

**Siting: Nuclear Power Plants
in the Agricultural Hinterland.**
Chris Bennett

SITING: NUCLEAR POWER PLANTS IN THE AGRICULTURAL HINTERLAND

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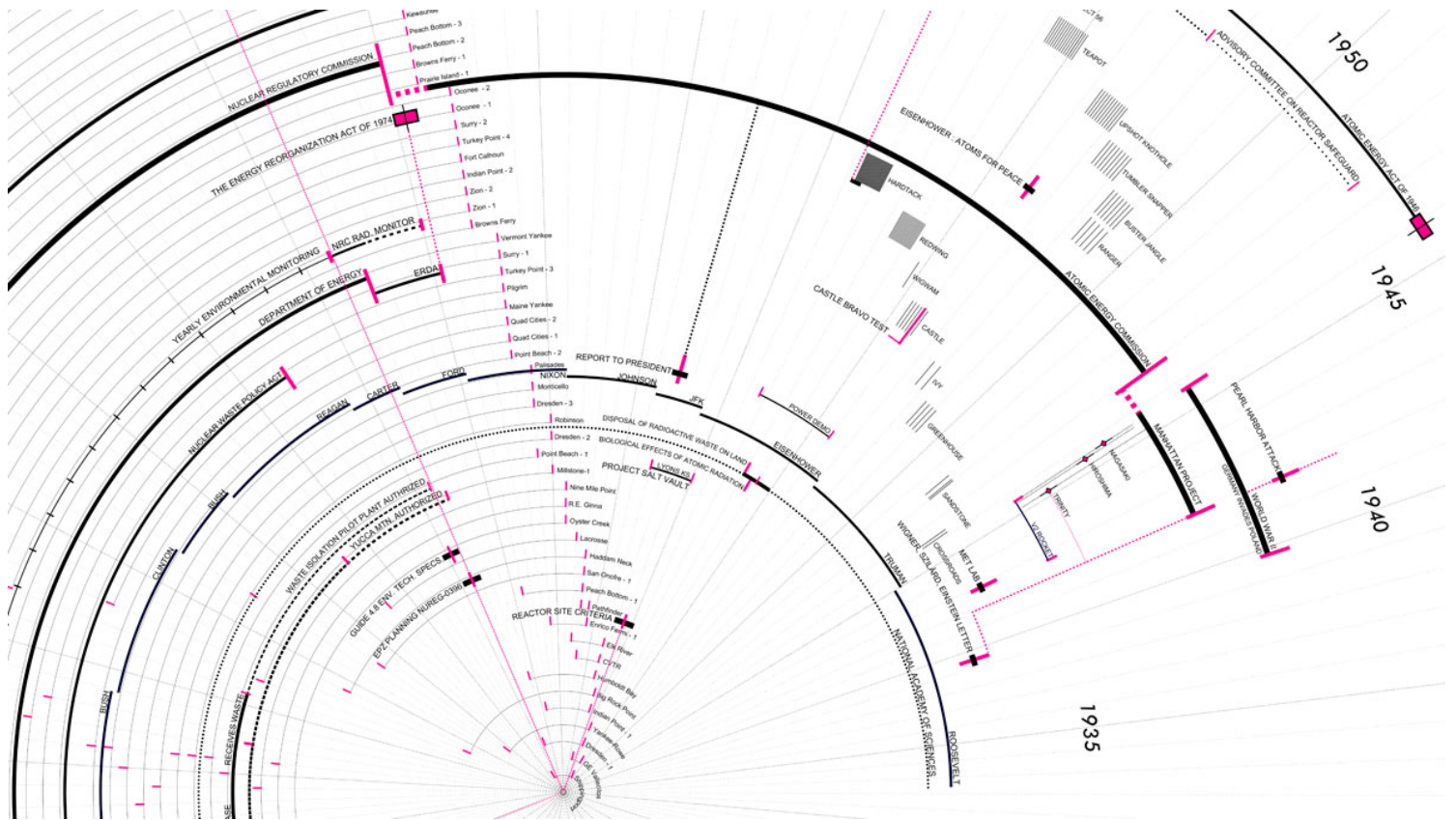
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The 2011 earthquake and tsunami that hit Fukushima Daiichi Nuclear Power Plant disabled and ultimately crippled the nuclear power reactors. With reactor vessels and containment structures breached, massive amounts of radioactive material, such as Cesium 137, were released into the atmosphere spreading as far as the western coast of the United States. Displacing nearly 300,000 people and rendering 30 sq km of land uninhabitable, this incident brought to the forefront the volatility of nuclear power reactor accidents and arose questions about how to plan and design for such massive breaches of radioactive containment.



