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December 13, 2012

TO: Lori Williams
Chris P. Dionigi

FROM: R. Timothy Columbus
David H. Fialkov

RE: Arundo Donax as a Feedstock under the RFS

INTRODUCTION

This memorandum discusses the best management practices Chemtex will follow in utilizing *Arundo donax* as a feedstock for its cellulosic ethanol plant in North Carolina. These practices derive from the State of North Carolina's Voluntary Best Management Practices for Energy Crops,[1] (hereafter referred to as "N.C. Best Practices") by which Chemtex abides and the relevant provisions of which Chemtex incorporates into its contracts with growers.

Specifically, this memo illustrates the consistency between Chemtex's practices and the Invasive Species Advisory Committee's ("ISAC") nine recommendations to reduce the risk of invasive species introduction and spread, as contained in its August 11, 2009 white paper, Biofuels: Cultivating Energy, not Invasive Species. ISAC's recommendations are intended to be a "basis for standards of operation" regarding invasive species when the federal government engages with the private sector and other partners. Below, we address how Chemtex's practices and the N.C. Best Practices comply with ISAC's nine recommendations. Further, we show that the N.C. Best Practices supplement the white paper with additional requirements pertaining to transportation and storage.

[1] North Carolina Department of Agriculture and Consumer Services, Voluntary Best Management Practices for Energy Crops: Minimizing the Risk of Invasiveness ("N.C. Best Practices").

We applaud the Invasive Species Council for fulfilling its obligation to ensure Federal agency activities concerning invasive species are coordinated, cost-efficient, and effective.[2] It is Chemtex's hope and desire that the consistency between its approach and ISAC's recommendations will facilitate a prompt resolution to the bureaucratic delay preventing Chemtex from beginning its work.

ISAC'S RECOMMENDATIONS AND N.C. BEST PRACTICES

Recommendation #1: *Identify Federal authorities relevant to biofuels. Determine their likely influence on biofuel invasiveness (*i.e., *prevention or facilitation). Identify gaps and inconsistencies in authorities within and among Federal Departments or Agencies. As appropriate, develop policies and programs to minimize invasion risk.*

N.C. Best Practices—itself a program to minimize invasion risk—shares the sentiment embedded in ISAC's first Recommendation, and obligates all growers and landowners to "identify whether any prohibitions or regulatory restrictions exist for the species in question" and forbids planting crops when doing so is inconsistent with Federal law.[3] Thus, both N.C. Best Practices and ISAC advise that the *first step* in minimizing the risk of invasiveness is to review existing authorities and determine their impact on the planting of any energy crop.

In addition, Chemtex itself has completed a review of federal authorities relevant to biofuels and is unaware of any federal requirements pertaining to Arundo donax. We have identified three federal agencies interested in the crop's potential—EPA, Interior, and USDA—and are working with them to address any concerns they may have. Chemtex also identified *state* agencies in North Carolina interested in Arundo donax and worked with them to develop protocols and best practices, including:

- The North Carolina Farm Bureau;
- The North Carolina Department of Agriculture and Consumer Service;
- The North Carolina State University Extension Service;
- The Nature Conservancy of North Carolina; and
- The Wildlife Federation of North Carolina.

Recommendation #2: *In order to determine potential biofuel benefits and risks, the invasive potential of each candidate biofuel crop needs to be evaluated in the context of each region proposed for its production. Use/promote species (including unique genotypes) that are not currently invasive and are unlikely to become invasive in the target region. Choose species or cultivars with a low potential for escape, establishment and negative impact. Where appropriate, implement mitigation strategies and plans to minimize escape and other risks.*

This recommendation is really two different recommendations consolidated into one:

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[2] Executive Order 13112, Sec. 4(a).
[3] N.C. Best Practices #1.

