed New Horizons mission, such as solar power and systems that would require less plutonium dioxide, have been assessed and were found to be technically not feasible; see Section 2.3.1 of this EIS for more information.</p>
<p>E71</p>	<p>From: Giardini, Mike RKFD IL HS [mailto: [REDACTED]] Sent: Tuesday, March 29, 2005 1:34 PM To: 'osspluto@hq.nasa.gov' Subject: Pluto mission</p> <p>Greetings</p>	

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	<p>GO TO PLUTO</p> <p>it needs to be done</p> <p>Regards Mike Giardini [REDACTED] Hamilton Sundstrand - Rkfd. IL.</p>	<p>Thank you for your comments.</p>
E72	<p>From: Paul Maunder [mailto:[REDACTED]] Sent: Tuesday, April 05, 2005 2:20 AM To: osspluto@hq.nasa.gov Subject: Plutonium in space</p> <p>Sir</p> <p>This is to register my objection to sneding plutonium fueled craft into space. The risk is far too great to contmeplate an increase in this form of energy use.</p> <p>Sincerely</p> <p>Paul Maunder New Zealand</p>	<p>Thank you for your comments.</p>
E73	<p>From: Isabel Denham [mailto:[REDACTED]] Sent: Monday, April 04, 2005 7:22 PM To: osspluto@hq.nasa.gov Subject: plutonium in space</p> <p>Most Americans do not want space polluted with any weapons or nuclear material. Leave space alone. Withdraw your plans for polluting space with plutonium. I</p> <p>Isabel Denham</p>	<p>Thank you for your comments. The New Horizons mission is for peaceful scientific purposes.</p>
E74	<p>From: Global Network [mailto:[REDACTED]] Sent: Monday, April 11, 2005 11:05 AM To: osspluto@hq.nasa.gov Subject: New Horizons DEIS Comments</p>	

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<p>E74-1</p> <p>E74-2</p> <p>E74-3</p>	<p>Kurt Lindstrom Mission and Systems Management Division Science Mission Directorate NASA HQ Washington DC</p> <p>Dear Mr. Lindstrom:</p> <p>I write on behalf of our organization to offer comments about NASA's <i>Draft Environmental Impact Statement</i> on the New Horizons mission to Pluto. We, as we have been since the 1989 launch of Galileo, remain opposed to the launching of nuclear power in space for any purpose.</p> <p>It is known that when NASA and the Department of Energy (DoE) identify a new mission they have a joint committee that sits down to decide on the kind of power source to be used. It is our understanding that the nuclear industry, who views space as a new market, have made sure to place their operatives right in the middle of this process. So at the very outset this is a rigged game.</p> <p>It is also known to us that NASA and the DoE have been defunding the research and development of alternative space power concepts in recent years. It is abundantly clear that the nuclear industry intends to ensure that there are not other significant players in the game.</p> <p>Our concern and opposition is of course centered around the fact that space technology can and does fail. We have seen rocket explosions on launch. We remember the 1996 Russian Mars mission carrying plutonium on-board that failed to achieve proper orbit and fell back to Earth burning up over the mountains of Chile and Bolivia spreading the</p>	<p>Thank you for your comments.</p> <p>E74-1) NASA considers a range of power sources for any potential future missions, and evaluates each type of power source based on how well it could achieve the science and engineering requirements of a mission. While other government agencies and commercial industries may provide capability and performance data to NASA for mission concept studies, NASA alone establishes the proposed mission design baseline for further mission definition.</p> <p>E74-2) Solar energy is the primary power source for the commercial satellite industry, and that industry invests its own R&D funds into advancing that technology, as does NASA. Commercial space interests, however, do not fund R&D for power sources that enable scientific exploration in deep space; all funding for those applications must come from NASA. It is appropriate that a majority of current</p>

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E74-4	<p>plutonium over that region. At the time the <i>Boston Globe</i> reported that those governments requested assistance from the U.S. to send in radiological teams to help identify the plutonium contamination belt, but then President Bill Clinton refused to respond. Then we witnessed the Columbia shuttle disaster two years ago and I myself saw NASA operatives on TV dressed in haz-mat suits with Geiger counters taking readings of people in Texas and Louisiana who had come in contact with debris from that accident. Local police forces were heard on <i>National Public Radio</i> warning the public to stay away from Columbia debris and said they were told by NASA that "radioactive" sources were on-board that mission. Just what was the radioactive source on Columbia?</p>	<p>NASA R&D funds are invested to meet the needs of NASA's Vision for Space Exploration, which calls for a variety of solar, battery and nuclear power systems.</p> <p>E74-3) Please see responses to comments E5-1 and E19-1.</p> <p>E74-4) Only small radioactive sources were on board Columbia. These were in the fire detectors (similar to the sources used in residential smoke detectors) in various locations throughout the Shuttle, in a navigation sensor, and in a biomedical experiment. The total activity of all sources on board Columbia was 7.2 microcuries. The main hazard of concern in the debris was from toxic propellants on board the Shuttle. The recovery personnel in haz-mat suits were using chemical detectors to test people for possible contamination from toxic chemicals; Geiger counters were used only while attempting to locate the small radioactive sources described above.</p>
E74-5	<p>In addition to space accidents, we are also concerned about the entire nuclear production process and its contamination of workers and communities. You should understand that we have very little confidence in the DoE. Years of contamination at the nuclear labs across the country is a matter of public record. <i>The New Mexican</i>, in Santa Fe, reported in 1996 that "Mishaps in which workers and equipment have been contaminated with radioactive sources are on the rise at Los Alamos National Laboratory." The reason? "Lab officials say the rise in radiation exposure and radioactive mishaps since 1993 has one primary cause: the [NASA] Cassini project and an ongoing effort to build radioactive heat sources." So in fact, even if there is no launch problem the production process is already contaminating and likely killing people.</p>	<p>E74-5) Please see response to comment E19-2.</p>
E74-6	<p>Now NASA and DoE are saying that they have so many plans for space nuclear power in the coming years that they must ramp up production of plutonium and it appears that DoE will center its operations for these missions at the Idaho National Laboratory. A \$230 million proposed</p>	<p>E74-6) The DOE is in the process of preparing the appropriate NEPA documentation for the proposed Consolidation of Nuclear Operations</p>

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E74-7	<p>facility expansion is now underway. Citizens across Idaho are opposed to this expansion and they fear, with good reason, that they will not get the truth about contamination from the DoE. In a recent article in the <i>Boise Weekly</i> newspaper, Jeremy Maxand, director of the nuclear watchdog group <i>The Snake River Alliance</i>, says the following in regard to this issue: "The DoE is proposing a project that could leave Idahoans breathing plutonium for the next 80 years and they won't tell us what its for. Let's talk about something they can't hide from the public. Plutonium-238 is lethal and difficult to contain. Is this secrecy going to benefit Idahoans given the DoE's well-documented and abysmal track record for worker, community, and environmental safety?"</p> <p>Maxand goes on to say, "It makes me highly suspicious that on one hand they sell this extremely hazardous process to Idahoans via sleek NASA space batteries, when in fact we've made them for decades using plutonium purchased from Russia's stockpile. Then in the next breath they'll say that the plutonium-238 produced in Idaho will be used for classified national security missions...."</p> <p>Forgive us for not believing anything our government says. But you all have no credibility. One example is Kodiak island in Alaska. The U.S. government built a rocket launch facility there and promised the citizens of Alaska that it would only be used for civilian launches, never military. But in reality the only missions that have yet been launched have been Missile Defense Agency (MDA) tests. We are convinced that the expansion of nuclear power in space for missions like New Horizons are a Trojan Horse. We are convinced that NASA, DoE and the Pentagon are setting up the nuclear space infrastructure to eventually build nuclear reactors for warfare in the heavens. New Horizons is an ice breaker.</p>	<p>Related to the Production of Radioisotope Power Systems. The DOE issued a Notice of Intent in November 2004 announcing DOE's intent to prepare an EIS for the proposed consolidation and identified the Idaho National Laboratory as the preferred alternative. DOE's EIS will address worker safety and environmental concerns as part of the review. The DOE has and will continue to protect the workers, community, and the environment. The DOE held public scoping meetings in Idaho, Wyoming, Tennessee, and New Mexico to solicit and encourage the public to provide comments on: the scope of the EIS; alternatives to be addressed in the EIS; and specific environmental issues of concern. In addition, DOE held informational meetings with key stakeholder groups in Idaho and Wyoming. DOE has and will continue to provide the public an opportunity to participate throughout the NEPA process. The Draft EIS is currently being reviewed and is planned for distribution in June 2005. Public meetings on the Draft EIS and additional outreach opportunities are planned for late summer 2005. The DOE has not made any decision regarding the proposed consolidation and will not make any decision until the NEPA process has been completed and a Record of Decision issued.</p> <p>E74-7) The New Horizons mission is for peaceful scientific purposes.</p>

Submission Number	Comment Submission	Responses to Comments
E74-8	<p>For all these reasons we must say that the New Horizons mission must be cancelled. NASA and DoE must develop new non-nuclear power sources for space exploration. We will work against the New Horizons mission in the same way we did for Galileo (1989), Ulysses (1990) and Cassini (1997). Project Prometheus, the nuclear rocket, will also be a target of our organization. NASA has been taken over by the military and the nuclear industry.</p>	<p>E74-8) NASA is an independent agency of the United States Government.</p>
E74-9	<p>The time has come for the public to reject plans to move war and nuclear power into space. It is our money that is being wasted on these dangerous projects while schools and libraries close across the nation and people can't afford health care. Jobs are leaving the U.S. by the millions and we are told there is no money to help the people. The public is turning against NASA and their gee-whiz plans for nuclear launches because the public understands the dangers involved. NASA and DoE are out of control and must be restrained by the taxpayers of the nation and the citizens of the world.</p>	<p>E74-9) The U.S. Congress and the Administration develop national budget priorities among the various Federal agencies based on many considerations related to national interests and security. The final budget reflects compromises and tradeoffs when all factors and programs are considered from the broadest perspective.</p>
E74-10	<p>In anticipation of a nuclear space accident the U.S. Congress has created the Price-Anderson Act that limits the liability of the U.S. for nuclear contamination clean-up. This law would not have been passed if NASA</p>	<p>E74-10) Congress enacted the Price-Anderson Act (PAA) (42 U.S.C. 2210, as amended) in 1957 as an amendment to the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) to provide a system of financial protection for persons who may be injured by and persons who may be liable for a nuclear incident. The PAA was enacted prior to the National Aeronautics and Space Act of 1958 (Pub. L. No 85-568, as amended) and the formation of NASA.</p>
E74-11	<p>did not expect a space nuclear accident at some point in the future. We will not wait until the tragedy happens before we speak out. Cancel New Horizons and all other space nuclear missions today before it is too late.</p> <p>Bruce K. Gagnon Coordinator Global Network Against Weapons & Nuclear Power in Space PO Box 652 Brunswick, ME 04011</p>	<p>E74-11) Under no circumstances would NASA proceed with a mission of any type (whether or not the mission uses nuclear power; whether the mission is robotic or human-crewed) if NASA expected an accident to occur in space or at any other time.</p>