At the time of the incident, the then Chairman of the United States Nuclear Regulatory Commission Chairman, Gregory Jaczko, recommended that all Americans within 50 miles of the reactor evacuate the area immediately. Why 50 miles? What is driving this radius number? Once radioactive containment is breached, radioactive fallout is driven by atmospheric and wind conditions, rendering ideas of Euclidian radial distance measurements ineffective. This thesis probes these issues

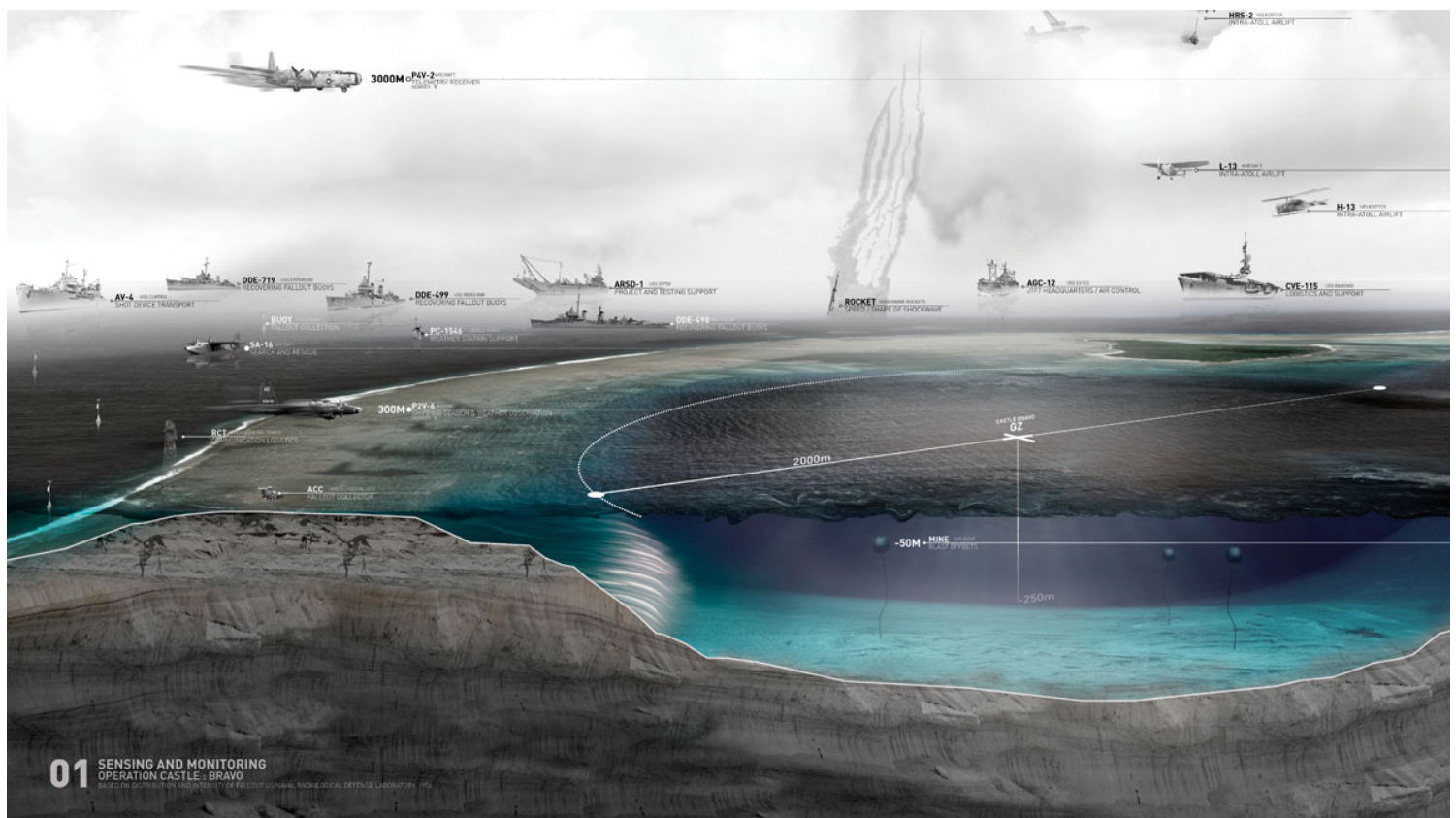
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by investigating the regulatory frameworks and history of nuclear power siting plants in the United States, as well as the history of this so called '50 mile radius'. Rather than viewing radioactive containment as a situation to be regulated from a top down approach, this thesis probes and examines new planning and design potentials for a 'ground up' radioactive containment breach scenario.