(i) *Evaluate each candidate biofuel crop in the context of the region proposed for its production and only use/promote species that are not likely to become invasive in that region.*

The N.C. Best Practices requires growers and landowners to educate themselves about the energy crop and determine whether its planting is appropriate for a specific region. "After checking on the plant in question, the grower can then make an informed decision as to whether that particular plant is well suited to be planted in the region in question."[4]

Chemtex evaluated Arundo donax in the context of eastern North Carolina. A Chemtex agronomic team evaluated the state of North Carolina based on soil and climatic conditions and estimated the average conservative yield of Arundo within a 35 mile radius of the proposed biorefinery would be 15-16 bone dry tons ("bdt") per acre (as opposed to 20 bdt found in other climates). Because Arundo's seeds are non-fertile, and because our farmers will shred the biomass in the field at harvest (eliminating viable propagation material), accidental spread is particularly unlikely in this setting.

Arundo donax poses a risk of invasiveness when it is planted in a riparian area. The literature and experience on this matter is clear. However, it is equally clear that Arundo poses a minimal risk of invasiveness when it is planted far away from riparian areas. Chemtex reached this conclusion after evaluating the crop *in the context* of eastern North Carolina. The most respected academics in the field were asked to comment specifically on the effectiveness of the N.C. Best Practices (which were naturally designed in the context of North Carolina), and the consensus was agreement that the crop could be safely grown utilizing the practices called for in that document.

Professor David Bransby of Auburn University summarized his 14 years' experience researching Arundo by saying:

> *It is true that [Arundo donax] has colonized riparian areas along the Rio Grande and Southern California. However, this is due to the total lack of management, and the fact that these watersheds are* very *different from those in the eastern United States. In particular, they are essentially in desert regions where the native vegetation is not competitive, and the rivers in question flood for a few months each year, seriously excavating their banks, and then subside to no more than a trickle for the rest of the year....In contrast, our rivers in the eastern United States are perennial, with a steady flow of water year-round, and are lined with highly competitive woody vegetation. Therefore, even though [Arundo donax] has been widely grown...in the eastern United States for well over a*

[4] N.C. Best Practices #2.

> *century, there is absolutely no evidence at all of it becoming invasive in this region.*[5]

Professor Barry Flinn, Director of the Institute for Sustainable and Renewable Resources at Virginia Tech University is currently studying Arundo and agreed that "concerns expressed about invasiveness, while relevant for riparian zones, are over stated for other sites." Summarizing his literature review of Arundo's invasiveness, Professor Flinn said:

> *Arundo donax shows a widely reported lack of seed and seedling production....Hence, inability to produce seeds represents a significant inhibitory mechanism to plant dispersion, and is not a contributing factor to the spread of the plant in the natural habitat. This is a positive trait for [Arundo donax], unlike other described weedy invasives. In a study of Arundo donax spreading inside and outside of flood zones, [one scholar] indicated that movement via fragmentation, rhizomes and layering occurred in the flood zone. However, it was also noted that in drier sites outside the flood zone, Arundo spreading was less dynamic, with slow expansion and similar stand appearances from year to year. These results further suggest that the invasive characteristic is dependent on site, and if careful selections are made to avoid riparian zones, and sites are managed, invasiveness can be avoided.*[6]

Finally, Jacob Barney, Professor of Invasive Plant Ecology at Virginia Tech, agrees with his colleague Dr. Flinn. In summarizing his views on Arundo's invasiveness, Professor Barney—whose work was cited in a recent letter from scientists concerned about Arundo's purported invasiveness—said:

> *[W]hile I fully recognize the dramatic Arundo invasions in California and Texas, and the consequences on native species and ecosystem properties, it should not be assumed that Arundo will become invasive in all circumstances and locations. Nearly all research on Arundo has been conducted in California and Texas....The intentional planting of Arundo along riparian corridors was also likely its downfall, which should not be the case for bioenergy predication.*[7]

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[5] Bransby, David I., Ph.D., Professor, Energy Crops and Bioenergy, Auburn University. November 20, 2012 (emphasis in original).

[6] Flinn, Barry, Ph.D., Director, Institute for Sustainable and Renewable Resources, Institute for Advanced Learning and Research, Danville, VA. February 11, 2012.

