

Perspectives from Previous DOE Low-Dose Research Program

**Developing a Long-Term Strategy
for Low-Dose Radiation Research
in the United States**

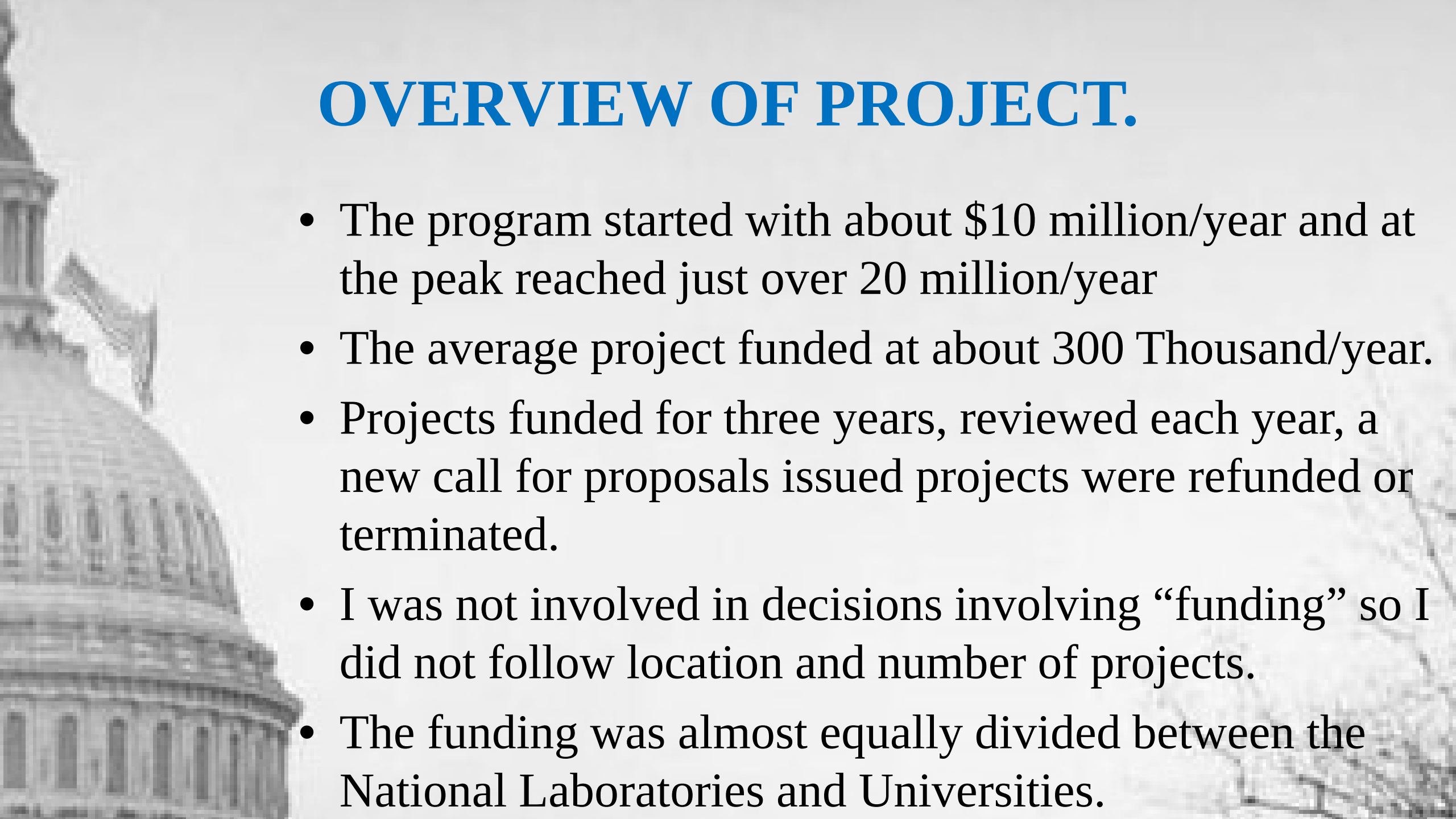
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**Dr. Antone L. Brooks
(Tony)**



Outline of Presentation

- Overview of the program including number of projects and Laboratories funded per year and \$ amounts.
- Areas where the Low Dose Radiation Research Program was successful.
- What were the shortcomings of the Program?
- Recommendations for the “NEW” Research Program!!



OVERVIEW OF PROJECT.

- The program started with about \$10 million/year and at the peak reached just over 20 million/year
- The average project funded at about 300 Thousand/year.
- Projects funded for three years, reviewed each year, a new call for proposals issued projects were refunded or terminated.
- I was not involved in decisions involving “funding” so I did not follow location and number of projects.
- The funding was almost equally divided between the National Laboratories and Universities.