This thesis represents an overlap of what you might call the hinterland and nuclear power plants. Or the co-occurrence of agricultural land and nuclear power plants. They both have similar locational constraints. We desire them to be within a reasonable distance to population centers to serve them, but they have spatial requirements that keep them remote. Nuclear power plants are part of what might be called a metabolic hinterland. Can we imagine agriculture as a type of sensing monitoring and response system? Can this co-occurrence of nuclear power plants and agriculture be productively imagined in a new model of planning? As a test case how could this play out?



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Castle Bravo Nuclear Test - Bikini Atoll 1954. Sectional diagram showing the expansive monitoring equipment to monitor radioactive fallout.

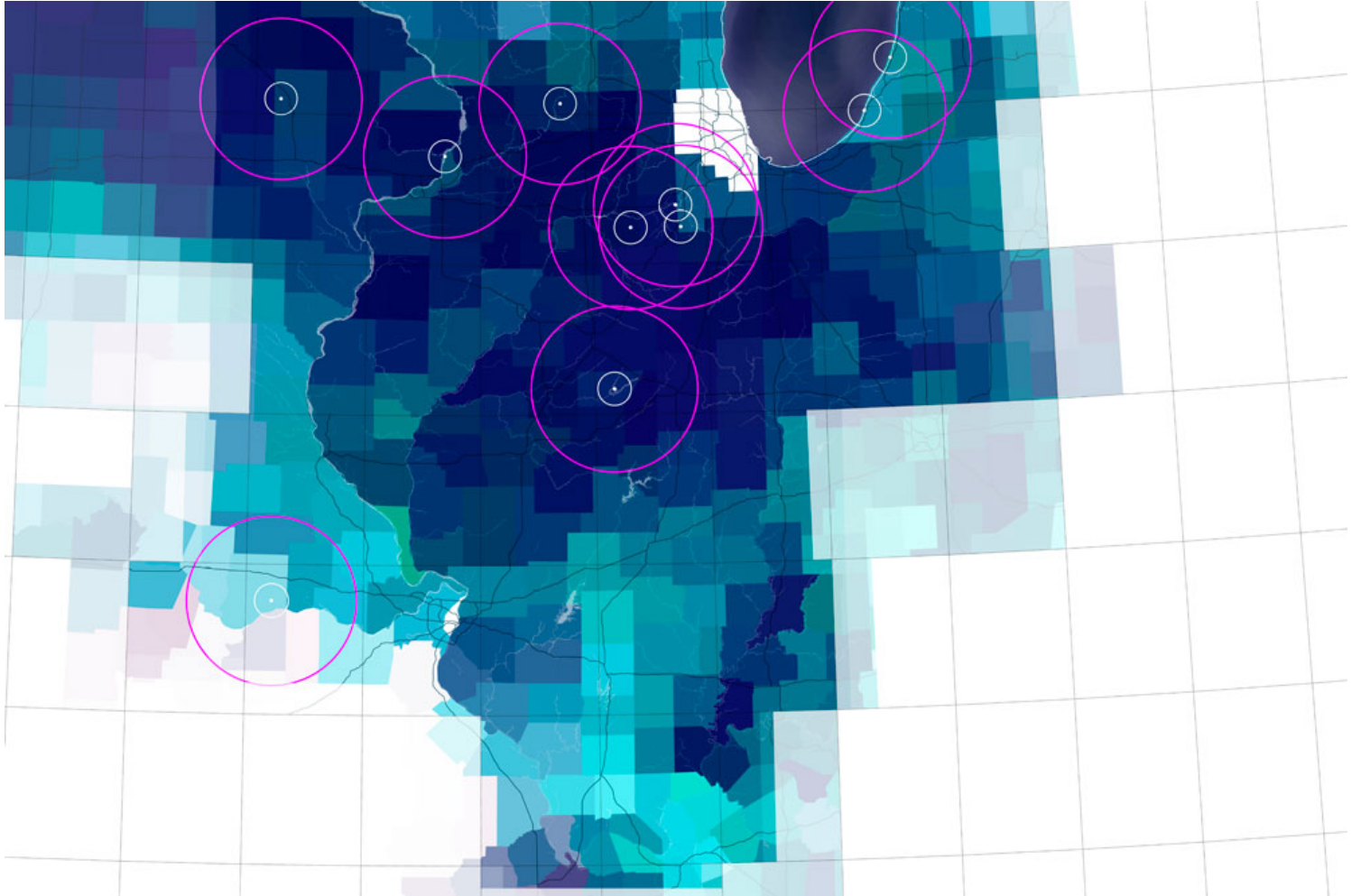


Nuclear Power Plant Monitoring Network Sectional diagram of how nuclear power plants are monitored after the 1979 accident at Three Mile Island in Middletown Pennsylvania.