Submission Number	Comment Submission	Responses to Comments
	<p>[REDACTED] (Cell Phone) http://www.space4peace.org [REDACTED] http://space4peace.blogspot.com (Our blog)</p>	
E75	<p>From: [REDACTED] Sent: Monday, April 11, 2005 11:40 AM To: osspluto@hq.nasa.gov Subject: Draft Environmental Impact Statement Mr. Kurt Lindstrom Mission & systems Management Division Science Mission Directorate MASA HQ Washington, DC</p> <p>Dear Mr. Linstrom:</p> <p>I am writing to urge you to oppose launching the New Horizons mission to Pluto with nuclear power. The U.S. should be in the forefront to discourage the use of nuclear power anywhere in the world but most certainly for use in space. We all know the dangers from radioactivity exceed that of any other substance known to us. The very thought of its being contemplated for use in space is evil.</p> <p>Please heed the concerns of the world's people that those in power make responsible and just decisions when the fate of humanity is at stake.</p> <p>Sincerely,</p> <p>Jane Hanna [REDACTED] Santa Fe NM 87508</p>	<p>Thank you for your comments.</p>
E76	<p>From: Dirk Neyhart [REDACTED] Sent: Monday, April 11, 2005 12:48 PM To: osspluto@hq.nasa.gov</p>	

Submission Number	Comment Submission	Responses to Comments
	<p>Subject: no nukes in space says this lifelong Christian Republican xoxo</p> <p>(There was no text in the body of Mr. Neyhart's message.)</p>	<p>Thank you for your comment.</p>
<p>E77</p>	<p>From: Wolfgang Schlupp-Hauck [REDACTED] [REDACTED]</p> <p>Sent: Monday, April 11, 2005 4:37 PM</p> <p>To: osspluto@hq.nasa.gov</p> <p>Cc: Global Network Against Weapons & Nuclear Power in Space</p> <p>Subject: Comments to the DEIS on the New Horizons mission to Pluto</p> <p>Dear Mr. Lindstrom:</p> <p>I write on behalf of our organization: Friedens- und Begegnungsstätte Mutlangen e.V. a German member of the Global Network Against Weapons and Nuclear Power in Space. I would like to offer comments about NASA's <i>Draft Environmental Impact Statement</i> on the New Horizons mission to Pluto. We, as we have been since the launch of Cassini, remain opposed to the launching of nuclear power in space for any purpose. We refer to Regina Hagens paper about accidents in the space exploration with nuclear impacts. We provide a copy if requested.</p> <p>Our concern and opposition is of course centered around the fact that space technology can and does fail. We have seen rocket explosions on launch. We remember the 1996 Russian Mars mission carrying plutonium on-board that failed to achieve proper orbit and fell back to Earth burning up over the mountains of Chile and Bolivia spreading the</p>	<p>Thank you for your comments. Please see responses to submission E74.</p>

Submission Number	Comment Submission	Responses to Comments
	<p>plutonium over that region. At the time the <i>Boston Globe</i> reported that those governments requested assistance from the U.S. to send in radiological teams to help identify the plutonium contamination belt, but then President Bill Clinton refused to respond.</p> <p>Then we witnessed the Columbia shuttle disaster two years ago and Bruce Gagnon himself saw NASA operatives on TV dressed in haz-mat suits with Geiger counters taking readings of people in Texas and Louisiana who had come in contact with debris from that accident. Local police forces were heard on <i>National Public Radio</i> warning the public to stay away from Columbia debris and said they were told by NASA that "radioactive" sources were on-board that mission. Just what was the radioactive source on Columbia?</p> <p>In addition to space accidents, we are also concerned about the entire nuclear production process and its contamination of workers and communities.</p> <p>The public is turning against NASA and their plans for nuclear launches because the public understands the dangers involved. NASA and DoE are out of control and must be restrained by the taxpayers of the nation and the citizens of the world.</p> <p>In anticipation of a nuclear space accident the U.S. Congress has created the Price-Anderson Act that limits the liability of the U.S. for nuclear contamination clean-up. This law would not have been passed if NASA did not expect a space nuclear accident at some point in the future. We will not wait until the tragedy happens before we speak out. Cancel New Horizons and all other space nuclear missions today before it is too late.</p>	


Submission Number	Comment Submission	Responses to Comments
	<p>Kind regards from Germany</p> <p>Wolfgang Schlupp-Hauck Friedens- und Begegnungssätze Mutlangen e.V. Pressehütte Forststr. 3 ██████████ ██████████████████ ██████████████████</p>	
E78	<p>From: PhoeBe ANNE sorgen [██████████████████] Sent: Monday, April 11, 2005 6:02 PM To: osspluto@hq.nasa.gov Cc: BFUU SJC; Tri-Valley Cares; transcend Subject: SPACE NUKES MISSION (last day for public comments)</p> <p>Mr. Kurt Lindstrom Mission and Systems Management Division Science Mission Directorate NASA HQ Washington DC osspluto@hq.nasa.gov</p> <p>Dear Mr. Lindstrom:</p> <p>I am a Peace & Justice Commissioner for the City of Berkeley and co-chair the Berkeley Fellowship of Unitarian Universalists' Social Justice Committee, writing as an individual citizen on my own behalf and on behalf of my family and friends. I am proud that the Berkeley City Council adopted a Resolution opposing the nuclearization of space a couple of years ago. Please record and consider my comments on</p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
E78-1	<p>NASA's Draft Environmental Impact Statement regarding the New Horizons mission to Pluto. The Global Network Against Weapons in Space has informed me that the comment deadline is today and has inspired my comments.</p> <p>All technology can and does fail at times. I remind you of the 1996 Russian Mars mission carrying plutonium on-board that fell back to Earth burning up over the mountains of Chile and Bolivia, spreading plutonium over that region. The Boston Globe reported that those governments requested assistance from the U.S. to send in radiological teams to identify the plutonium contamination. Our President did not respond. Need I also remind you of the Columbia shuttle disaster? NASA workers were televised dressed in haz-mat suits with Geiger counters taking readings of Texans and Louisianans who had come in contact with debris. NPR aired police warnings that the public avoid debris, saying NASA had told them "radioactive" sources had been on-board. What was the radioactive source? How many cancers have resulted from these two mishaps? For health and safety reasons, I oppose launching nuclear power in space.</p> <p>I am also alarmed by the nuclear production process and its contamination of workers and communities. Due to decades of contamination at nuclear labs nationwide, a matter of public record, I do not trust the Department of Energy. I quote The New Mexican (Santa Fe) 1996: "Lab officials say the rise in radiation exposure and radioactive mishaps since 1993 has one primary cause: the [NASA] Cassini project and an ongoing effort to build radioactive heat sources." The production process is already contaminating and likely killing people, even if there were no launch risks.</p> <p>On Kodiak island in Alaska, our U.S. government built a rocket launch facility, having promised the citizens that it would only be used for civilian launches, never military, yet the only missions that have been</p>	E78-1) Please see responses to submission E74.

Submission Number	Comment Submission	Responses to Comments
	<p>launched were Missile Defense Agency (MDA) tests. It seems the expansion of nuclear power in space for missions like New Horizons are a Trojan Horse. I believe that NASA, the DoE and the Pentagon are setting up the nuclear space infrastructure to eventually build nuclear reactors for warfare in the heavens.</p> <p>When NASA and the Department of Energy (DoE) identify a new mission, a joint committee decides on the power source. The nuclear industry gets in the middle of this, probably seeing space as a new market. It is a rigged game from the get go. NASA and the DoE have been defunding R & D for alternative space power. The nuclear industry impedes alternative participants.</p> <p>For the sake of our species and higher life on this planet, I am praying that you will cancel the New Horizons mission. NASA and the DoE must develop non-nuclear power sources. Apparently, NASA has been taken over by the military and the nuclear industry.</p> <p>The informed public rejects moving war and nuclear power into space. Our taxes are wasted on these dangerous projects while schools and libraries close, City Commissions are weakened, and people can't afford health care. Jobs are outsourced while there is less money to help our citizens. The public is turning against NASA and their nuclear launches as we come to understand their dangers. NASA and the DoE will be restrained by the taxpayers of the nation and the citizens of the world, or we will all regret the consequences.</p> <p>Anticipating a nuclear space accident, the U.S. Congress passed the Price-Anderson Act limiting U.S. liability for nuclear contamination clean-up. This law was written and lobbied for because NASA expects a nuclear accident in space. Do not await a massive tragedy. Please cancel New Horizons and all other space nuclear missions today.</p>	

Submission Number	Comment Submission	Responses to Comments
	<p>Sincerely,</p> <p>PhoeBe ANNE (sorgen) [REDACTED] Berkeley, CA 94708</p>	
E79	<p>From: Leah R. Karpen [REDACTED] Sent: Monday, April 11, 2005 7:42 PM To: osspluto@hq.nasa.gov Subject: [Fwd: GN COMMENTS ON SPACE NUKES MISSION (last day for public comments)]</p> <p>I wish to add my signature to these excellent comments on the space mission.</p> <p>----- Original Message ----- Subject: GN COMMENTS ON SPACE NUKES MISSION (last day for public comments) Date: Mon, 11 Apr 2005 11:08:42 -0400 From: Global Network <[REDACTED]> Reply-To: Global Network <[REDACTED]> To: Global Network Against Weapons <[REDACTED]></p> <p>(The remainder of Ms. Karpen's message repeats the text of the message in submission E74.)</p>	Please see responses to submission E74.
E80	<p>From: Rhodes Thompson [REDACTED] Sent: Monday, April 11, 2005 9:24 PM To: osspluto@hq.nasa.gov Subject: On keeping space for peace</p> <p>Mr. Kurt Lindstrom Missions and Systems Management Division Science Mission Directorate NASAHQ</p>	

Submission Number	Comment Submission	Responses to Comments
	<p>Washington, D.C.</p> <p>Dear Mr. Lindstrom,</p> <p>As a supporter of Global Network and a friend and admirer of Bruce Gagnon, director of Global Network, I write in full support of his eloquent statement, asking that we convince the world that we really do want global peace and those conditions that will help guarantee our future on "spaceship earth." Please use your wisdom and energy to curtail all efforts at transforming space into the horrifying battle ground of the future.</p> <p>Let me make my personal appeal today by telling you my "Tale of Two Cities." Dateline for the first: New Year's Days, 1968. Place: Peace Park in Hiroshima, Japan. Participants: my wife, Lois, and I; Lynn 12, Mark 10, and Jody 8. With wide eyes and weeping hearts we shuddered at seeing the pictured devastation and death caused by that first ever atom bomb to target people. By comparison, all past wars seemed like children playing "cops and robbers"; while further use of all such weapons seemed incomprehensible by human beings formed in the image of a loving God. At the park exit we came upon a very large Peace Bell. Beside it, in many languages was a simple invitation for each departing visitor to send a heavy free-swinging log crashing into that bell, so that its powerful tones could be heard bearing this message to the ends of the earth: NO MORE HIROSHIMAS! Perhaps, Mr. Lindstrom, you may understand why those resonant tones still motivate me to pursue that dream!</p> <p>Dateline for the second: August 9, 1995 -- 50th Anniversary of the bombing of Hiroshima. Place: Nevada Test Site, north of Las Vegas, "the place where more nuclear weapons have been exploded than</p>	<p>Thank you for your comments. Please see responses to submission E74.</p>

