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Inspection
Service



Rule for the Importation of Mangoes (*Mangifera indica* L.) from India

Environmental Assessment, March 2007

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I. Need for This Action

The regulations in “Subpart-Fruits and Vegetables” (7 Code of Federal Regulations [hereinafter “CFR”] 319.56) prohibit or restrict the importation of fruits and vegetables into the United States from certain parts of the world in order to prevent the introduction and dissemination of plant pests that are new to or not widely distributed within the United States. Currently, the regulations do not provide for the importation of mangoes (*Mangifera indica* L., family Anacardiaceae) from India.

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service [“USDA APHIS”], is considering the amendment of its regulations to permit under certain conditions the importation of fresh, whole mangoes [“mangoes”] from India into the United States. This is in response to a request from the national plant protection organization [“NPPO”] of the Government of India to allow the importation of this fruit into the United States.

This environmental assessment has been prepared, consistent with USDA APHIS’ National Environmental Policy Act implementing procedures in 7 CFR 372 for the purpose of evaluating how various actions described in the following section, if implemented, may affect the quality of the human environment.¹

This document will be used to help determine whether or not to prepare an environmental impact statement that entails a more comprehensive study of the alternatives considered in this analysis. An environmental impact statement must be prepared if implementation of the rule may significantly affect the quality of the human environment.

II. Alternatives

This environmental assessment analyzes potential environmental consequences of amending the fruits and vegetables regulations to allow the importation of mangoes from India into the United States. Two alternatives are considered in this assessment: (1) no change in the current regulations, which do not allow the importation of mangoes from India into the United States [the “no action” alternative] and (2) amendment of the regulations to allow the importation of mangoes from India into the

¹ The term “human environment” is “interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment” (40 CFR 1508.14).

continental United States under certain conditions [the “preferred” alternative].

A. No Action

The no action alternative will leave the fruits and vegetables regulations unchanged. Mangoes from India will continue to be prohibited from importation into the United States.

B. Preferred Alternative

The rule under consideration will amend existing fruit and vegetable regulations in 7 CFR 319.56 for the purposes of allowing the importation of commercial shipments of mangoes from India into the continental United States [*i.e.* the 48 contiguous States and the State of Alaska]. The rule will also amend the table in 7 CFR 305 of the phytosanitary treatments regulations by amending the entry for India to include mangoes and designate irradiation as an approved treatment for the specific pests named in this document.

A pest list compiled by the USDA APHIS Center for Plant Health Science and Technology for mangoes from India identifies twenty potential quarantine pests, or pests of concern, that could follow the pathway of imported *Mangifera indica* fruit: fourteen insects, five fungi, and one bacterium (APHIS 2006a):

- Insects (14)
Bactrocera caryeae, *Bactrocera correcta*, *Bactrocera cucurbitae*, *Bactrocera diversa*, *Bactrocera dorsalis*, *Bactrocera tau*, *Bactrocera zonata*, *Sternochetus frigidus*, *Sternochetus mangiferae*, *Aulacaspis turbercularis*, *Parlatoria crypta*, *Pseudaonidia trilobitiformis*, *Ceroplastes rubens*, *Coccus viridis*.
- Fungi (5)
Actinodochium jenkinsii, *Cytosphaera mangiferae*, *Hendersonia creberrima*, *Macrophoma mangiferae*, *Phomopsis mangiferae*.
- Bacterium (1)
Xanthomonas campestris pv *mangiferaeindicae*.

USDA APHIS intends to implement the following mitigation measures to prevent the introduction of these twenty potential pests of concern associated with importation of mangoes from India (APHIS 2006a):

The fruit must be commercially produced and part of a commercial shipment, as defined in 7 CFR 319.56.

- The fruit must be treated by irradiation in an USDA APHIS-certified facility outside the United States by receiving a minimum absorbed dose of 400 Gy and must meet all other relevant requirements in 7 CFR 305.31 including monitoring of the treatment by USDA APHIS inspectors.