[7] Barney, Jacob, Ph.D., Assistant Professor of Invasive Plant Ecology, Department of Plant Pathology, Physiology and Weed Science, Virginia Tech University. February 12, 2012.

Chemtex has worked in conjunction with the state of North Carolina in evaluating Arundo donax in the context of eastern North Carolina where Chemtex proposes to plant Arundo as a feedstock for its biorefinery. The results are clear and unmistakable: Because it is not near a riparian area, Arundo donax poses very little risk of invasiveness. Chemtex and the state-funded North Carolina Biofuels center have worked together to plant a 100 acre nursery of Arundo for use in commercial scale propagation. The two organizations' independent research brought them to the same conclusion concerning Arundo's potential for farmers in North Carolina.

This low risk of invasiveness is especially true in Chemtex's case. Chemtex chose Arundo not only because it is the best source of biomass we could identify for producing advanced biofuels, but because it lends itself to being harvested in a manner that minimizes the already small risk of invasiveness. It has *infertile seeds,* and its rhizomes do not generate long underground runner systems typical of inherently invasive plants. Instead, Arundo's rhizomes tend to be no more than 18 inches, and if left undisturbed in a non-riparian area, Arundo is unlikely to spread more than one foot beyond its original location.

Further, Chemtex contractually requires its farmers to minimize this already small risk of invasiveness: Farmers may not grow or transport Arundo near a river or stream; they must field-chop the plant, thereby rendering everything that is *removed* from the field *non-viable.* (This is the opposite of what occurred in California, where Arundo—including cane and rhizomes—was *bulldozed* into the rivers.) Utilizing a direct field chop harvest, the soil is never disturbed more than once every ten-twenty years for replanting, and reeds are shredded to eliminate viability. Arungo will be harvested one foot above the ground, to minimize tire damage as well as to ascertain that the rhizomes stay safely embedded in the soil to be the source of the next year's crop and the following ten to twenty years' crop.

(ii). *Where appropriate, implement mitigation strategies and plans to minimize escape and other risks.*

The N.C. Best Practices mandates harvesting methods that "eliminate or reduce viable propagules"[8] and "reduce propagule dispersal and establishment."[9] Toward that end, Chemtex will abide by the guidelines contained in that document to minimize escape, including:

- All planting, harvesting, and transport vehicles will be cleaned of all plant material prior to moving off site;[10]
- If viable seeds are produced, harvesting/baling methods (such as wrapping bales) will be used to reduce propagule spread;[11]
- If stem fragments are known propagule sources, harvest practices will reduce/eliminate propagule viability, *e.g.*, shredding above-ground material to kill stem buds;[12]
- Human access to the field will be controlled;[13] and

[8] N.C. Best Practices #3.
[9] N.C. Best Practices #2.
[10] N.C. Best Practices #3.
[11] *Id.* Of course, Arundo does produce viable seeds, so this requirement is not directly applicable to Chemtex.
[12] *Id.*

- Field boundaries, buffer areas, and adjacent areas will be inspected regularly for propagules/seedlings.[14]

Further, Chemtex complies with the U.S. Forest Service eradication protocol, which has been shown to be 100% effective.[15] In fact, we go beyond this protocol: When plants are no longer a productive source of biomass, we will remove the rhizomes from the field and dispose of them properly.

All of this is done despite the fact that the Arundo's risk of invasiveness when harvested in a non-riparian area is already minimal. Its seeds are infertile and its rhizomes are not long. Above and beyond the N.C. Best Practices noted above, Chemtex contractually requires its farmers to grow and transport Arundo far away from a river or stream; they must field-chop the plant thereby rendering everything that is *removed* from the field *non-viable.* The field will be surrounded by a buffer zone of native grasses and weeds against which Arundo does not compete effectively. Under Chemtex's approach, the soil does not get disturbed more than once every ten to twenty years for replanting.