Submission Number	Comment Submission	Responses to Comments
	<p>anywhere else on the earth." We were there to remember, not only the victims and Hibakusha (survivors) of Hiroshima and Nagasaki, but also the countless people who had suffered in the 50 years of the atomic age (the downwinders, atomic veterans, native American peoples, and former test site workers whose work and everyday lives had seen and felt the painful effects of nuclear weapons testing. Alas! our nation's example has lured others to into the insidious business of utilizing nuclear energy for the purposes of war and death -- rather than harnessing this power for the purposes of peace and life. (The Franciscan community of the Catholic Church started and gave birth to the Nevada Desert Experience in 1981. I've attended three NDE events (this one in 1995, another as the new century dawned in 2000, and the third in 2001.) Each has been a moving and empowering experience for me.</p> <p>Therefore, Mr. Lindstrom, please use all the persuasive ability you have to see that the vast new source of nuclear energy and power that we human beings have discovered and unlocked in that past 60 years is used in ways that honor our loving God of all humankind and that bless the lives of all our human family. That's a challenging task when so many -- here in our land and all around our world -- are intent upon using nuclear energy and power for purposes more geared toward "making war" than for "making peace." But for the sake of our children and grandchildren, it's worth every bit of energy and effort we can expend to work for a saner, safer world. Therefore, thank you very much for the leadership you can give us all on these crucial issues!</p> <p style="text-align: center;">Sincerely -- and with shalom!</p> <p style="text-align: center;">Rhodes Thompson </p>	


Submission Number	Comment Submission	Responses to Comments
	Claremont, CA 91711 [REDACTED]	
E81	<p>From: [REDACTED] Sent: Monday, April 11, 2005 10:36 PM To: osspluto@hq.nasa.gov Subject: Comments for the New Horizon Space Missions</p> <p>Please reply to: Sheila Baker [REDACTED] San Luis Obispo, California 93405 [REDACTED]</p> <p>Mr. Kurt Lindstrom Mission and Systems Management Division Science Mission Directorate NASA HQ Washington DC osspluto@hq.nasa.gov</p> <p>Dear Mr. Lindstrom;</p> <p>Hopefully my comments on the New Horizon mission will be accepted. I am writing to you at April 11, 7pm PST.</p> <p>For quite some time I have been concerned about NASA's missions to various plants. I received the New Horizons pluto mission DEIS booklet from you and read that each radioisotopic thermal generator contains 133,000 curies. As one who lives in a county with nuclear reactor, I know that area citizens that host any facility containing nuclear materials must constantly be watchful of that facility. The arrogance of</p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
<p>E81-1</p> <p>E81-2</p> <p>E81-3</p> <p>E81-4</p>	<p>DOE and NASA in viewing this project as safe is disappointing. People around Cape Canaveral Air Force Station (CCAFS), Florida will no doubt take on watchdog roles to insure public safety from rocket accidents. No nuclear material and operations in this world are as safe as the New Horizons plutonmission booklet claims.</p> <p>Additionally, the RTG process is cyclical in that the beginning of the production starts somewhere else. Organizations such as Snake River Alliance in Idaho are prepared for the problems that RTG production will bring to the Idaho Fall's facility INEEL.</p> <p>Space vessel launches create additional pollution in the form of hydrazine and perchlorate. In California alone, two major rivers, the American and the Colorado, have been contaminated by rocket chemical materials, and vegetable fields as well as cow's milk have become contaminated with rocket chemical byproducts. The issue therefore, is not just radioactive toxic materials, but other chemical toxic materials as well. Every area hosting rocket and missile launches endure toxic problems, and Florida's Cape Canaveral is no exception.</p> <p>Finally, the space missions rob Earth planetary citizens of basic needs. The vast majority of Earth's citizens are so poor that even clean water and food are out of reach. The homeless population of our planet are increasing due to wars and theft of resources by NASA, DOE, DOD and aerospace corporations. The transfer of Earth's money to space is grossly unfair.</p> <p>Please drop this project.</p> <p>Thank you and Sincerely,</p>	<p>E81-1) NASA and DOE do not simply "view" the proposed New Horizons mission as safe, but take very seriously the possibility that an action they take could result in human fatalities or harm to the environment. NASA and DOE have conducted rigorous and detailed analyses and safety tests in support of the risk assessment presented in this EIS, and continue to conduct risk analyses in support of the Presidential launch approval process as specified in Presidential Directive/National Security Council Memorandum 25. Please also see responses to comments E1-1 and E12-1.</p> <p>E81-2) Please see response to comment E74-6.</p> <p>E81-3) Processing and launch of the New Horizons mission would follow all applicable procedures and requirements for hazardous materials handling (including propellants such as hydrazine), hazardous waste management, pollution prevention, and other aspects of environmental compliance at Kennedy Space Center and Cape Canaveral Air Force Station; please see Sections 4.1.1 and 4.8 of this EIS for more information. Exhaust emissions from the Atlas V 551 would consist primarily of water vapor, carbon dioxide, oxides of nitrogen, aluminum oxide particulates, and hydrogen chloride. These combustion products are typical for all expendable launch vehicles of this type, and have been shown to not create long-term adverse impacts; see Sections 4.1.2 and 4.1.3 of this EIS for more information. Perchlorate contamination could only occur as a result of unburned solid propellant following an unlikely launch</p>

Submission Number	Comment Submission	Responses to Comments
	Sheila Baker	accident. However, pieces falling on land or in fresh water areas would be collected and properly disposed as hazardous waste. E81-4) Please see response to comment E74-9.
E82	<p>From: Chuck Broscious [REDACTED]</p> <p>Sent: Tuesday, April 12, 2005 12:15 AM</p> <p>To: osspluto@hq.nasa.gov</p> <p>Cc: Global Network</p> <p>Subject: FW: COMMENTS ON SPACE NUKES MISSION</p> <p>On behalf of the Environmental Defense Institute, Inc. we concur with the below comments previously submitted by Global Network Against Weapons.</p> <p>Chuck Broscious Executive Director Environmental Defense Institute P.O. Box 220 Troy, Idaho, 83871 [REDACTED]</p> <p>(The remainder of Mr. Broscious' message repeats the text of the message in submission E74.)</p>	Thank you for your comments. Please see responses to submission E74.
E83	<p>Date: Sun, 10 Apr 2005 22:07:47 -0400 (GMT-04:00)</p> <p>From: mary beth <[REDACTED]></p> <p>To: osspluto@hq.nasa.gov</p> <p>Subject: Comments on Draft EIS for New Horizons Mission</p> <p>April 10, 2005</p> <p>Kurt Lindstrom Program Executive</p>	

Submission Number	Comment Submission	Responses to Comments
E83-1	<p>Mission and Systems Management Division Science Mission Directorate NASA Headquarters Washington, D.C. 20546-001</p> <p>To Whom It May Concern:</p> <p>I am no scientist. I currently work in the field of early intervention – providing for services to infants, toddlers, and preschoolers who show developmental delays. In this “day job,” I am to wonder why the significant increases with children diagnosed with asthma, autism, hyperactivity, attention deficit disorder, to name a few. I confess that I often wonder about what might be in the air, water, and food our children take in that is affecting development.</p> <p>As a volunteer, I work with likeminded individuals to exercise democracy. I pay very close attention to the political process, and to the impact of political decisions on the world around me. Thus, I am aware of the recent report on the crumbling infrastructure in America, and of the recent poll that shows the American people’s budget priorities vary dramatically from that reflected in the President’s budget.</p> <p>Thus, the following comments reflect that of a citizen concerned about democracy as it is practiced in the United States today, and concerned for the children of today, and seven generations into the future.</p> <p>The draft EIS for the New Horizons Mission raises the following issues for me:</p> <p>1. Page B-6 notes that, in the event of plutonium ingestion, absorption estimates are based on “the average individual.” Without clear definition, I assume that means healthy white men. A more important analysis would</p>	<p>Thank you for your comments.</p> <p>E83-1) Please see response to comment E74-9.</p>

Submission Number	Comment Submission	Responses to Comments
E83-2	<p>base its estimates on the impact on a pregnant woman, a toddler, a young child, or the elderly. Thus, my question is: why focus estimates on what the healthiest in the population can absorb, rather than those who are the most vulnerable? Where is the evidence that pregnant women and children would not be harmed?</p>	<p>E83-2) By utilizing the health effects estimators developed by the International Commission on Radiation Protection (ICRP), NASA and DOE have included all members of the potentially exposed population in estimating the consequences of a potential accident involving the release of plutonium dioxide. The increased sensitivity of women, fetuses, and infants to low level radiation with respect to detrimental effects (fatal cancers, non-fatal cancers, and severe hereditary effects) are addressed in ICRP 1990. The average individual dose is an aggregate over all age groups, and therefore does not represent any one group or gender.</p>
E83-3	<p>2. Table 2-5 on page 2-34 looks at calculated individual risk by various causes. Although there are exceptions, most of the accident types are not subsidized by taxpayer dollars. (Exceptions include the transportation items - railways; water, air, and space transportation; some work injuries would likely be in government jobs.) But in each case, the individual makes a choice to participate in the activity that results in a tragic accident. In the case of the New Horizons mission, the people of Florida, of Africa, or in the worst-case scenario the earth's population have no say in plutonium exposure - and whether or not they think the science is worth the risk.</p>	<p>E83-3) Many people view voluntary and involuntary risk differently. Table 2-5 of this EIS only provides a perspective on average individual risks.</p>
E83-4	<p>3. On the same topic, I'm also curious about interpreting individual risk as "probability of an individual in the exposed population incurring a fatal cancer." I'm not aware of any public government studies of the long-term health impacts of the previous plutonium accidents that occurred in the earth's atmosphere - whether they were American or Russian probes. Please provide documentation of previous studies on this matter.</p>	<p>E83-4) The National Environmental Policy Act (NEPA) provides the framework, through this EIS, by which the public can comment on NASA's proposed New Horizons mission. In addition, NASA conducted public meetings on the DEIS in the Cape Canaveral, Florida area. Please also see responses to comments E2-1 and E4-1 and submission E42.</p>
E83-5	<p>4. Table 4-5 on page 4-33 looks at potential land decontamination cost factors. It notes the cost per kilometer of farmlands, rangelands, forests, and mixed-use urban areas. Text notes that these cost factors include the possibility of land acquisitions, off site waste disposal (although doesn't tell us where the contamination will be stored), site restoration and final surveys of radiated sites. The dollar calculations do not/cannot</p>	<p>E83-5) Section 4.1.4.8 of this EIS indicates that since the health effects resulting from a release are equal to the sum of the probability of a health effect for each individual in the exposed population, risk can also be expressed as the total probability of one health effect given the mission.</p>
E83-6	<p>4. Table 4-5 on page 4-33 looks at potential land decontamination cost factors. It notes the cost per kilometer of farmlands, rangelands, forests, and mixed-use urban areas. Text notes that these cost factors include the possibility of land acquisitions, off site waste disposal (although doesn't tell us where the contamination will be stored), site restoration and final surveys of radiated sites. The dollar calculations do not/cannot</p>	<p>E83-6) Only one such accident is known to</p>