According to the provisions of 7 CFR 319.56-2tt(b) as amended, the mangoes are treated with a broad spectrum post-harvest fungicidal dip; **or** the orchard of origin is inspected prior to the beginning of harvest as determined by the mutual agreement between APHIS and the NPPO of India and the orchard is found free of *Cytosphaera mangiferae* and *Macrophoma mangiferae*; **or** the orchard of origin is treated with a broad spectrum fungicide during the growing season and is inspected prior to the beginning of harvest as determined by the mutual agreement between APHIS and the NPPO of India and the fruit is found free of *Cytosphaera mangiferae* and *Macrophoma mangiferae*.

- Mangoes must be harvested from orchards which have been inspected prior to the beginning of harvest, as predetermined by APHIS and the NPPO of India.
- Each shipment of fruit must be inspected jointly by USDA APHIS and NPPO of India inspectors and accompanied by a phytosanitary certificate issued by the NPPO of India certifying that the fruit received the required irradiation treatment. The phytosanitary certificate must also include two additional declarations that state:

(1) The mangoes were treated in accordance with a broad spectrum fungicide or otherwise meet the conditions of § 319.56-2tt(b) **and**

(2) “The fruit in this shipment was inspected during preclearance activities and found free of *Cytosphaera mangiferae*, *Macrophoma mangiferae* and *Xanthomonas campestris* pv *mangiferaeindicae*.”

- Fruits imported into the continental United States will be subject to inspection at the port of entry should inspectors determine such inspection is necessary (APHIS 2006a).

III. Environmental Impacts

A. No Action

Current regulations do not allow the entry of mangoes from India into the United States. Under the no action alternative, mangoes from India will continue to be prohibited from entering the United States. There will be no change to existing conditions, and therefore no adverse consequences to human health or the environment.

B. Preferred Alternative

Under the preferred alternative, the fruits and vegetables regulations in 7 CFR 319.56 and the phytosanitary treatment regulations in 7 CFR 305 will be amended to allow the importation of commercial shipments of mangoes from India into the continental United States under certain conditions, as specified in the Alternatives section, above. The requirement that the fruit is commercially produced ensures that imported mangoes are subjected to standard commercial cultural and post harvest practices that reduce the pest risk associated with mangoes. Standard cultural practices in the commercial production of Indian mangoes reduce the risk associated with pests by the regular use of sanitation measures, irrigation, fertilization, pest control, export orchard registration and traceback capability (APHIS 2006a). In May 2006 USDA APHIS verified the following standard post harvest practices for commercial mango production in India (APHIS 2006a):

- Harvested fruit is moved to packing houses in a manner that precludes reinfestation by pests.
- Blemished and damaged fruit is culled in the field and during preclearance commercial processing.
- The stem attached to the fruit is cut by hand and the fruit turned upside down for desapping on the conveyor belt.
- The fruit passes through a 52° C water bath for 3-4 minutes.
- The fruit is dried using forced hot air.
- The fruit is rinsed using a clear water bath and brushes.
- The fruit is dried and brushed using brushes.
- The fruit is then dried using forced hot air.
- The fruit is graded and sorted by size.
- The fruit is packed in boxes by hand into a layer of shredded paper placed along the bottom of each box at the rate of 9-12 mangoes per box depending on the size.
- The fruit is pre-cooled for 6 hours to 12.5° C.
- The fruit is stored at 12.5° C until it is picked up for shipment.

The primary purpose of risk mitigation is to prevent potential quarantine pests from entering and becoming established in the United States. The USDA APHIS pest list identifies twenty potential quarantine pests (14 insects, 5 fungi and 1 bacterium) likely to follow the pathway of mango fruit that is imported from India. USDA APHIS has determined a Pest Risk potential Rating of *High* for eight of the insects; *Medium* for three insects, two fungi and one bacterium; and *Low* for three insects and three fungi (APHIS 2006b). Each assigned rating represents the best professional estimate of (1) the likelihood of introduction and (2) potential consequences of introduction of a particular insect or pathogen.