The N.C. Best Practices require mitigation strategies and plans to minimize escape and other risks. Despite the already small risk of invasiveness, Chemtex will go above-and-beyond these strategies to ensure the crop does not spread. Annual inspections of growers will be performed in cultivated stands while native stands of Arundo will be documented. Signs of spreading will be sought outside of the fields in adjacent waterways and byways to and from the biorefinery.

Recommendation #3: *Ideally, biofuel crops should be propagated in containable systems (e.g., terrestrial or aquatic sites constructed specifically to cultivate biofuel crops) and be unable to survive outside of cultivation. Use research findings to identify the most appropriate sites (e.g., unable to impact sensitive habitat or create disturbances that will foster invasion) for cultivation of biofuel crops within landscapes. Support for biofuel research and demonstration projects will require site selection that minimizes the potential escape of plant species or cultivars to sensitive areas and the loss of wildlife habitat.*

Consistent with ISAC's Recommendations, Chemtex was required by the N.C. Best Practices to ensure not only that the *region* (*i.e.*, eastern North Carolina) is suitable to Arundo donax, but the specific site (*i.e.*, the farmland near the proposed biorefinery location) as well. Thus, the N.C. Best Practices required Chemtex to choose a site wherein the production field "not be located directly adjacent to major dispersal corridors, such as streams, irrigation canals, major roads, or utility right of ways."[16] In addition, storage sites are required to be "placed in locations not adjacent to sensitive habitats."[17]

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[13] N.C. Best Practices #2.
[14] *Id.*
[15] An investigation to test the effectiveness of glyphosate for control of Arundo was conducted in southern California by Caltrans, the state transportation agency. Results indicate that cut-stem treatments, regardless of time of application (May, July, or September), provided 100% control with no resprouting. http://www.fs.fed.us/database/feis/plants/graminoid/arudon/all.html#MANAGEMENT.
[16] N.C. Best Practices #2.
[17] N.C. Best Practices #5.

Chemtex has done precisely what is called for in ISAC's third Recommendation. We worked to identify a site that whereby our work will not impact sensitive habitat or create disturbances that will foster invasion. The field will be surrounded by native competing plants against which Arundo does not compete well. It will not be located—and Arundo material will not be transported—near a river or stream or other riparian area. As described above, research demonstrates that when Arundo is grown in non-riparian areas, the potential for escape is minimal. Research findings lead to the unmistakable conclusion that our site location, combined with Arundo's inherent characteristics and the steps we require our farmers to follow, minimizes the risk of invasiveness.

Recommendation #4: *Incorporate desirable traits (e.g., sterility or reduced seed production, inability to regenerate by stem fragments) into biofuel varieties to minimize their potential for invasiveness. Use information from plant research, agronomic models, and risk analyses to guide breeding, genetic engineering, and variety selection programs.*

Because the seeds from Arundo donax are sterile, work in this area has been completed by nature. Although sterile seed is desirable from a biomass standpoint, it makes breeding programs difficult. Only genetic modification (by gene manipulation) of Arundo can be used to instill new traits. (Research programs are only now starting along these lines.) In addition, because of Arundo's ability to stand in the field, regardless of the weather patterns, it lends itself to minimizing invasiveness because it is not making any contact with the ground (*i.e.*, we have evidence that Arundo will not fall over or lodge during a hurricane). Despite all this, our farmers are required to follow rigorous steps to minimize the risk of invasiveness: they must grow and transport Arundo far away from a river or stream; they must field-chop the plant thereby rendering everything that is removed from the field non-viable. The field will be surrounded by berm with which Arundo does not compete effectively. Under Chemtex's approach, the soil does not get disturbed more than once every ten to twenty years for replanting.

Arundo's inherent traits are desirable so as to enable Chemtex to minimize its potential for invasiveness. We have used information from plant research and risk analyses to substantiate this conclusion.