Submission Number	Comment Submission	Responses to Comments
<p>E83-7</p> <p>E83-8</p> <p>E83-9</p> <p>E83-10</p>	<p>factor in the human costs of the disaster – costs in the form of communities lost, and the emotional stress of people losing all they have. The idea that the price-Anderson Act could reimburse property-owners as a sufficient remedy is ludicrous. Also, I understood that the Price Anderson Act severely limits the liability paid out in foreign countries when the damage is done elsewhere. Please comment on the Price Anderson Act and whether there would be limits on liability claims for African nations if there were to be a problem of radiation exposure or contamination on that continent and the United States.</p> <p>5. DEIS offers two alternatives: the mission carrying RTPs, or no mission at all. The GPHS –RTG was identified as the only feasible system capable to power the mission. The ESA is developing solar technology for use in deep space missions. Please provide indication of NASA’s budget on research and development for solar power use on deep space missions, as compared with NASA and DOE’s budgets to develop RTGs and other nuclear technology for space exploration.</p> <p>I oppose the use of plutonium for space exploration. It’s hard for me to believe that the nation that put a man on the moon on an impossible time schedule cannot, given the funding and the priority mandate, find alternatives to nuclear power for space exploration. I believe in the ingenuity of the motivated scientists at NASA. Give them the mandate, the money, and the time, and it will be done.</p> <p>I look forward to your response.</p> <p>Sincerely,</p> <p>Mary Beth Sullivan </p>	<p>have resulted in a release of plutonium to the atmosphere. That was reentry of the SNAP-9A RTG in April 1964 (see Table 2-2 of this EIS) during which 17,000 curies (Ci) of plutonium-238 was released, consistent with the design philosophy at the time (see Section 3.2.5.2 of this EIS). Compared to the 440,000 Ci of plutonium released by aboveground nuclear weapons tests between 1945 and 1974, and the approximately 100,000 Ci of various radioisotopes released by the Chernobyl accident in 1986, the SNAP 9-A release represents a relatively minor contributor to worldwide levels of radiation exposure.</p> <p>A perspective regarding radiation exposure of the global population can be gained from United Nations reports on the Sources and Effects of Ionizing Radiation prepared by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). The 2000 UNSCEAR report to the U.N. General Assembly is available at http://www.unscear.org/. This report indicates that while atmospheric testing of nuclear weapons is considered the largest human-derived contributor, by far the largest contributor to radiation exposure of the global population is natural background radiation by a factor of almost 500.</p> <p>E83-7) Under the Price-Anderson Act (PAA) the current limit on liability is about \$9.5 billion. Explicit language in the PAA (42 U.S.C 2210) requires Congress to consider further compensation if industry and Federal government liability is exceeded. Included are nuclear incidents outside the United States if</p>

Submission Number	Comment Submission	Responses to Comments
	Brunswick, Maine 04011	<p>the nuclear material involved is owned by the United States. In addition, see responses to comments E74-10 and E83-8 below.</p> <p>E83-8) The Outer Space Treaty of 1967 and the Liability Convention of 1972 establish the ground rules regarding responsibility for accidents involving space objects, launch vehicles, and their component parts. They place liability firmly upon States whose launch of objects causes harm to the property or persons of another nation. Liability claims for any accident of a space object originating from the United States that affects another nation would be handled by the U.S. State Department.</p> <p>E83-9) Please see response to comment E32-3.</p> <p>E83-10) Please see response to comment E74-2.</p>
E84	<p>Date: Sat, 09 Apr 2005 07:02:34 -0400 From: Mary Van Valin <[REDACTED]> To: osspluto@hq.nasa.gov Subject: Nuclear power in space</p> <p>To whom it may concern, I would like to be put on record as very much opposed to putting nuclear power into space. The magnitude of the potential harm is far too great to risk. We have so many needed projects right here on our home planet to energize and fund; such as, alternate energy for heat and electric power, new designs for powering automobiles, non-polluting options for industries. These have far more potential to promote lasting peace than nuclear power in space. Sincerely, Mary Van Valin</p>	<p>Thank you for your comments. Please see responses to comments E1-1, E3-1, and E74-9.</p>
E85	Date: Wed, 06 Apr 2005 09:49:09 +0900	

Submission Number	Comment Submission	Responses to Comments
	<p>To: osspluto@hq.nasa.gov From: Mitsuo Okamoto <[REDACTED]> Subject: Opposition to nuclearization of space. Cc: [REDACTED]</p> <p>Dear Americans,</p> <p>We, the citizens of Hiroshima including hibakusha, the survivors of the Atomic Holocaust 60 years ago, oppose strongly the exploitation of space for military purpose and its nuclearization.</p> <p>The danger is too great to ignore and Americans with their posterity are not immune from such an unprecedented danger. Awake, and get rid of nuclear weapons and everything nuclear!</p> <p>Mitsuo Okamoto, Ph.D. Representing The Hiroshima Alliance for Nuclear Weapons Abolition (HANWA)</p>	<p>Thank you for your comments. The New Horizons mission is for peaceful scientific purposes.</p>
<p>E86</p> <p>E86-1</p> <p>E86-2</p> <p>E86-3</p>	<p>From: [REDACTED] Date: Wed, 6 Apr 2005 10:44:12 EDT Subject: No Plutonium in space - Stop the New Horizons Mission To: osspluto@hq.nasa.gov CC: [REDACTED]</p> <p>To Whom it may Concern:</p> <p>Please enter my written comments into the official records before April 11, 2005. It has come to my attention that NASA is planning to launch the New Horizons Mission from Florida in Jan. or Feb. 2006. It's my understanding that this mission will use plutonium on board as a power source. What I do not understand is why a 10-20% launch failure rate from Florida is not being considered? And, Russia had an accident in 1996 when a Mars mission failed to achieve proper orbit and burned up as it reentered Earth's orbit spreading deadly plutonium over the mountains of Chile. What can possible justify such a deadly scenario where severe health consequences are spread globally?</p>	<p>Thank you for your comments.</p> <p>E86-1) Please see response to comment E5-1.</p> <p>E86-2) There is no indication that any of the plutonium contained in the radioisotope heat sources used on the Russian Mars-96 mission</p>

Submission Number	Comment Submission	Responses to Comments
	<p>Please reconsider the New Horizons Mission and stop this accident before it happens.</p> <p>Sincerely, Lynda A. Hernandez [REDACTED] Huntington Beach, CA 92646 [REDACTED]</p>	<p>was released to the environment.</p> <p>E86-3) Please see Chapter 1 of this EIS regarding the purpose of the New Horizons mission, and also please see responses to comments E1-1, E3-1, and E5-2.</p>
E87	<p>From: "wayne rainy" <[REDACTED]> To: osspluto@hq.nasa.gov Subject: one mans opinion Date: Sat, 09 Apr 2005 15:32:38 +0000</p> <p>Please consider my opinion, I would like it very much if you would not risk launching rockets containing plutonium, i believe it is a dominantly negative enterprise when resources could be used for greater causes. Does everything need to be looked at as a market or a product?</p> <p>sincerely</p> <p>Wayne Rainy</p>	<p>Thank you for your comments. Please see response to comment E74-9.</p>
E88	<p>Date: Sun, 10 Apr 2005 17:02:09 -0400 Subject: PLEASE From: Emmy Lou <[REDACTED]> To: osspluto@hq.nasa.gov</p> <p>PLEASE! Save our space- please keep it free of Nuclear use, waste, errors, mistakes. And keep us safer- what we do- someone eventually will do even worse against us. Arming does not make us safer but more vulnerable. PLEASE!!!</p> <p>Thank you!! - Emmy Lou Cholak Traverse City, Michigan</p>	<p>Thank you for your comments. The New Horizons mission is for peaceful scientific purposes.</p>
E89	<p>Date: Sat, 09 Apr 2005 22:13:39 -0500 From: Margaret Maier <[REDACTED]></p>	

Submission Number	Comment Submission	Responses to Comments
	<p>preservation.</p> <p>Sincerely,</p> <p>Cindy Shapiro [REDACTED] Beulah, MI 49617</p>	
E91	<p>From: Steen Eiler Jørgensen<[REDACTED]> To: <osspluto@hq.nasa.gov> Subject: New Horizons Mission Date: Fri, 8 Apr 2005 11:31:01 +0200</p> <p>Mr. Lindstrom,</p> <p>Having reviewed the Draft Environmental Impact Statement, it is the sincere hope of the Danish Astronautical Society, that the Proposed Action will be followed. There are immense amounts of knowledge to be gained from planetary missions like the New Horizons Mission.</p> <p>Considering the very small probabilities for failure, it would be extraordinarily narrowminded to cancel a mission like this one because of worries that the RTG's might pose a hypothetical problem. The hysteria surrounding planetary missions involving RTG's is completely out of proportions. We certainly hope that NASA will choose to push on with the mission.</p> <p>If risk was unacceptable, we couldn't be exploring space. Considering the wealth of data returned by other RTG-powered missions like Cassini, Galileo, and the Pioneers and the Voyagers, it would be foolish to cancel the New Horizons Mission.</p> <p>On behalf of the Danish Astronautical Society,</p> <p>Steen Eiler Jorgensen Vice President</p>	<p>Thank you for your comments.</p>

Submission Number	Comment Submission	Responses to Comments
	Danish Astronautical Society www.spaceflight.dk	

Submission Number	Comment Submission	Responses to Comments
E92	<p>The following e-mail message has been submitted as a form letter by individuals and was generated from the following web site: http://www.progressivesecretary.org/letter.php?id=48</p> <p>From: (name of individual submitting comment; see list below) Sent: Monday, April 04, 2005 3:35 AM To: National Aeronautics and Space Administration Subject: NASA cancel New Horizons program</p> <p>Comment on EIS Statement</p> <p>I am disturbed to learn that the New Horizons mission to Pluto will carry a radioisotope thermoelectric generator (RTG) that transforms heat from decaying plutonium-238 into electricity to power the spacecraft's instruments.</p> <p>Nuclear fuels in space pose terrible dangers to life on earth in case of accident, and there have already been serious accidents.</p> <p>Please cancel the planned launch of New Horizons, and abandon your use of nuclear fuels in all space probes.</p> <p>Regards, (name of individual submitting comment; see list below)</p>	<p>Thank you for your comments.</p> <p>Please see responses to submissions E1, E3 and E12.</p>

The following individuals submitted the same electronic message with the same Subject line as Submission E83.