Risk mitigation measures such as inspection, irradiation and fungicidal treatment are designed to prevent potential quarantine insects and pathogens from entering the continental United States. Environmental concerns associated with the mitigations to be implemented for the importation of mangoes from India are discussed below in greater detail. There may be undesirable impacts to the human environment should any of the twenty identified pests become established in the continental United States.

1. Irradiation

The fourteen potential insect pests identified in the pest risk assessment will be effectively controlled by the irradiation of mango shipments during preclearance activities. Irradiation treatment involves exposure of the commodity, under controlled conditions, to gamma rays or to electron beams. The amount of energy absorbed is expressed in units of Grays ["Gy"]. The current regulation under 7 CFR 305.31 calls for a minimum absorbed dose of 400 Gy for a generic neutralization of insect pests excluding adults and pupae of the order Lepidoptera. "Neutralization" signifies that the insect has been killed, rendered sterile, or prevented from further development into an adult (APHIS 2006a).

Irradiation treatment is the primary measure that USDA APHIS is recommending to mitigate the insect pest risk associated with importing mangoes from India into the continental United States. The rule requires that commercial mango shipments receive a 400 Gy minimum absorbed dose in a regulated irradiation treatment facility before export from India (APHIS 2006a). Specific regulation requirements for foreign irradiation treatment facilities used to treat commodities imported into the United States are provided in 7 CFR 305.31. In compliance with these regulations, specific operational requirements for each irradiation facility in India will be provided in an operational work plan developed jointly and reviewed for renewal annually by the NPPO of India and USDA APHIS.

Consumption of irradiated fruits and vegetables poses no significant risk to consumers. The U.S. Department of Health and Human Services' Food

and Drug Administration issued a final rule regarding food irradiation in 1986 (21 CFR 179) which states that absorption rates below 1000 Gy will not make food radioactive, affect the safety of the food, alter the nutritional value of the food, or adversely affect the balance between microbial spoilage organisms and pathogenic organisms.

The Food and Drug Administration also determined that no adverse environmental effects are anticipated at food processing plants that are designed to irradiate fruits and vegetables (FDA 1982). Properly designed and correctly operated commercial irradiators have been routinely shown to function without significant radiation risk to workers or the public (CH2M Hill 1987). A written certification by a licensed engineering and safety inspector will be issued showing that the facility meets all safety and health requirements for safe operation in compliance with 7 CFR 305.31.

Since the 2002 rule by USDA APHIS to allow the use of irradiation for imported commodities, no country has employed irradiation to treat fruit for importation into the United States. However, 15 different fruits have been irradiated for movement from Hawaii into the continental United States at a minimum absorbed dose ranging from 250 to 400 Gy without any observed adverse effects to human health or the level of pest risk. Fruits and vegetables treated with irradiation in Hawaii and moved to the continental United States have had no live pest interceptions of quarantine significance (APHIS 2006c).

The USDA APHIS risk management document for the importation of mangoes from India states that the 400 Gy minimum absorbed dose with which Indian mangoes will be treated will adequately mitigate the potential insect pest risks (APHIS 2006a). There are no pests of the order Lepidoptera associated with this mango pathway (APHIS 2006b).

2. Fungicide

Irradiation at 400 Gy is not known to be effective against plant pathogenic fungi. The pest list identifies five fungi as potential pests of concern. Three fungal pathogens have Low Pest Risk Potential ratings: *Actinodoichium jenkinsii*, *Hendersonia creberrima*, and *Phomopsis mangiferae*. Current USDA APHIS regulations stipulate that pests with a Low Pest Risk Potential do not require mitigation measures other than visual inspection of a potential host commodity at the port of entry into the continental United States (APHIS 2006b). In the event that *Actinodoichium jenkinsii*, *Hendersonia creberrima* or *Phomopsis mangiferae* is imported with a shipment of mango, it is unlikely that it will be able to establish itself in the United States. The pest risk assessment concludes that these three fungal pathogens have a low pest risk potential and according to existing regulatory guidelines do not require mitigation measures beyond port of entry inspection (APHIS 2006b).