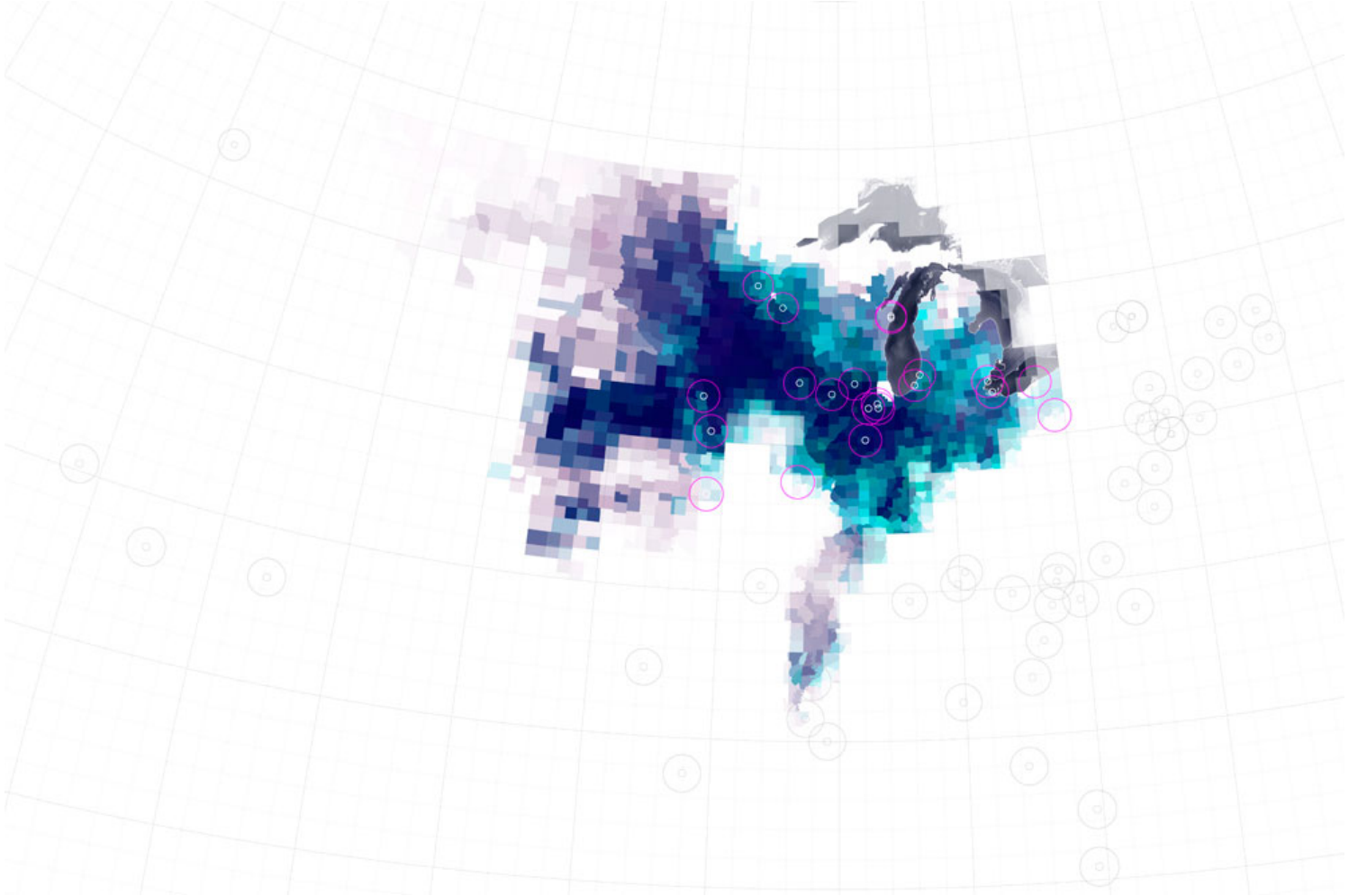
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