Sarah Rubin
 Cory Rogers
 Jessica Dee Baker
 Corwin Haught

Asa Dodsworth
 Mark M. Mattison
 Joy Cornett
 Mercedes Nunez

June Jaye Logie
 Judith Hallock
 Kathryn A. Freude
 Mauna Richardson

Tamara Colten Stevens
 Robert & Judith Provasoli
 Jim H. Head, Jr.
 Greta E. de Jong

Jennifer Douek
Norm Cohen
Rosa K. Soulier
Charlie Lord
Carol Moore
Susanna Bertgold
Bonnie D. Clark
Pamela S. Harders
Pierce R. Butler
Leslie Belt
Dr. Christopher Roman
Kate Nelson
Jennifer Branigan
Gary Moran
Sue Sheldon
Paul Jacobson
Joyce Hartsfield
Maurice Hicks, MS
Ellen Schwartz
Dana Raphael
David Hartsough
Timothy Johnston
Joyce Banzhaf
Shawn Dicken
Burnis E. Tuck
Bruce E. Cady, CEO
Jacqueline M. Freeman
Louis B. Guida
Rachel Foxx
Stephanie Phillips
Andrew M. Abian
Karen McAuley
Dr. John Neumaier and
Dr. Sara F. Luther
Martha Barclay
Mary Jo Tarasar
Patrick Mertens
Julie Sanford
William Franklin
Aileen Terra

Amber Lee
Jeremy Garrison
Carolyn Franklin
J. Millynn James
Larry Norton
Delphine Palkowski
Janet Carey
Carol-Ann Hey
Dieter Randolph
Tracy Joy Manaster
D. Narveson
Bonnie Summers
Marianne Edain
Jason Baker
William C. Hazlett
Alan Furchtenicht
Lisa Chipkin
W. Byron Kelly
Debbi Selbiger
Doris Diamond
Richard Brinton
Zarah Celeste Walker
Dr. Susan L. Taylor
Kathleen Boyd
Holly B. Green
Tammie Haugen
Gary Kehoe
Jean Bond-Slaughter
Marcia K. Rider
Karla Garcia
Katherine Salzman
Stacia M. Fleegal
Prof. Roberto Gautier
Chad M. Halsey
Patricia Roberts
B. Allan Ross
Torey Bookstein
G.M. Arnold
Elizabeth Anthony
Bette Stobaugh

Irna Gadd
George Robinson
Randy Hendrickson
Shirley A. Matulich
Bonno Bernard
Vincent McCogg
Margaret Wilbur
Laurie Bunker Grier
Terry Greiss
W. Arthur Raab
Molly Condo
Dr. Darrell Moen
Maureen Kane
Louis Philpott
A. Easy
James E. Ashburn, III
Patrice Titterington
Penny LaDeur
Candace Esslinger
Gail Brown
Rachel Clary
Denise Hanley
Alice Zillah
Margaret and Lou Grannis
Walter P. McClatchey, Jr.
Matthew Evinger
Russell Stevens
Darien De Lu
Sara M. García
Jonathan Kraeszig and
Cos Raimondi
Elizabeth Ruby
Katherine F. Buchanan
Byron and Mary Graves
William Stavisky
Kathy Galligan
Robin C. Moody
Ken Plants
A. Keiser
Annmarie Parmenter

Phil Denton
Marilyn Dinger
Dean Thompson
Eva Kataja, PhD
Fred Brown
Larry Maas
Jennifer Pike
Steve Kretzmann
Barbara E. Davis
Elizabeth Witt
Barbara Tolson Fields
Kay Dellinger
Karin Grobe
Daria Harrison
Diane M. Warth
Dana Bellweather
Barbara Pryor
Lisa Mackinney
James Hooper
Jesse Isaak-Ross
Lisa Finn
Kristen & Jens Eventyr
Christi Hatcher
Erik Ulman
William R. Masciarelli
Raymond Mangione, Jr.
Richard Hill
Patricia Powers
Deborah Dado
David Moritz
Amanda Rhoads
Harriet M. Ludwig
Linus Hart
Vita C. Shapiro
Stephen Greenberg
Bonita Hughes
James F. Olson
Jerome Garger
Gabiella Turek, PhD
Howard M. Evans

Michael J. Tomczyszyn
Mary L. Donnelly
Mike Sersch
Ruth C. Busch
Ben Thomas
Linda McVarish
Sophia de la Mar
Christine M. Hansen
Anna L. Messer
John V. Noel, III
Raymond N. Johnson
Sharon Tipton
Emily Antul
Norman Shelly
Rus Postel
Dianne Abshire
José M. Santos
Karin Landsberg
Marian Ronan
Paul Larned
Jim Dunn
Laurie A. Needham
Kurt K. Bigler
Linda Johnson-Rubick
Esther M. Ho
Dr. Terri Ginsberg
David Howenstein
Pamela S. Jiranek
Alan Young
Genie Uebelacker
W.H. Warrick III MD
Elizabeth Wills

Stacey Champion
Carolyn Wilkerson
L. James Frye
Janice C. Jochum
Nicholas Lubofsky
Krista Luoto
Mario Galvan
Erick McWayne
Jason Serinus
M.V. Conn
Dale Nesbitt
Aire Celeste Norell
Frank S. Sterrett
Elke Leinwand
James C. Sweeton
Jacqueline Bethune
B.J. Crawford
Glen Zorn
Loren Clift
Jean Patterson
Anthony Ehrlich
Ellen Chuse
Georgia Lee Pinkel
Tom Civiletti
John Morearty
Bernie Schatz
Marie Falbo
John R. Merritt
Jim Bearden
Jay & Sharon Stock
Mary Ratcliff
Eileen Ruski

Mandy Hampson
P. Dolan
Kathryn Vargas
Jan Boudart
Jane Welford
Diana Quinones
Sally Ferrell
Ethan Clauset
Billie Wolf
Cecile Dobelbower
Frayda Garfinkle
Erik Shelley
Katie Z. Farrar
William C. Capps, III
Larry L. Daigneault
Linda Sartor
James D. Martin
Marla Bottesch
Jared Laiti
Jan Fox
W. Tom Walls
John Gazurian
Kiva L. Williams
Robert Hupf
Israel David Fishman
Cheryl S. Isaacs
Stephanie Alise Lombardo
Arisa Victor
John Bruce Liles
Elizabeth Hegeman, PhD
John H. Creed
Dr. R.S. Rosen, OMD

Chris J. Everett
Neal Austin
Nina Falk
Jody Heatlie
Michal Pober
Joan M. MacIntyre
Mark Levy
Nancy Mikelsons
M. McConnell
Orla Nicholls
Stephanie Billecke
Adam Rabinowitz
Jeff Tollafield
James Sheldon
Jessie Ortiz
Kristina McLaughlin
Lincoln B. Justice
Nathaniel Hannon
Ray Dubuque
Shannon Dodge
Imre Bard
Virginia L. Senders
Spencer Lennard
Stuart MacIntyre
Ken Jopp
Carolyn Scarr

Submission Number	Comment Submission	Responses to Comments
E93	<p>The following e-mail message has been submitted as a form letter by individuals.</p> <p>From: (name of individual submitting comment; see list below) Sent: Monday, April 04, 2005 3:35 AM To: National Aeronautics and Space Administration Subject: NASA stop using nuclear fuels</p> <p>Comment on EIS Statement</p> <p>I am disturbed to learn that the New Horizons mission to Pluto will carry a radioisotope thermoelectric generator (RTG) that transforms heat from decaying plutonium-238 into electricity to power the spacecraft's instruments.</p> <p>Nuclear fuels in space pose terrible dangers to life on earth in case of accident, and there have already been serious accidents.</p> <p>Please cancel the planned launch of New Horizons, and abandon your use of nuclear fuels in all space probes.</p> <p>Sincerely, (name of individual submitting comment; see list below)</p>	<p>Thank you for your comments.</p> <p>Please see responses to submissions E1, E3 and E12.</p>

The following individuals submitted the same electronic message with the same Subject line as Submission E84.

Louise Chambers
 Gerry Tenney
 Karen Duda
 Michael John Mayo
 Gladys Schmitz

Chris Sanders
 Maggi Sullivan Godman
 Joan & Edward Ormondroyd
 Fitz J. Fleenor
 Morrissa Cherie

Nancy W. Kurtz
 Osiel E. Ruiz
 Victoria Woods
 Dan Bacher
 Alan Lott

R. English
 Paul Kesler
 Martha A. Dugan
 Sheila R. Blust
 Alice C. Swift

Doret Kollerer
 Yona Flemming
 Madeline Hartman, MSW
 Alice Wald
 Deborah Gayle Underwood
 Patrick A. Denevan
 Kris Mazure
 Martine Joseph
 Phil Runkel
 David Cayford
 Jeff Staples
 Wythe W. Holt, Jr.
 T. Cho
 Aajonus Vonderplanitz
 Erica Frank, MD, MPH
 Daniela Gundling
 Jason Drummer
 Jimmy Lawrence Sperling
 Doug Sembla
 Karen White, LMSW
 Mark E. Mauren
 Melanie Coerver
 Russ Wellen
 Elaine Matthew
 Dr. Mha Atma S. Khalsa
 Mary Gallagher
 Ann Mari Spector
 Mandy Spitzer
 Bill Evans
 Alcia Knigge
 Betty Bazur
 Herb Bazur
 Teri Middleton
 Ruah Swennerfelt
 Alda M. Tavares
 Robert Bennett
 Kristy A. Bryant-Berg
 Stuart Tanner
 Tim Zorach
 Eric Berrger

Florence Weintraub
 Julia Tucker
 Julia Eve Hennessy
 Donald Power
 James Boettner
 Glenn (last name not given)
 Jody Terry
 Ann Jones
 Christopher Allwein
 Scharl Stewart
 Keren Batiyov
 Ruth van Veenendaal
 Marie Wilson Nelson
 Eugene Ortiz
 Pamela Haengel
 Rebecca S. Mosher
 Jonathan Osmond
 Michael Law
 Pat O'Brien
 Alycia (last name not given)
 Elizabeth Payne
 Nathan Bahn
 Roberta E. Richardson
 Gwen good-Price
 Sandra Assasnik
 Katherine M. Patrick
 Naomi Schneider
 Sharon Boone
 Bronnie Meadows
 Andy McAvin
 Emiene Tardzer
 Linda Piera-Avila
 Nici Edwards
 Dr. Kani L. Nicolls
 Elizabeth M. Engelhardt
 Trisha M. Rhoades
 Fran Divine
 Maggie Hunter
 David Banga
 Lucy W. Sells

Jennifer M. Weishaar
 David A. Lambert
 David M. Quintana
 Eric Cole
 Celia Bucci
 Kathleen Ruggiero
 Matt Hulstrunk
 Constance Tennant
 Anna Reycraft
 Richard B. Wilcox
 Alden S. Waitt
 Thomas A. Warner, MFT
 Rebecca S. Bailey
 April Brumson
 Ted Lewis
 Kirstin M. Summers
 Barbara A. Porter
 Murugan Pandian
 George Lloyd
 Surya-Patricia Lane Hood
 Sandra J. Barton, MD
 David P. Farkas
 Charles Alvarez
 Joshua Bernstein
 Bill Verdier
 John W. Covey
 George Caneda
 Nicholas Braden
 Mark Reback
 Barbara Lightner
 Janice Rael
 Laura Vaidya
 Robert W. Schultz
 Darla Anelli
 Samia El-Moslimany
 Stephen Pew
 William Parker
 Helena O'Reilly
 Senanu Pearson
 Janet M. Beardsley