Cytosphaera mangiferae and *Macrophoma mangiferae* have received pest risk potential ratings of *Medium*. A *Medium* rating indicates that, in addition to port of entry inspection, specific phytosanitary measures may be necessary to ensure the exclusion of the pest (APHIS 2006b). A pre-harvest field inspection and fungicidal applications to the orchard or fruit will be required to mitigate the risk that these two potential pathogens may cause post harvest infections. *Cytosphaera mangiferae* and *Macrophoma mangiferae* are discussed separately in the following paragraphs.

***Cytosphaera mangiferae*:** This fungus is found primarily in tropical regions in Australia and Asia. Potential hosts in the United States include multiple species from multiple plant families: mango, agarwood, *Artocarpus frengeniifolia*, *Macadamia integrifolia* and *Sabal palmetto*. The Pest Risk Assessment has determined that there is a Medium pest risk potential for *Cytosphaera mangiferae* (APHIS 2006b).

***Macrophoma mangiferae*:** This fungus occurs in mango producing areas in India and Nigeria and has been intercepted coming from Mexico. Its primary host is the mango, but it can also infect *Ficus carica*, *Eryobotrya japonica*, *Eugenia jambolina* and *Vitis vinifera*. The Pest Risk Assessment has determined that there is a Medium pest risk potential for *Macrophoma mangiferae* (APHIS 2006b).

The risk mitigations for these medium-risk fungal pathogens will impose the following phytosanitary measures to limit the introduction of these two fungi:

- Mangoes from India shall be treated with a post harvest broad spectrum fungicidal dip, **or**

The orchard of origin shall be inspected prior to the beginning of harvest at a time determined by mutual agreement between APHIS and the NPPO of India and be found free of *Cytosphaera mangiferae* and *Macrophoma mangiferae*, **or**

The orchard of origin shall be treated with a broad spectrum fungicidal application during the growing season, be inspected prior to the beginning of harvest at a time determined by mutual agreement between APHIS and the NPPO of India, and its fruit found free of *Cytosphaera mangiferae* and *Macrophoma mangiferae*.

- Each shipment of fruit shall be inspected jointly by APHIS and Government of India inspectors and accompanied by a phytosanitary certificate issued by the NPPO of India. The

phytosanitary certificate will include additional declarations stating whether there was a fungicide treatment and that the fruit was inspected prior to the beginning of harvest and found free of *Cytosphaera mangiferae* and *Macrophoma mangiferae*.

Fungicides to be used to treat mango orchards and individual harvested fruit will be determined by mutual agreement between APHIS and the NPPO of India. If all usage instructions and safety precautions are followed correctly, no adverse impact on the human environment is expected to occur.

The USDA APHIS risk management document for the importation of mangoes from India states that the pre-harvest field inspection, the post harvest fungicidal dip or an orchard application of broad spectrum fungicide is designed to mitigate the risk of post harvest infection by these fungal pathogens (APHIS 2006a).

3. Inspection

Inspections will be visual and are expected to have no measurable adverse effect on the human environment. The irradiation treatment facility, orchard and shipments must be inspected. Inspections are designed to mitigate the potential risk of non-native pests being introduced into the United States. Inspection mitigations, as determined by mutual agreement between APHIS and the NPPO of India, will be required in order to import mango from India into the continental United States and will occur at various points:

- The irradiation treatment facility in India will be inspected and monitored by APHIS personnel.

In all cases, mangoes must be grown in commercial orchards registered with and monitored by the NPPO of India to ensure that fruit produced is free of disease and other quarantine pests.

- Registered orchards will be inspected by NPPO personnel during the growing season and the harvest season.
- Inspection of individual harvested fruit will take place under the supervision of NPPO personnel.

Commercial shipments of mangoes from India will be subject to a joint preclearance inspection by APHIS and NPPO of India personnel.

- Mangoes imported into the continental United States are subject to inspection at the port of entry, under the existing provisions of 7 CFR 319.56.