Recommendation #5: *Develop and coordinate dispersal mitigation protocols prior to cultivation of biofuel plants in each region or ecosystem of consideration. Implement a comprehensive plan, appropriate to the specific crop, throughout the cultivation period. Examples of dispersal mitigation measures include the use of sterile cultivars, species not likely to genetically mix with other plants (different species or cultivars), harvesting prior to seed maturity, cleaning equipment, and minimizing propagule dispersal throughout the biofuel production cycle.*

The N.C. Best Practices contain a number of requirements designed to minimize dispersal. For example, in those instances where viable seeds are produced (which is not the case with Arundo), it requires that measures be taken to "minimize their dispersal, such as choosing late-flowering cultivars or harvesting prior to seed maturation,"[18] and harvesting/baling methods be

[18] N.C. Best Practices #2.

utilized in order to reduce propagule spread (*e.g.*, wrapping bales).[19] Additionally, it requires that barriers (*e.g.*, slit fences or berms) be installed down slope of production fields in order to intercept crop fragments such as inflorescences or stems if the field is slope ≥5%. [20]

The N.C. Best Practices also require all planting, harvesting, and transport vehicles and equipment be "cleaned…of all plant material prior to moving off site."[21] Additionally, if stem fragments are known propagule sources, harvest practices should reduce/eliminate propagule viability (*e.g.*, shredding above-ground material to kill stem buds).[22]

The fact that Chemtex is not planting a crop that will reproduce via seed eliminates great risk. By ensuring that we don't have viable materials, we are inherently limiting the risk that Recommendation #5 seeks to minimize. Chemtex chose Arundo not only because it is the best source of biomass we could identify for producing advanced biofuels, but because it lends itself to being harvested in a manner that minimizes the already small risk of invasiveness. It has *infertile seeds,* and its rhizomes do not generate long strands typical of inherently invasive plants. Instead, Arundo's rhizomes tend to be no more than 18 inches, and if left undisturbed in a non-riparian area, Arundo is unlikely to spread more than one foot beyond its original location.

Further, Chemtex contractually requires its farmers to take a number of measures to minimize this already small risk of invasiveness, while subjecting them to regular inspection and verification. Farmers may not grow or transport Arundo near a river or stream; they must field-chop the plant thereby rendering everything that is removed from the field non-viable. This is the opposite of what occurred in California, where Arundo was *bulldozed* into the waterways. Under Chemtex's approach, the soil does not get disturbed more than once every ten to twenty years for replanting. Arundo will be harvested one foot above the ground, so that which gives life (and by which it is propagated) is not disturbed.

In reality, Chemtex is using a crop where the risk of invasion is minimal, but is operating as though the risk were great. Even though science and experience suggests there is little to worry about regarding Arundo's invasiveness in eastern North Carolina, we are making sure it is harvested in a manner that renders it non-viable once it is removed from the field, and transported in a manner that eliminates the chances of unintentional spread.

Recommendation #6: *Proactively develop multiple year eradication protocols to plan for the rapid removal of biofuel crops if they disperse into surrounding areas or become abandoned or unwanted populations (e.g., those which persist beyond desired crop rotation period).*

Consistent with the N.C. Best Practices, Chemtex must prepare an "eradication plan…prior to planting that provides treatment recommendations and procedures that are followed after confirmation of escapes or abandonment of the field."[23]

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[19] N.C. Best Practices #3.
[20] N.C. Best Practices #2.
[21] N.C. Best Practices #3.
[22] *Id.*
[23] N.C. Best Practices #2.

Chemtex complies with the U.S. Forest Service eradication protocol, which is considered 100% effective.[24] In fact, we go beyond this protocol by picking up the rhizomes we cut off in the field and properly disposing of them.

All of this is done despite the fact that the Arundo's risk of invasiveness when harvested in a non-riparian area is already minimal. Even if Arundo's seeds are "dispersed into surrounding areas," by the time they are removed from the field the material is non-viable. Arundo's seeds are infertile and its rhizomes are relatively short. Above and beyond the N.C. Best Practices noted above, Chemtex contractually requires its farmers to grow and transport Arundo far away from a river or stream; they must field-chop the plant thereby rendering everything that is removed from the field non-viable. Under Chemtex's approach, the soil does not get disturbed more than once every ten years to twenty years for replanting.