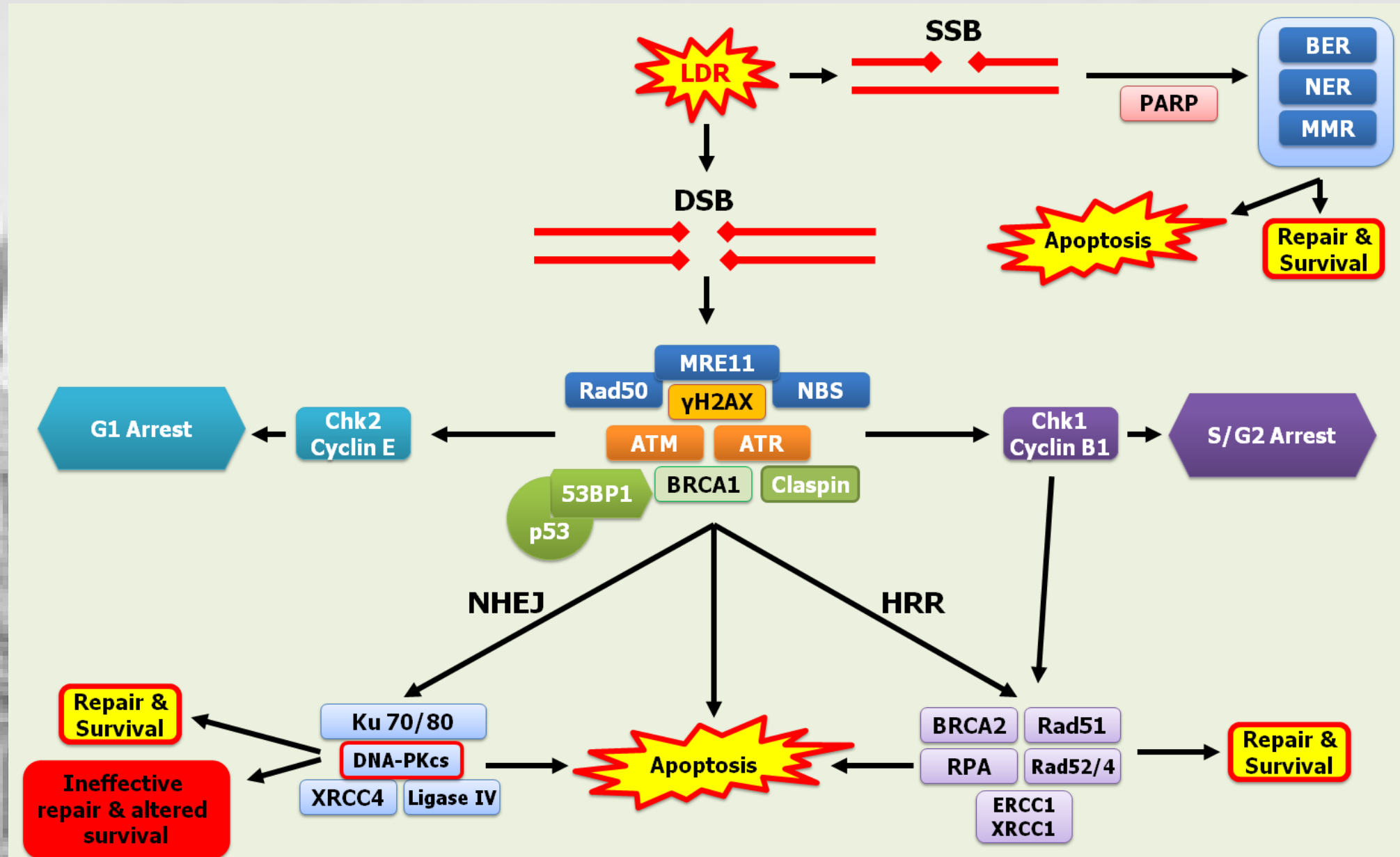
Areas where the Program was successful !!

- Funded the best science we could find anywhere in the World.
 - Microbeams in England
 - Low dose and Dose Rate studies in Canada
 - Studies at Chernobyl (Texas Tech University)
 - Mutation studies in Australia
- We got the money to the investigators!!
- Published the results in the open literature and Book with all the published data summarized.

Areas where the Program was successful !!

- Acted to help trigger world-wide interest in Low Dose Research.
- Let the data do the talking.
 - Sometimes the data were not what the scientific committee expected.
 - Defined molecular changes and pathways which were unique for high and low doses or radiation. Many low dose pathways were protective.
 - Adaptive protection for chromosome aberrations and micronuclei.
 - Lower frequency of transformed cells in low dose exposed compared to controls.
 - “Protective” epigenetic effects from low doses of radiation.
 - Increases in synthesis of “Protective” chemicals following low doses of radiation.
 - Activated immune system.

Low Dose Radiation & DNA Damage



WHAT WERE THE PROGRAMS SHORTCOMINGS?

- Loss of the advisory committee!!
- Need for more focused goals.
- Lack of outreach!!
 - Loss of projects focused on public and regulatory outreach
 - Meeting with Scientists, Regulators and Bureaucrats.
 - Meeting with Nuclear activists.
 - Meeting with the News Medium.
- Inadequate funding to maintain direction.
 - Failure to keep up with expanding costs of research.

RECOMMENDATIONS FOR “NEW” LOW DOSE RADIATION RESEARCH PROGRAM

- Learn from past mistakes of the Low Dose Radiation Research Program.
 - Provide adequate funding to keep up with high costs of doing modern research.
 - Strong advisory group.
 - Outreach and communication top priority.
- Need for carefully controlled molecular and cellular human studies using data and exposed populations from epidemiology and medicine where dose and responses can be carefully documented.
- Use best molecular techniques and up to date technology to develop mechanistic understanding of biological responses to low dose and dose rate radiation.
- Focus research on key events in critical pathways as cells are transformed from normal to cancer.

Summary

- The DOE Radiation Research program opened up many new areas of research.
- New Research must be based on the best scientific techniques and research tools available today to link mechanistic molecular and cellular studies to studies using human tissue.
 - These can draw from epidemiological, medical and planned human studies to further define radiation risk, costs and finally the potential for protection against and cure of cancer.
- New program must have careful oversight and direction toward well defined goals.
- New program should focus a significant part of the funding on outreach and communication of the research to allow the science to have an impact on regulations and safety.
- The funding of this new program is “Great News” if the money can be properly directed, focused on essential research, and have a direct impact on national health, safety and energy goals.

LOW DOSE RADIATION

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**THE HISTORY OF THE U.S. DEPT.
OF ENERGY RESEARCH PROGRAM**

**History of the
DOE Program**
AL Brooks