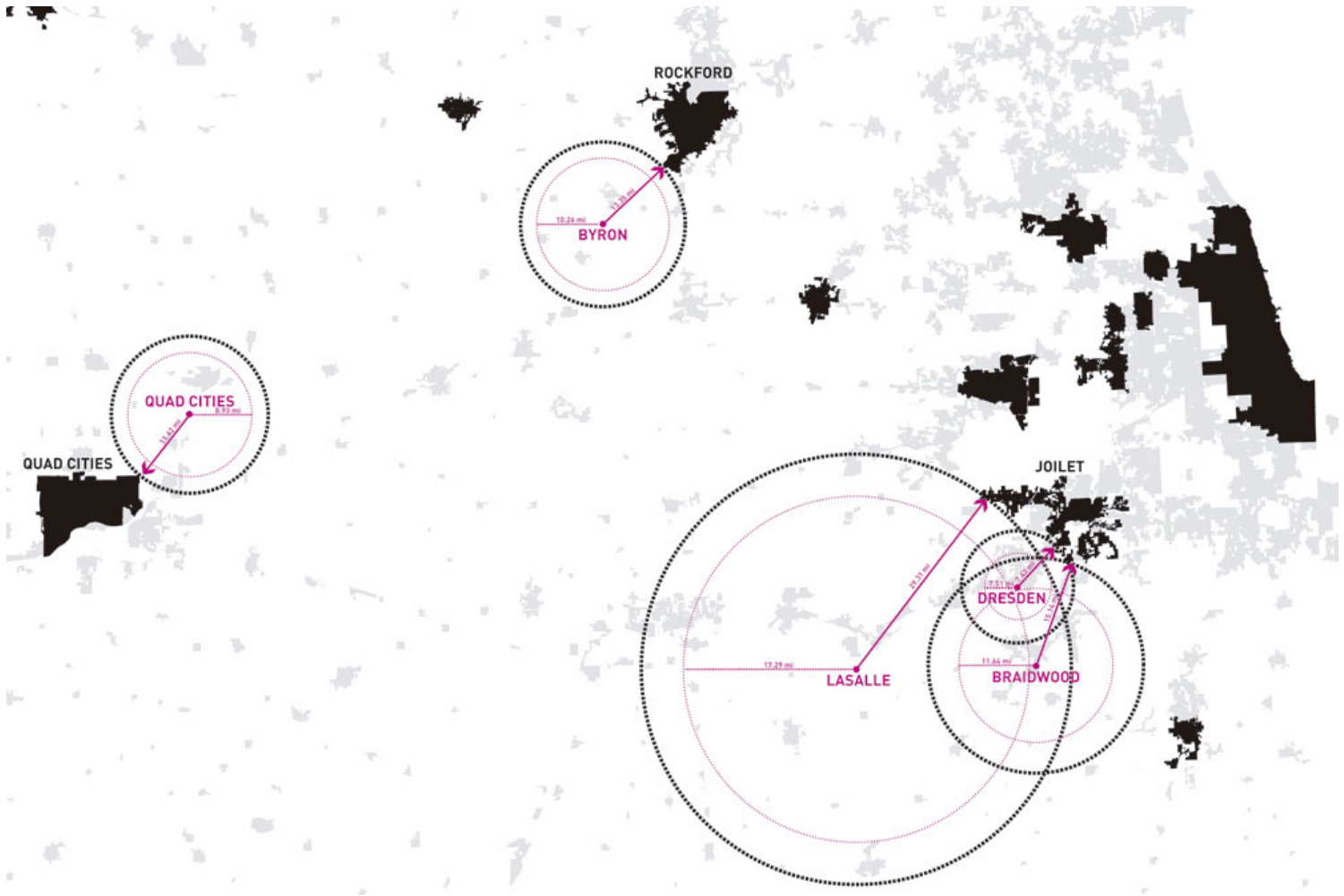
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Agricultural Hinterland Nuclear