Dr. Richard Wahl
 Miriam Bauerlin, OSF
 Marthe Keller
 Kerry Hart
 Shirley Crenshaw
 Sydney Gurewitz Clemens,
 MA
 Esther Roberts
 Karen Lind
 Blake Nicholoff
 Lorena Gaibor
 Suzanne Rauer
 Christine Lorenz
 M.E. Randall
 Beverly Conway
 Catherine Levine
 Patricia A. Fogg
 David Dick
 Louis Kranz
 Allen V. Thomsen
 Blaine Stanton
 Barbara J. Spiegelberg
 Gwen Foss
 Doyle Warren
 Carol Page
 Anne D. Dunlap
 Jan W. Elders
 Gessika Rovario-Cole
 Florence Windfall
 Margaret Flowers
 Dr. Kevin E. Conn
 Rita Bogolub
 Kathy Dorn
 Michelle Morgan
 Alexandra and Susan Brown
 Leslie Lakind, DDS
 Michrel L. Standefer
 Kate Bernard
 Thomas E. O'Grady
 Christine Aquilino

Debbie Riches
Marjorie A. Schubert
Paul Schaeffer
Fernando Pontoriero
Jon Moe
Donald E. Carey
Michael J. Kolibaba
Greg Kimber
Norah Renken
Charles M. McLean, Jr.
Lori Salomon
Joseph Shulman
Myra Kelly
Lynn Hoefgen
Edward R. Waxman
Dorn Hetzel
Stephen Wishart
Lisa J. Rademacher
Nancy Salwen
Barbara Horning
Bob Runyan
Richard Hardack
Leslie Cerier
Eric R. Stietzel
Beverly Scaff
Jani McCormick
Sarah Lanzman
Carole January Erickson,
PHN
Arthur W. Shores, Jr.
Enrique Santos
Nand Lal Johari

Susan Tereba
Daniel Benedict and Kelly
Murphy
Peggy Seeger
Judith Looby
Barbara T. Russum
Marcia Ziccardy
Brenda Loew
Patti Moore
Edward Dunar
David Dorinson
Gary L. Spicer
Dr. Timothy D. Taylor
Barbara Collins
Heather Burns
Robert W. Hemighaus, Jr.
Jim Levey
James M. Nordlund
Jean Basinger
M. Teresa Walsh
Jeanine Jackson
Rosemary E. Howley
Marie Glennon
Kevin M. Bayhouse
Marcus C. Hansen
Virginia Gilmore
Linda Brunner
Lynn Houston
Janice Norberg
Peter Smith
Meredith Garmon
Norma J.F. Harrison

Peter Manon
Monnie Reba Efross
Linda A. Ballantine
Rev. Dr. Diane
Christopherson
Starlene Rankin
Bernice Turnoff
M.S. Adams
Brent Buell
Thomas V. Connor
Julie Winsberg
Erick Brownstein
Patricia St. Onge
Brenda Champney
Jean Gore
Bob Thomashevsky
Christina Solinas
Lloyd Greenwell
Ed Mays
Gabrielle Welford, PhD
Eric E. Conn
Anna Ghonim
Cheshire Frager
Ronnie Dadone
Jill Colgin
Amber Coverdale Sumrall
Rita Jongen, SSJ
Lyn Wall
William Shelley
Kevin R. Spidel
Mary Burke
Claire Perrault

Douglas C. Estes
Judi Poulson
Bob Nichols
Douglas McNeill
Jerome A. Carpenter
Margaret Richards
Lee Gibson
Richard B. Holland
Christopher Michaels
Donna Smith-Remick
Barry Cutler
Sally Peck
Patricia H. Rain
Char Carroll
Shawn Porter
David Roth
Mike Gifford
Dianne L. Tongco
Carol Liu
Jackie Disalvo
Jeanie Keltner
William R. Heck
Amy Beth Biven
Penn Valley
Eric Hoffman
Andrew McKenna
Meg Beeler
Fred Hirsch
Paul Tifford
David Horvath

Submission Number	Comment Submission	Responses to Comments
E94	<p>The following e-mail message has been submitted as a form letter by individuals.</p> <p>From: (name of individual submitting comment; see list below) Sent: Monday, April 04, 2005 3:35 AM To: National Aeronautics and Space Administration Subject: No plutonium in space probes</p> <p>Comment on EIS Statement</p> <p>I am disturbed to learn that the New Horizons mission to Pluto will carry a radioisotope thermoelectric generator (RTG) that transforms heat from decaying plutonium-238 into electricity to power the spacecraft's instruments.</p> <p>Nuclear fuels in space pose terrible dangers to life on earth in case of accident, and there have already been serious accidents.</p> <p>Please cancel the planned launch of New Horizons, and abandon your use of nuclear fuels in all space probes.</p> <p>Sincerely, (name of individual submitting comment; see list below)</p>	<p>Thank you for your comments.</p> <p>Please see responses to submissions E1, E3 and E12.</p>

The following individuals submitted the same electronic message with the same Subject line as Submission E85.

Sarah Elizabeth Dillon
 Aidea Sluyter
 Alison Hade
 Ellen N. Duell
 Judith O'Connor

Margaret Johnson-Stukey
 Ruth Grunberg
 Debby Bolen
 Stephanie Bahr
 Ross G.R. Pili

Paul Troyano
 Carol Fox
 Kristen Zehner
 Evalyn F. Segal, PhD
 Cheryl L. Hood

John DiModica
 Jon R. Dougal
 Rebecca Lord
 Marjorie N. Edguer
 Nyla Jabousek

Lisa Kirschman
Neena McNair
Heidi C. Bara
Marjorie Visher
Kate Sky
Stacie Leech
Pat and Al McLaine
Paula Kamps
Stephanie Hammett
Dr. Corey Lewis
Anonymous
Michele Benderra
Alice Powell, PhD
Rula Borelli
Kaj Dorstenia
Barry Kapke
L. Wayne Bennett
William Holley, Jr.
Karen Ehrlich
Marcia Mason
Mimi Plevin-Foust
Christian Kurtz
J.D. Kotria-Chipps
Charles D. Smith
Donald L. Bruestle
Mary Ann Hilgeman, CSJ
Clyde Ussery
Clifton Buck-Kauffman
Ray Berthiaume
Tracy O'Connell
Phyllis Sladek
Susan L.D. Shamblin
Carolyn Schmidt
Erica Fox
Clove Tsindle
Brandelle Manini
Jaime Winn
Michael Wilson
Mano Marks
Michele Mieloch

Patricia Nagy
Kate Chittenden
Monica Nolan
Adrienne Diaz
Sarah Perrault
Alan Dakak
Teresa Ponikvar
Tyler Layne
Joanne Nagy
Sonni Quick-Standefer
Ruth Black
Judith L. Poxon
Ken Erickson
Terry Stone
Jean Keller
Joni Handley
Gordon Freeman
Paul L. Donoho, PhD
Clifford B. Pearson
Juliana (last name not given)
D.L. Ellenburg
Margaret Weimer
Melissa Ann Herman
Martha B. Kaplan
Lawrence J. Nader
Fred Dodsworth
Sabrina Choi
Bob Helm
Anne Sussman
John Bernard
Kathy Mosher
Erin Chianese
Lika Smith
Jeffrey Sturm
Neil Altman
Dinda Evans
Shirlene Bauer-Maheia
Nicki Godwin
Steven Tobin
Erica D. Burdett

Melissa Weiss
Jefferey T.S. Farrell
Alice Dorsey
Anne Bancroft
Adam Wolman
Jens M. Krummel
William T. Cowan, Jr.
Phillip C. Woolery
Craig Tower
James Moore
Bob Sheak
Jacqueline Frank
Jeanne Sears, MS, RN
Tom Burns
Julien Puzey
Steven D. Hohensee
Catherine O'Reilly
Sasha Pollack
B.B. Moser
Sharon Dube
Zora L. Kolkey
John A. Hammond
Ellen Hobbs
James A. Halbig
Clara M. Sinclair
Marilyn Tyszka
David Lisle
Deborah A. Webber
Marilyn Hayes
Lois White
Marlene Bundy
Miriam Dyak
E. Victor Mereski
Nathan Parker
Meredith L. Kenyon, LICSW
Glen Anderson
Joan K. Williamson
Robert K. Hughes
Anna Jacus
John and Helen Zunes

Eileen Dennis
Susan Kennedy
Robert Behrens
Dick Stephens
Pam Allee
Robert Hoglate
Rees Acheson
Marv Kaminsky
Deborah E. Browne
Sasha Mitchell
Frederick J. Koster
Sally Brant
Maria Zervos
Nancy Graham
Rachel Klein
Erika Stewart
William & Sue Harrison
Alan H. Coverstone
Kathryn Runyan
Vincent L. Guarisco
Linda G. Wilscom
Ginny Schneider
John H. St. John
Larry Forsberg
Eileen Rodan
Dale D. Curcio
Robert Spotswood
Nicole Willey
Linda Estrin
Grant Silverstein
Nancy Zimmermann
Matt Hicks
Eric Emerson
Ann N. Gleason
Jessica Rivera
Heather Moss
David Way
Richard J. Macklin
Ean Murphy
Michael De Sha Donaldson

Peter Grant
Casey Certis-Milby
David J. LeBlanc
Richard A. Egan
Anonymous
John Arteaga
Stana Weisburd
Mary Devevan
Ralph & Ellen Greenwood
Kathryn A. Holt
Brian J. Lutenegger
Barbara Silverstein
Judy Lightstone
Judith R. Neel
Patricia Eakins
Lawrence J. Kessenich
Richard L. Hawley
Adrienne Lauby
Jodi Ross
Jeanne Liechty
Howard A. Pellett
Melissa K. Benham
Jean Dichter
Shelly Bathe Lenn

Sara J. Totonchi
Joan Covici
Iris Freeland
Ken Hayes
Jean Patterson
Bert Davis
Robert Harry Rovin
Karen Abrams
Vicki Cohn Pollard
Neal Kellner
Susan G. Shannon
Keiko Kubo
Charles M. Hancock
Patti Bossert
Greg Wingard
D'Cady Sarachild
Anne Statton
Valarie Liveoak
Jennifer Hoyt
Susan Steffens
Marianne U. Widmalm
Ernie Goitein
Geoffrey Paterson
Jedediah Burkey

Kathleen Halbert
Kristen L. Bunting
Barri Yanowitz
Rhonda Rudd
Dr. Karl vonWerther
Karen Shelley
Michael Friedman
Beth Ribet
Laurie Manis
Peggy Javellana
John Weber
Meredith Weiss
Joyce Hart
Bruce A. Wald
Barbara Hinde
Casey Welch
Judith A. May
Amy S. Williams
Joani Blank
Thomas J. Windberg
Kathleen Kaeding Turner
Jack Zylman
Margie Davis
Nickie Phillips

Keith Carlson
David B. Minert
Lori Barg
Free Polazzo
Cory Zuckerman
Ramona J. McNabb
Greg Nigh
Mary M. Dean
Craig Clark
Michael J. Dunkley
Prof. Robin Lorentzen
Chris Willemin
Magaret Sweeney
John Breen
Emmett J. Murphy
Victoria (last name not given)
Patria Brown

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APPENDIX E
PUBLIC REVIEW AND COMMENT MEETINGS

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APPENDIX E

PUBLIC REVIEW AND COMMENT MEETINGS

NASA published a Notice of Availability (NOA) of the Draft Environmental Impact Statement (DEIS) for the New Horizons Mission in the *Federal Register* on February 25, 2005 (70 FR 9388). The U.S. Environmental Protection Agency published its NOA for the DEIS in the *Federal Register* on February 25, 2005 (70 FR 9306). The public review and comment period closed on April 11, 2005. During this period NASA held two public comment meetings on March 29 and 30, 2005. The meetings were held at the Florida Solar Energy Center in Cocoa, Florida, beginning at 6 p.m. EST on March 29 and at 1 p.m. EST on March 30. This appendix provides a summary of the meetings, including an excerpt of the official transcript of the March 30 meeting, during which members of the public raised questions and offered comments (no questions were raised and no oral comments were offered during the March 29 meeting).