Not only did Chemtex consciously choose a crop as its feedstock where the risk of invasiveness is minimal, but we have also developed effective eradication protocols to plan for the unlikely event that Arundo disperses into surrounding areas.

Recommendation #7: *Develop Early Detection and Rapid Response ("EDRR") plans that cover multiple years to eliminate or prevent establishment and spread of escaped invasive populations. A flexible funding source needs to be in place to support EDRR efforts.*

Pursuant to the N.C. Best Practices, we will regularly inspect field boundaries, buffer areas, and adjacent areas for propagules and/or seedlings.[25] This is in addition to the mandatory eradication plan providing treatment recommendations and procedures to be followed after confirmation of escapes.[26] As noted above, Chemtex also complies with the U.S. Forest Service eradication protocol, which is considered 100% effective.[27] We even go beyond this protocol: when plants are no longer a productive source of biomass, we will *remove the rhizomes from the field and dispose of them properly.*

To enhance our ability to detect unwanted spread, Chemtex established paths the trucks transporting the material must always traverse. This not only facilitates efficient inspection of the surrounding areas, but ensures the material does not ever go near streams or ponds (as we accounted for this in designing the transport route). We are also documenting *pre-existing* strands of Arundo that are already growing naturally in North Carolina separate and apart from our cultivation. These have been there since the early 1800s without making their presence widely known. The control inherent to a spray field—a targeted planting area—will enhance our ability to recognize escaped populations and distinguish them from natural strands. This is all in addition to the fact that Chemtex intentionally chose a plant and site where the risk of invasiveness is already minimal.

As far as a flexible source of funding, the N.C. Best Practices do not contain such a requirement. However, Chemtex is currently in the process of working with the state to create a fund and

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[24] *See supra* n.15.
[25] *Id.*
[26] *Id.*
[27] *See supra* n.15.

monetize it in an effective manner to address escaped populations if necessary. Planting will not begin until this fund is established. However, small, widely dispersed populations of Arundo which have been present for many years must also be documented. Chemtex would have no objections to legally requiring the fund's establishment as a prerequisite to beginning work.

Recommendation #8: *Disturbed environments are especially prone to plant invasion. Minimize the soil disturbance resulting from biofuel harvest by rapidly replanting, using cover crops, or employing other methods that will prevent the potential for future invasion of non-native plants from the surrounding areas into the harvested site.*

In order to minimize plant invasion, the N.C. Best Practices require Chemtex to "establish a buffer area surrounding the production field of 20 feet, which should be maintained with a perennial cover (*e.g.*, legumes, bermudagrass, tall fescue)." In addition, Chemtex is ensuring that Arundo will not be grown or planted in riparian areas. That is the only environment in which it is invasive. Every ton of biomass Chemtex purchases is traceable; the company can monitor growers to make sure they are observing best practices. This includes things like cutting reeds in the field to the point where they are not viable, keeping away from rivers, and washing transport vehicles' tires when they leave spray fields.

The fields will be surrounded by buffer strips of native species against which Arundo does not compete effectively to eliminate spreading and ease inspection of field border integrity. As described above, research demonstrates that when Arundo is grown in non-riparian areas, the potential for escape is minimal. Our site location, combined with Arundo's inherent characteristics and the steps we require our farmers to follow, further minimizes the risk of invasiveness.

Recommendation #9: *Identify and employ cooperative networks (e.g., working groups and councils), communication forums, and consultation processes through which Federal agencies can work with state agencies, tribes, the private sector, and other stakeholders to reduce the risk of biological invasion via the biofuels pathway.*

The N.C. Best Practices are a product of the very type of process envisioned in this recommendation. It was a collaborative effort by three agencies: The North Carolina Department of Agriculture and Consumer Services; The North Carolina State Extension Service; and the North Carolina BioFuels Center in collaboration with well-known invasiveness expert, Dr. Jacob Barney of Virginia Tech University. The North Carolina Farm Bureau and the Nature Conservancy of North Carolina were included in the process, ensuring multiple voices were heard.