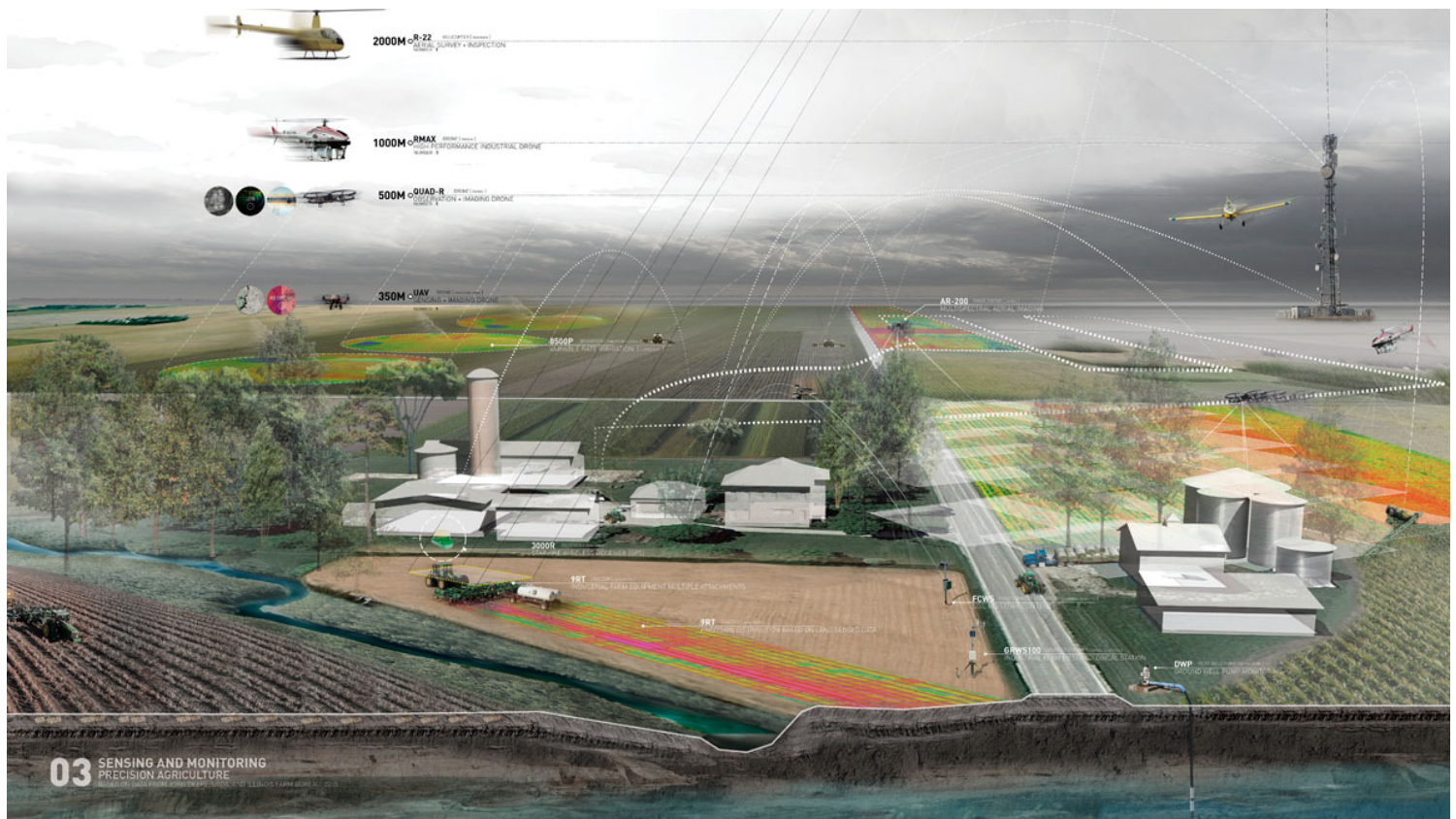
Cartography showing the spatial overlap of productive farmland yield and the location of nuclear power plants within that land.

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1.3x Nuclear Siting Ratio

Cartographic diagram showing the 1.3x distance ratio for nuclear power plants to be located away from cities that are 25,000 population or more.



Precision Agriculture Remote Sensing

Section diagram showing the relationship between remote sensing and Precision Agriculture. Agriculture and Nuclear Power plants are often located in the same spatial hinterland.

Precision Agriculture for Nuclear Containment Breach Sensing

The embedded sensing equipment of Precision Agriculture would allow for sites of observation and sensing to claim the nuclear power plant site.

Precision Agriculture for Containment Breach Response

The existing agricultural production equipment could be used to respond to a nuclear containment breach.

