James Romph and Adam Gincel

12/22/16

HST 495

Professor Wellerstein

Entertain and Educate: Interactive Media about Reactor Disasters

Video games, as a modern means of entertainment, have demonstrated great potential to convey information and educate audiences. Classic entries like *The Oregon Trail* have comfortably made their home in schools and educational programs, attaining significant fame for their worth as a teaching tool. Learning software designed with a gameplay experience has become prevalent in many fields – but one deficit waits to be patched up: educational games on nuclear technologies.

Nuclear warfare and disaster is a common theme in several blockbuster video game titles – the *Fallout* series, the *Metro* series, and specific instances of the *Call of Duty* series revolve such themes. These games are designed with entertainment in mind; the inclusion of nuclear technologies is used as a vehicle to tell a sensationalized story, not to educate. The large-scale disasters and doomsday scenarios in these games only reinforces the fear of the technology in popular culture. Misinformation and ignorance is never good, but it can be especially damaging with the energy crisis considered. Modern nuclear reactors and procedures are designed with safety in mind, such as thorium-salt reactors that drain their contents when they overheat. Major disasters often used to discredit nuclear energy, such as Chernobyl and Three Mile Island, were induced by design and decision-making errors – not any inherit danger with nuclear energy itself. This damaging viewpoint permeates the ranks of high politics – Green Party presidential candidate Jill Stein drew ire after making a misinformed comment about nuclear reactors on a message board[[1]](#footnote-1).

*Meltdown* is a computer game produced within this class to provide an educational computer game about nuclear reactor disasters. *Meltdown* puts the player in control of Mason, a recently hired nuclear technician working the night shift as a reactor maintenance technician. Mason walks around the facility, communicating with his coworkers and boss, learning about the technology he is responsible for. Through a computer program known as the Fuel Rod Upkeep (FRU) system, Mason adjusts the control rods and water intake of an RMBK-style nuclear reactor, much like the reactor that went critical at Chernobyl. As the FRU system slowly destabilizes, a test is scheduled during the day shift to find and repair the reactor’s problems – only for it to be postponed to the unprepared night shift team. Ultimately, negligence and inexperience from the team causes the reactors to go into full meltdown, and catastrophically detonate.

*Meltdown*’s gameplay systems and progression are inspired the Chernobyl incident, showing how long-term faults and human error create these disasters. The game focuses on a specific crew member and his involvement with the system, humanizing the story rather than using nuclear technology only as a vehicle for plot progression. The meltdown is portrayed as a direct consequence of actions, not a spontaneous and uncontrolled happenstance. These portrayals were chosen to undo such misconceptions about the incident. Lessons from the design and human error issues of Chernobyl can be applied to other noteworthy accidents – namely Three Mile Island and Fukushima, where poor indicator lights and low reactor floors contributed to their respective disasters. Reactor design and safety has been a huge talking point in the modern nuclear discourse, and *Meltdown*’s demonstration of a faulty reactor makes for an excellent supplement to the study of reactor design.

*Meltdown* was a two-person undertaking, with audio contributions from an outside party. The game was designed in *GameMaker: Studio*, a Windows-based game engine for multi-platform projects. *GameMaker*’s fast workflow coupled with a combined eleven years of team member experience greatly accelerated development. James Romph worked on the underlying gameplay systems, such as the reactor minigame, player movement and interaction with the environment, objective tracking and progression systems, and visual designs. Adam Gincel provided the conversational systems and the accompanied writing, created the level design and experience, and tied up any other loose ends as they appeared during the final stages of production. As a joint effort, *Meltdown* was built over 90 working hours, from ideation to final product (not including any additional research efforts along the way).

*Meltdown* features a simulation of an RMBK reactor. This simulation is simplified for a number of reasons: while we were given access to more formal RMBK reactor documentation, it was all in untranslated Russian and was highly technical. A degree of artistic license was taken with the reactor minigame, in order to provide an entertaining gameplay experience while also explaining the basic concepts of a nuclear reactor to someone with little prior knowledge.

*Meltdown* aims to fill a very specific, but important, niche. Nuclear reactors and facilities are a modern-day concern for many, and it is very easy to leverage misinformation and bureaucracy to disrupt efforts towards establishing it as a reliable source of clean energy. By taking a complex situation and putting it in an engaging, informative format, *Meltdown* seeks to educate and fight erroneous nuclear notions that exist in the modern day.

Works Cited

Alexievich, Svetlana. *Voices from Chernobyl: The Oral History of a Nuclear Disaster.* Picador. 2006.

Friedman, Edward, et al. *30 Years After the Accident: The Meaning of Chernobyl Today?* Fas.org. https://fas.org/event/chernobyl-30-year-anniversary-event/

Maki, Shiraki, and Makiko, Kitamura. *"Fukushima Nuclear Accident - U.S. NRC warned a risk on emergency power 20 years ago".* Bloomberg L.P. 16 March 2011. Web.

Medvedev, Grigori. *No Breathing Room: The Aftermath of Chernobyl*. Basic Books. 1993.

Schlosser, Eric. *Command and Control: Nuclear Weapons, the Damascus Accident, and the Illusion of Safety*. Penguin Books. 2014.

1. Comment from Reddit thread here: https://www.reddit.com/r/IAmA/comments/4ixbr5/i\_am\_jill\_stein\_green\_party\_candidate\_for/d31yzc7/ [↑](#footnote-ref-1)