NASA placed paid advertisements announcing the dates, times, and purpose of the public meetings in the *Orlando Sentinel* and *Vero Beach Press Journal* on March 11, and in *Florida Today* and the *Daytona Beach News-Journal* on March 14, together with the full text of NASA's NOA in the legal notices section of each newspaper. The advertisements appeared a second time on March 24 in each newspaper.

Members of the public attending either meeting were asked to register their attendance at the meeting. However, registration was not a requirement for anyone wishing to present either oral or written comments. Three members of the public registered for the March 29 meeting and five registered for the March 30 meeting.

Each meeting began with the opportunity for members of the public to hold informal discussions with representatives from NASA and the U.S. Department of Energy (DOE) in an open house format. These sessions included displays and printed material regarding the proposed New Horizons mission and the process under which NASA is complying with the National Environmental Policy Act (NEPA).

Each open house session was immediately followed by a town hall session, during which NASA representatives gave brief presentations followed by a period during which members of the public were invited to provide oral comments. While written comments could be presented to NASA at anytime during the meetings, none were submitted during either meeting.

Each town hall session was moderated by an independent facilitator who made opening remarks summarizing the intent and format of the meeting and then introduced each of the NASA representatives making presentations. All oral presentations and discussions were recorded by a certified court reporter during each town hall session. The NASA representatives and the topics of their presentations were as follows.

- Mr. Kurt Lindstrom, New Horizons Program Executive, NASA Headquarters
 - Overview of the New Horizons Program

- Dr. Hal Weaver, New Horizons Project Scientist, Applied Physics Laboratory
 - Overview of the New Horizons Science Objectives
- Mr. Glen Fountain, New Horizons Project Manager, Applied Physics Laboratory
 - Overview of the New Horizons Mission
- Mr. Kenneth Kumor, NASA NEPA Coordinator, NASA Headquarters
 - Overview of the NEPA Process
- Mr. Kurt Lindstrom, New Horizons Program Executive, NASA Headquarters
 - Overview of the New Horizons DEIS

The remainder of this appendix presents an excerpt of the official transcript taken by the court reporter during the town hall session of the March 30, 2005, meeting. Page and line numbers embedded in the transcript are shown on the left. This portion of the transcript includes all questions raised and comments offered by members of the public in attendance as well as NASA's responses. In addition to the NASA representatives listed above, the other individuals identified by name in the transcript are Mr. Ridenour, the session moderator, Mr. Tatro, a member of the audience, and Mr. Lugo and Mr. Scott, NASA representatives.

7 MR. RIDENOUR: Good presentation. A lot of
8 rich language there for someone who is a
9 non-engineer; rich in robust language. I can
10 just see James Earl Jones with a deep voice,
11 "Launch to deep space to invade the Kuiper Belt
12 in search of the icy dwarfs and the mysterious
13 shadow of Charon." Very good.

14 What I would like to do first is take any
15 questions that relate to clarifications of the
16 presentation of the panel. We will get into
17 comments right after that, but we want to take
18 advantage of the fact that we have these
19 individuals here.

20 So, if you saw anything either up here or in
21 the presentation that you would like a
22 clarification on, just raise a hand, and I'll
23 recognize you.

24 Seeing none, let's move into the formal
25 comment period. I have one person who signed up

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1 at the registration desk who indicated that they
2 wanted to provide oral comment, and that's Mr.
3 Charles Tatro. Are you here? Yes.

4 MR. TATRO: I'm here, but I don't have any
5 oral comments. I must have checked the wrong
6 box.

7 MR. RIDENOUR: Okay. You did. You checked
8 yes rather than no.

9 Let's open it up to anyone that has a
10 comment. Yes, sir.

11 UNIDENTIFIED SPEAKER: What's the total cost

12 of the project from the inception to the
13 conclusion in the year 2030, would be my first
14 question.

15 Second would be, what would be the cost up
16 to the point where NASA says for some reason it's
17 not safe to launch and the project is
18 disassembled, and what would happen at that
19 particular point?

20 MR. LINDSTROM: Total cost is just a little
21 bit below \$700 million roughly.

22 And I'm not really sure what the total value
23 is. That's actually something we probably have
24 to go calculate because it's somewhat complicated
25 with contracts and that kind of thing to answer

0043

1 that question correctly. So, I'd have to take
2 that back to give you a precise answer to that.

3 UNIDENTIFIED SPEAKER: Is the spacecraft
4 monitored for years while it's traveling?

5 MR. LINDSTROM: Actually, I'll let Glen talk
6 to you a little bit about the operations.

7 MR. FOUNTAIN: Yes, it is. We'll be
8 constantly monitoring during the first year. And
9 once we get beyond Jupiter, we'll be going
10 into -- we'll slowly wean ourselves of monitoring
11 that on a every-few-day basis. Then we'll
12 eventually go into hibernation mode in which we
13 will go in and interrogate it every once in a
14 while, but it will be basically asleep. And
15 we'll just see, it will say, I'm okay and we'll
16 leave it in that mode, and then do, once a year,
17 a thorough checkout of it as we go on. But it
18 will basically be at a state in which there will
19 not be hardly any activity at all. Then when we
20 get to Pluto, we'll then bring it back up, start
21 the set and measurements we talked about.

22 MR. RIDENOUR: Another question, comment?
23 Yes, sir.

24 UNIDENTIFIED SPEAKER: I'd like to address
25 the safety issue. The first speaker said that if

0044

1 the launch looked like it wasn't safe at all,
2 that it would be cancelled or postponed or
3 whatever. But I don't have a very good feeling
4 about that. I mean, when we started this
5 presentation, the microphone wasn't working, and
6 all these guys with Ph.D.s -- I am presuming you
7 have Ph.D.s -- just are not saying anything. I
8 mean, clearly that is a malfunction up there.
9 You are not saying anything. I think that's
10 clearly a big indicator what NASA's track record
11 on safety has been in the past.

12 Secondly, if the planet is evaporating at
13 445 square kilometers or whatever at, you know,
14 whatever that number was that was up on the
15 screen, why are we studying Pluto? I mean, if
16 it's bubbling away, or if it's -- I don't

17 understand why -- what the purpose of the mission
18 is. The planet is so far away, it's getting
19 ready to bubble away, what use is it going to be
20 to mankind?

21 And secondly, if we don't know that much
22 about Pluto, how can we say that, like, these
23 meteors are caused by, you know, other planetary
24 systems, you know, encroaching on this planetary
25 system? We can learn other information from a

0045

1 neighboring space. To me, it seems just as
2 logical to say that, you know, those meteors are
3 where, or as relevant as saying the meteors are
4 where the Klingons had a civil war or something,
5 and those are bomb imprints or something.

6 What's the relevance of something so far
7 away that's evaporating and the speculation of
8 what that is? I just don't see what the
9 long-term effect of this was.

10 I'm from Florida. I remember seeing the
11 first man on the moon mission in the air.
12 Everybody in our neighborhood was exited. They
13 were out in their yards, and people were thrilled
14 by that. But I just don't see where this is
15 going. That's my comment.

16 MR. RIDENOUR: Basically, your first issue
17 was safety.

18 UNIDENTIFIED SPEAKER: Right. Yeah.

19 MR. RIDENOUR: Anyone want to address that
20 issue?

21 MR. LINDSTROM: I think, just despite the
22 microphone, I have a good voice, I think. So --

23 UNIDENTIFIED SPEAKER: Everybody didn't say
24 anything.

25 MR. LINDSTROM: -- it is a very safe

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1 mission. And as I said before, there is multiple
2 reviews that go on in both the EIS process as
3 well as the nuclear safety process. There is a
4 lot of peer review, a lot of people involved who
5 are not part of the project. Multiple agencies
6 are looking at this. And to preclude that exact
7 problem, to make sure there is a lot of voices in
8 it, everybody gets heard. And in the end, we all
9 understand what the risks are, and are able to
10 make the crucial decision whether to move forward
11 or not, and ultimately that decision is the
12 President's.

13 MR. RIDENOUR: Hal, maybe you might talk a
14 little bit about the second.

15 MR. WEAVER: Maybe I didn't explain myself
16 very well. Pluto is not evaporating away. What
17 I was referring to was the seasonal effect. So,
18 if you imagine the sun being those lights over
19 there, and here's Pluto, and the rotational axis
20 is pointing like this, then there is a portion of
21 the planet that never goes to the sunlight. If

22 it's like this, you know, the rotation axis was
23 like this, then the whole planet gets to see the
24 sunlight. But if you are tilted like this, then
25 it doesn't.

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1 What happens is Pluto's rotational axis is

2 like this. As it goes around the sun, the
3 orientation somewhat changes. It's always the
4 same way in space, but the portion of the planet
5 that gets illuminated by sunlight changes from
6 the south to the north, just like it does on the
7 Earth. You know, about midnight the sun -- you
8 know, on the Earth in the arctic regions we are in
9 summertime, it's always in sunlight, the sun
10 never sets. It's just like that.

11 UNIDENTIFIED SPEAKER: You are saying that
12 our view is diminishing, but the planet itself is
13 solid.

14 MR. WEAVER: Yeah. There is 200,000 square
15 kilometers of area on Pluto's surface that goes

16 out of sunlight every year because of this --

17 UNIDENTIFIED SPEAKER: Does it come back?

18 MR. WEAVER: Eventually it does. As it goes
19 around this orbit, it comes back. As Glen was
20 saying, it takes 250 years almost. So, it takes
21 a really long time to go around that whole cycle.
22 One year on Pluto is 250 years. So, the planet
23 is still there.

24 And with regard to why is it relative to go
25 there. Well, this is the third zone of the solar

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1 system. Pluto, and Charon, and all the Kuiper
2 Belt objects, being that far away from the sun,
3 they really did preserve the original material
4 from which the solar system formed. That's
5 because it is so cold out there.

6 UNIDENTIFIED SPEAKER: Isn't that based on a
7 theory?

8 MR. WEAVER: No. We know from physical
9 principles how far away something is from the
10 sun. Pluto's temperature is only 40 degrees
11 above absolute zero. It's like minus 250 degrees
12 Celsius right now. Objects in the Kuiper Belt
13 are even colder than that.