The bacterium *Xanthomonas campestris* pv *mangiferaeindica* has received a Medium Pest Risk Potential rating for introduction and dissemination within the continental United States. A rating within the *Medium* range indicates that, in addition to port of entry inspection, specific phytosanitary measures may be necessary to ensure the exclusion of the pest (APHIS 2006b). *X. campestris* is found in India, Australia, Brazil, the Comoros Islands, Japan, Kenya, Malaysia, Mauritius, New Caledonia, Pakistan, the Philippines, Reunion, Sudan, South Africa, Taiwan, Thailand and the United Arab Emirates (APHIS 2006a, APHIS 2006b). It attacks plants of multiple species in the Anacardiaceae family. Long distance spread depends almost entirely upon the movement of infected plants.

Evidence of the presence of this bacterium is easily discernible with the naked eye and likely to be detected by visual inspection of the fruit at the packinghouse before export. Inspection of the fruit during preclearance activities will be required, as well as an additional declaration on the phytosanitary certificate stating that the fruit has been inspected and found free of *Xanthomonas campestris* pv *mangiferaeindica* in order to remove this potential pathogen from the pathway of imported mangoes from India (APHIS 2006a).

The USDA APHIS risk management document for the importation of mangoes from India states that inspections are effective mitigations of the potential pest risks when carried out as delineated in the Alternatives section, above (APHIS 2006a).

4. Summation

Commercial mango producing regions in the continental United States are located in California, Florida and Texas, and are expected to receive low numbers of imported mangoes from India. Mitigations have been designed to lower the likelihood of introduction to these regions of the twenty potential insect pests and pathogens identified with the final action. A generic irradiation treatment of 400 Gy will be required for all mango shipments to mitigate the fourteen potential insect pests. Additional measures such as fungicide treatment, pre-harvest and post harvest inspections, and additional declarations on the phytosanitary certificate will be required to mitigate pest risks for the five fungi and one bacterium.

Based on the findings of the Pest Risk Analysis, the USDA APHIS risk management document concludes that the safeguards of 7 CFR 319.56 and the additional mitigations described above will result in the effective removal of these quarantine pests from pathway of the importation into the United States of fresh mango fruit from India (APHIS 2006a). There should be no adverse impact to the quality of the human environment from implementation of the risk mitigations.

C. Cumulative Impacts of the Action

NEPA regulations require that federal agencies analyze the potential cumulative effects of an action, meaning “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” (40 CFR 1508.7).

The mitigations of the rule for the importation of mangoes from India are expected to provide an effective level of phytosanitary protection (APHIS 2006a). They are designed to prevent adverse cumulative impacts on the environment by decreasing the risk of introduction and establishment of quarantine plant pests as a result of the importation of mangoes from India into the continental United States. Should other countries petition to export mangoes to the continental United States, their requests will be considered under separate rulemakings. The potential pest risk associated with such imports might identify quarantine pests in addition to those considered in this document. There is not likely to be a cumulatively significant impact on the environment, since the rule is designed to mitigate effectively every identified quarantine pest risk associated with the importation of mangoes from India.

IV. Other Environmental Considerations

The APHIS NEPA implementing procedures require, to the fullest extent possible, the integration of Federal environmental laws and executive orders with the analysis of environmental impacts (7 CFR 372.7). The following have potential association to plant, animal, or human health impacts from implementation of the rule.

A. Endangered Species Act

Section 7 of the Endangered Species Act and its implementing regulations require Federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat.

USDA APHIS has considered the potential environmental effects of the rule to allow the importation of mangoes from India. Because the rule’s mitigations of irradiation, fungicide treatment and inspection are designed to be effective in preventing the establishment of the twenty pests of concern, no adverse impact on identified potential host species in the continental United States is anticipated (APHIS 2006a, APHIS 2006b).

The importation of mangoes from India into the continental United States is therefore expected to have no effect on federally listed threatened or endangered species or their habitats.

B. Other Considerations

Certain executive orders, such as Executive Order 13045 (*Protection of Children from Environmental Health Risks and Safety Risks*), Executive Order 12898 (*Federal Actions to address Environmental Justice in Minority Populations and Low-income Populations*), Executive Order 12114 (*Environmental Effects Abroad of Major Federal Actions*), and departmental or agency directives call for special environmental reviews in certain circumstances.