ADDITIONAL REQUIREMENTS IN N.C. BEST PRACTICES

Beyond those requirements noted above that align with ISAC's recommendations, the N.C. Best Practices contain a number of additional components that supplement ISAC's white paper. Most notably, the N.C. Best Practices contain explicit requirements regarding *transportation* and *storage* that the white paper does not directly address.

Transportation – The N.C. Best Practices note that land along the route from the harvested fields to the bioenergy facility may be susceptible to inadvertent escapes. As such, Chemtex will be required to transport feedstock material "in a manner that reduces unintentional propagule loss:

- Trucks and trailers should be covered;
- Routes that minimize crossing of highly sensitive habitats (*e.g.*, riparian areas) should be utilized; and
- Right of way along transport routes should be visually inspected to ensure no escapes."

Chemtex will ensure that all trucks and trailers transporting Arundo will be cleaned of all planting material prior to leaving the fields and covered to prevent the material from exiting the traveling vehicle. Further, Chemtex established paths the trucks transporting the material must always traverse. This not only facilitates efficient inspection of the surrounding areas, but ensures the material does not ever go near streams or ponds (as we accounted for this in designing the transport route).

Storage – The N.C. Best Practices treats storage sites as being "analogous" to production fields in serving as a stationary source of propagules, and thus requires:

- Storage sites be placed in locations not adjacent to sensitive habitats;
- Storage sites be inspected on a regular schedule for seedlings; and
- Stored plant material be covered.

Of course, Chemtex is targeting the Arundo portion of the supply chain to be direct chopped in the field and does not anticipate storing Arundo beyond run inventory, minimizing storage as a potential invasive risk. As the biomass is the targeted raw material, all plant material will be utilized as feed in the process once it leaves the field. Chemtex chose Arundo not only because it is the best source of biomass we could identify for producing advanced biofuels, but because it lends itself to being harvested in a manner that minimizes the already small risk of invasiveness.

CONCLUSION

The N.C. Best Practices propose feasible practices for the commercial cultivation of Arundo donax as a biofuel crop. "These practices minimize the chance of Arundo donax escaping from cultivated plantings."[28] The program in fact is very similar to risk management procedures in Australia[29] that when followed, have been shown to result in minimal risk of invasiveness.[30] Of course, to the extent that its plan to minimize invasiveness can be reasonably improved to account for additional potential risks, Chemtex would support such additions, as the company's desire to minimize the risk of invasiveness is second to none. Indeed, Chemtex has proposed a

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[28] Barker, David, Associate Professor of Grassland Ecology, Department of Horticulture and Crop Science, The Ohio State University, February 9, 2012. *See* **Tab #5.**

[29] Virtue, John, Ph.D. Manager – NRM Biosecurity, Adelaide, South Australia, Presentation, Australian Weeds Conference. *See* **Tab #6.**

[30] Virtue, John, Ph.D. Manager – NRM Biosecurity, Adelaide, South Australia, October 15, 2012. *See* **Tab #7.**

scheduled evaluation of the effectiveness of these measures be scheduled at after five and ten years to identify beneficial procedural changes based on experience.

In the end, The N.C. Best Practices is exactly what the ISAC white paper encourages. Under Executive Order 13112, the Invasive Species Council is charged with ensuring that Federal agency activities concerning invasive species are coordinated, complimentary, cost-efficient, and effective. Cultivation and processing of Arundo donax in conformity with those Best Practices will assure that the objectives of the Renewble Fuels Standard can be achieved in a manner which minimizes any risk of invasiveness, thereby assuring that the legitimate interests of all of concerned Federal agencies. We hope that this memorandum, by documenting that the analytical steps recommended by ISAC have been followed and that the appropriate control measures suggested by that analysis have been adopted, helps finalize this exhaustive effort as it pertains to Arundo donax and its use as a source of biomass for the purposes of the Renewable Fuels Standard.