14 UNIDENTIFIED SPEAKER: So, you're saying the
15 material from Pluto came from the same source as
16 the material from Earth, that formed the Earth?

17 MR. WEAVER: No. The Earth formed closer to
18 the sun, and it's more of a rocky object. But
19 the original material when the solar system first
20 formed -- this is, you know, theory about how the
21 solar system formed in the first place. We
22 started from a big cloud of gas and dust, slowly
23 rotating, a star formed at the center, which is
24 our sun, and then that material collapsed into a

25 disk. Within that disk you have the formations
0049
1 of planets, including the Earth near the sun, and
2 then farther out you have the formation of Pluto,
3 Charon, and the Kuiper Belt objects.

4 But the Kuiper Belt objects include --
5 because there is literally millions of these icy
6 objects out there, they actually, over the course
7 of the age of the solar system, collide with each
8 other and break up into smaller pieces. They get
9 their orbits changed. And some of them actually
10 get their orbits moved in towards the inner solar
11 system, and some of them go out and are ejected
12 from the solar system.

13 The ones that end up coming into the inner
14 solar system are called short-period comets. You
15 see those; they are among the prettiest objects
16 in the sky. The icy objects, as they come in and
17 get heated by the sunlight, they start to sublime
18 the ices from the surface, evaporate the ices
19 from the surface, pulling off little dust
20 particles, and you will see the comet tails.
21 That's really the clue those things are icy and
22 cold and came from somewhere else. Well, you can
23 tell from their orbits where they came from. And
24 actually, you'd never have an --

25 UNIDENTIFIED SPEAKER: If you have all this
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1 factual information about Pluto, why even go?
2 MR. WEAVER: You saw that Hubble image of
3 Pluto which, you know, if that's all you knew
4 about the moon, for example, if you had a
5 similarly bad image, there is just a whole wealth
6 of information that you gain by going there,
7 looking at it. And it's just putting together
8 the whole puzzle, you know. We're interested in
9 all the planets of the solar system and their
10 relationship to each other. It's part of
11 answering the big questions of where we came
12 from, where are we going.

13 MR. RIDENOUR: Other questions? Yes.

14 UNIDENTIFIED SPEAKER: My question pertains
15 to the back-up mission. I was wondering what
16 similarities are there between the back-up
17 vehicle and the primary vehicle, and what
18 capabilities do you have to change the mission of
19 the back-up vehicle with things learned from the
20 first mission?

21 MR. FOUNTAIN: Well, the back-up mission I
22 spoke to was with the same launch vehicle and the
23 same spacecraft. But that if we were not able to
24 launch the mission in 2006, there was an
25 opportunity to launch the same spacecraft, on the

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1 same launch vehicle a year later with arrivals at
2 Pluto in the very late part of the first
3 decade -- the second decade of this century.

4 UNIDENTIFIED SPEAKER: I see. So, there is
5 only one vehicle.

6 MR. FOUNTAIN: There is only one vehicle.
7 The only difference between -- I didn't point it
8 out, but on the craft, there was a difference of
9 the spacecraft mass of about 20 kilograms. That
10 would be to offload a certain amount of the
11 on-board hydrazine propellant. That's what we
12 use for the thrusters so we can orient the
13 spacecraft. We take about 20 kilograms off
14 because the amount of energy it takes to get to
15 Pluto in 2007 is even more than in 2006. And,
16 therefore, we have to reduce the total mass of
17 the payload a little bit to be able to get there.
18 That would be the only substantial change. And
19 that would mean that we have a little less margin
20 maneuvering the vehicle, and some smaller chance
21 of getting beyond Pluto out to the Kuiper Belt.

22 MR. RIDENOUR: Yes.

23 UNIDENTIFIED SPEAKER: Is there anyone among
24 you that can speak to the certainty of -- we are
25 going somewhere that we have never been before --

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1 that when we get there it will actually be able
2 to do what you want it to do, whether the
3 instruments will work?

4 MR. FOUNTAIN: There is a number of things
5 to say about our certainty. We spend time doing
6 a lot of work, being sure that the reliability of
7 all the parts that were going into the spacecraft
8 are very high reliability parts, and have a known
9 lifetime. We have past relevant experience. For
10 instance, the Voyager spacecrafts are still
11 operating. The RTGs aboard are still producing
12 power. We're still gathering data. There is one
13 instrument in the far reaches of the solar system
14 that's still gathering data after all of these
15 years. So, we have that kind of relevant
16 experience for this kind of a mission.

17 We spend a great deal of time analyzing the
18 design. We go through multiple design reviews,
19 not only to ensure safety, but to ensure that the
20 design is going to work properly. Then we go
21 into a test program. So that then we verify that
22 the as-built system will operate over the
23 environments we expect including the launch
24 environment.

25 UNIDENTIFIED SPEAKER: You do actual

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1 physical testing?

2 MR. FOUNTAIN: We do actual physical
3 testing. So, it is a set of experience over a
4 large number of years on similar missions, the
5 design and the work that goes into that, the
6 knowledge of the materials that go into it, and
7 the test program all combined to give us the high
8 sense of the reliability of the vehicle. And

9 high expectations are gathered with that.

10 MR. RIDENOUR: Other questions, comments?

11 Yes, ma'am.

12 UNIDENTIFIED SPEAKER: I was wondering, how
13 long is plutonium radioactive for? That's one
14 question.

15 And another is, if there were an accident at
16 the Cape, and there is a wind rift just above
17 Florida, what would happen to tourism in the
18 future? What would happen to -- as far as
19 effects to children or pets and house values and
20 resale, and that kind of thing? I mean, that may
21 not all be environmental, per se, but I am just
22 wondering what an environmental impact -- I am
23 trying -- maybe it is, you know, has that been
24 looked into. I guess after the hurricanes and
25 all this, you know, house values and everything

0054

1 has changed, and insurance problems. I'm just
2 wondering --

3 MR. LINDSTROM: I'll have Randy talk to that
4 second half, but I'll answer your first question.
5 The half life of plutonium is about 87 years.
6 So, half of its radioactivity goes down after 87
7 years.

8 I'll have Randy discuss -- Randy Scott from
9 KSC -- talk about potentially planning and the
10 contingency issues, the second part of your
11 question.

12 MR. SCOTT: Well, under the National
13 Response Plan, I think a little bit, as we talked
14 earlier, my charter as the coordinating agency
15 representative is to ensure that we have a
16 well-thought out, well-prepared multi-agency
17 response force that's capable of quickly
18 assessing the environment following the unlikely
19 event of an accident.

20 We have a radiological control center that
21 I'll be directing that will be orchestrating
22 pre-deployed field teams both on site and around
23 the county. In there we'll have people from the
24 Department of Energy, EPA, the State of Florida,
25 Brevard County. So, we are working very

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1 close-knit together with everyone to ensure that
2 we can assess the environment and make whatever
3 necessary precautions, recommendations, that
4 might be necessary for on-site people, and giving
5 guidance to the State, County, if there are any
6 possible areas that might be effected off site,
7 and from that be able to ensure that we have
8 timely information going out to the public to
9 ensure their well-being and safety.

10 MR. LINDSTROM: You mentioned one other
11 thing, and I don't have all the details, but we
12 might be able to get those details before the end
13 of the day. You talk about housing values and

14 things like that. There is an act, a law, it's
15 called the Price Anderson Act, which provides
16 for, in the case of absence of magnitudes, very
17 unlikely things in this instance, but it is in
18 place to address those kind of issues. It's kind
19 of like an insurance, I guess, insurance program.
20 So, that exists, and that's in place for those
21 kinds of instances.

22 We can talk about that later. We'll give
23 you more information if you'd like if you write
24 out a comment card.

25 MR. RIDENOUR: Any other comments or

0056

1 questions?

2 I suggest at this point that we take about a
3 half an hour, 15 minutes to a half an hour, let's
4 call it 15 minutes, for restroom breaks or
5 anything like that, and a little more informal
6 discussion out here, one-on-one, if you would
7 like. It might be a little easier for you; it
8 might be a little less awkward. Then we will
9 reconvene for any final last questions, comments.
10 We will reconvene back here at Tammy's call. At
11 that time, we will finish up with comments and
12 questions, and close the meeting.

13 So, let's take about 15 minutes. The
14 restrooms are out to the right.

15 (Whereupon, a short recess was taken.)

16 MR. RIDENOUR: If we can reconvene please.
17 Let's reconvene. And the purpose of reconvening
18 now is you may have thought of something, you may
19 have come up with a different slant that you
20 wanted to bring up a question about. This is the
21 time to do that. I would say speak now and
22 forever hold your peace, but that wouldn't be
23 true because you have all these options,
24 including hard copy mail, e-mail, and comment
25 forms all are still available to you. But recall

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1 that they must be postmarked by --

2 MR. KUMOR: April 11.

3 MR. RIDENOUR: -- April 11. So, the time
4 frame is growing short. Tomorrow is the 31st of
5 March.

6 So, this is your opportunity. Are there any
7 other questions or comments?

8 UNIDENTIFIED SPEAKER: I have a question.
9 Who ultimately has responsibility for the safe
10 watch of the vehicle? Is it NASA, or is it the
11 Air Force?

12 MR. LUGO: I can probably answer that one.
13 There is two things --

14 MR. RIDENOUR: Can you identify yourself?

15 MR. LUGO: With respect to the launch
16 vehicle, there are two pieces of it. NASA is the
17 ultimate government authority that will commit
18 the mission for launch. So, the launch of the

19 vehicle itself is a NASA decision.
20 However, the launch decision authority,
21 that's the Eastern Range Commander, Colonel Owen,
22 he has responsibility for public safety. So, you
23 need to go from both to vehicle launch. Does
24 that answer your question?

25 UNIDENTIFIED SPEAKER: I am just wondering,
0058

1 if they launch the missile and it starts heading
2 for my house over here on US1, who is going to
3 blow it up or stop it or --

4 MR. LUGO: The Air Force will blow up the
5 rocket.

6 UNIDENTIFIED SPEAKER: So, the Air Force has
7 the final responsibility on the rocket once it
8 leaves the ground. Okay. That's all I wanted to
9 know.

10 MR. RIDENOUR: Any other questions or
11 comments?

12 If not, I would like to thank you very much
13 for coming and bringing your comments.

14 I want to give a special thanks to the team
15 who worked hard to put this presentation
16 together. I thought it was very, very well done.

17 And again, recall that you have other
18 opportunities. And, Kurt, do you want to sort of
19 lay your blessing on the final comments?

20 MR. LINDSTROM: Yeah. On behalf of NASA,
21 I'd like to thank you all for coming out today.
22 I'd like to thank the Florida Solar Energy Center
23 for providing this space, let us do this. And we
24 look forward to continuing our process toward the
25 planned launch to Pluto on January 11. And

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1 hopefully, you will get to enjoy that event with
2 us. Thanks very much for coming.

3 MR. RIDENOUR: Thank you very much.

4 (Whereupon, these proceedings concluded at
5 this time.)
6