No circumstances that will trigger the need for special environmental review are involved in implementing the rule discussed in this document. No disproportionate adverse effects are anticipated to any minority, low income population or particular sub-group of the U.S. population. Irradiation treatment and fungicide applications will take place in India before export. Provided that appropriate safety procedures and protocols in the irradiation program and fungicide treatments are implemented and followed, there should be no adverse impact on the human population domestically or abroad.

V. Listing of Agencies and Persons Consulted

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Policy and Program Development
Environmental Services, Unit 149
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U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Commodity Import Analysis and Operation, Unit 133
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U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Phytosanitary Issues Management, Unit 140
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U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Regulatory Coordination, Unit 141
Riverdale, MD 20737

VI. Literature Cited

APHIS—See U.S. Department of Agriculture, Animal and Plant Health Inspection Service.

ARS—See U.S. Department of Agriculture, Agriculture Research Service.

CH2M Hill 1987. Feasibility study for a commodities irradiation facility in the State of Hawaii (final report and attachments). State of Hawaii, April 1987.

FDA—See U.S. Department of Health and Human Services, Food and Drug Administration.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2006c. Importation of *Lichi chinensis* (lychee or litchi), *Dimocarpus longan* (longan), *Mangifera indica* (mango), *Garcinia mangostana* L. (mangosteen), *Nephelium lappaceum* L. (rambutan), and *Ananas comosus* (pineapple) into the United States from Thailand. Risk Management, January 2006. Riverdale, MD.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2006a. Importation of Fresh *Mangifera indica* (mango) Fruit from India into the Continental United States. Risk Management, August 2006. Riverdale, MD.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2006b. Importation of Fresh Mango Fruit (*Mangifera indica* L.) from India into the Continental United States. A Qualitative, Pathway-Initiated Pest Risk Assessment. June 2006. Riverdale, MD.

U.S. Department of Health and Human Services, Food and Drug Administration, 1982. Proposed regulation for the use of irradiation for the treatment of food. Environmental Assessment, September 1982.

**Finding of No Significant Impact
For the Importation of Mangoes from India
Environmental Assessment, March 2007**

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), has prepared an environmental assessment (EA) that assesses the potential environmental impacts of amending the regulations that govern the importation of fruits and vegetables. The rule will allow the importation of fresh mango from India into the continental United States. The EA is available from:

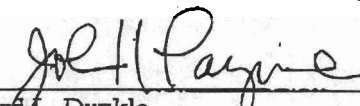
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
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The EA analyzes two alternatives: no action, and the preferred alternative. Under the no action alternative there will be no change to the existing regulations which prohibit the importation of mangoes from India into the United States. Under the preferred alternative, the importation of mango to the continental United States will be permitted under certain conditions. APHIS has considered the potential environmental consequences of each alternative and has determined that the preferred alternative, which incorporates effective pest risk management strategies, best supports the agency's mission of protecting domestic agriculture and preserving the environment while removing a barrier to trade with India that according to scientific analysis is no longer necessary.

APHIS has determined from the EA that there will be no significant impact to the human environment in adopting this rule. There will be no effect to federally-listed threatened or endangered species resulting from implementing the rule.

The EA has also considered the potential effects of the action with its accompanying mitigations as they pertain to Executive Order 13045 (*Protection of Children from Environmental Health Risks and Safety Risks*), Executive Order 12898 (*Federal Actions to address Environmental Justice in Minority Populations and Low-income Populations*), and Executive Order 12114 (*Environmental Effects Abroad of Major Federal Actions*). APHIS finds that the rule is consistent with the principles of environmental justice and that, provided appropriate safety procedures and protocols in the irradiation program and fungicide treatments are followed, its implementation is unlikely to result in disproportionate adverse effects to the health or safety of children, minorities and low-income populations, domestically or abroad.

I therefore find no evidence of significant impact on the environment associated with the rule, and further find that an environmental impact statement does not need to be prepared.


Richard L. Dunkle
Deputy Administrator
Plant Protection and Quarantine
Animal and Plant Health Inspection Service

Mar 9, 2007
Date