

## **Twenty Important Questions About the Worker Health Study and Radiation Activities at Rocketdyne**

### ***1. What is the Worker Health Study?***

Researchers at UCLA -- working with the California Department of Health Services and funded by the Department of Energy -- examined the exposure records of radiation workers employed at Rocketdyne/Atomics International (AI). The purpose of the study was to determine if exposure to radiation at Rocketdyne/AI increased the risk of dying from cancer among Rocketdyne/AI workers. An Advisory Panel made up of independent scientists, community and government representatives and a representative of the United Auto Workers approved the study design, gave recommendations during the study and reviewed the findings before the release.

### ***2. Who was included in the study?***

The study examined the radiation exposure records of 4,607 employees who worked at Rocketdyne/AI between 1950 and 1993. All workers had been monitored for radiation exposure and were enrolled in Rocketdyne's Health Physics Radiation Monitoring Program.

### ***3. What did the Worker Health Study find?***

There are no widespread health effects related to radiation exposure at Rocketdyne. Overall, Rocketdyne workers had a lower incidence of death from "all causes" and "all cancers" when compared to both the U.S. population and other worker groups. The study found a slight increased risk of leukemia/lymphoma and lung cancer among the 34 radiation workers who received greater than 200 milli-Sieverts (mSv) (20,000 millirem) external radiation exposure while working at Rocketdyne; this represents fewer than 1% of the total study group of Rocketdyne radiation workers.

### ***4. What did the Worker Health Study find in regard to internal radiation exposure?***

The study suggests an increase in leukemia/lymphoma and upper aerodigestive tract cancers in the internal radiation exposure groups. However, UCLA states in the final report that the results related to internal radiation exposure should be viewed with caution due to the small numbers and limitations of the methodology used to calculate internal exposures. A panel of expert reviewers felt that all of the findings associated with internal radiation exposures are questionable, difficult to interpret and not

consistent with what has been seen in a majority of other worker studies that examined higher exposures and larger study groups.

**5. *Should current or former Rocketdyne employees be concerned about the results of the study?***

Overall, the study showed that Rocketdyne radiation workers, in general, have lower rates of death from all causes and all cancers. Workers in the part of the study group that received over 200 mSv external radiation exposure should be aware of their exposure history and the fact that the study suggests that workers in this group have a slightly elevated risk of contracting certain cancers. Workers not in this group, yet that still have worked around radiation, should be familiar with their exposure records. Armed with that information and a clear understanding of the effects of radiation exposure enables the worker to make appropriate health care and lifestyle choices.

**6. *What is radiation?***

Radiation is energy or particles released from something. Several types of radiation exist; each with different characteristics. Nuclear radiation can be divided into a few general categories. Alpha and beta radiation refer to particles emitted by a radioactive substance. Gamma rays and x-rays are similar to light, except that they are much more energetic. Neutron radiation is created when certain types of nuclear material are used in reactors.

**7. *What types of radiation did this study examine?***

This study looked at ionizing radiation resulting from gamma, x-ray and neutron radiation for external exposures. In addition, the study evaluated internal exposure from records of intake of radioactive materials.

**8. *What is the difference between external radiation and internal radiation?***

*External radiation* is radiation that is created from sources external to the body. An X-ray machine produces external radiation, as do certain types of industrial radioactive sources.

*Internal radiation* is produced from radioactivity that has been taken into the body. The amount of the dose is highly dependent upon the type of material and upon the circumstances of the intake.

**9. *How much radiation exposure occurs naturally and from what sources?***

The U.S. population is exposed to radiation from a variety of sources known as “background.” These sources include cosmic rays, rocks and soil, food, indoor radon, fertilizer, smoke detectors, salt substitutes, ceramics, glassware, dental work, photographic emulsions, medical and dental x-rays, airline flights, etc. The normal

background levels of exposure to a member of the general public are generally about 3.6 mSv (360 millirem) per year or 250 mSv (25,000 millirem) over a lifetime.

***10. How and where would Rocketdyne workers have been exposed to external radiation?***

The primary exposed occupational groups are nuclear workers (Atomics International) who worked at the various fuel fabrication and reactor facilities operated at DeSoto or Santa Susana Field Laboratory (SSFL). Those workers currently involved in decontamination and decommissioning work at SSFL could potentially be exposed.

***11. How and where would Rocketdyne workers have been exposed to internal radiation?***

Internal exposures occurred in the fuel fabrication and analysis operations. In addition, decontamination and decommissioning personnel may have received internal radiation doses.

***12. Can you describe the major activities that led to Rocketdyne workers becoming exposed to radiation?***

The major activities that involved such exposures were fuel fabrication, fuel analysis, reactor operations, radiochemistry, and decontamination and decommissioning of these sites.

***13. What current activities at Rocketdyne would potentially expose workers to radiation?***

Today, Rocketdyne does not conduct any nuclear work. Exposures to radiation workers are very limited. The only associated activities are x-ray operations and cleanup of facilities used in former nuclear work.

***14. The study only goes through 1993. What exposures are workers receiving today during cleanup activities?***

The average dose has been steadily decreasing for the last six years as the decommissioning work is completed. For 1996, the average dose calculated from all monitored persons at Rocketdyne was 0.09mSv (9 millirem). The majority of badged personnel received zero occupational radiation dose.

**15. What control measures does Rocketdyne have to protect radiation workers?**

Work with radiation is a state and federal licensed and regulated activity. Rocketdyne has complied with these requirements and in many cases has exceeded the standards established by regulations. Workers involved in radiation work are routinely trained and monitored and are included in a medical surveillance program. An extensive radiation protection program has been maintained throughout Rocketdyne's history.

**16. How has Rocketdyne exceeded the standards set by state and federal regulators?**

Since the beginning, Rocketdyne has done everything possible to minimize and monitor radiation exposure to its employees. As science and technology has improved, the company voluntarily reduced exposure limits. In 1985, Rocketdyne set limits that were more than twice as strict as the established regulatory limits. No employee, while working at Rocketdyne, has ever received more radiation exposure than the regulations allowed.

**17. Should residents in the surrounding community be concerned about radiation exposure from Rocketdyne operations?**

Recent sampling of properties in the immediate vicinity of SSFL conducted by Rocketdyne in conjunction with the California Department of Health Services and the U.S. Environmental Protection Agency found that there is no significant source of contamination, either radiological or chemical, which results in exposure or risk to Rocketdyne's neighbors.

**18. What about radiation exposure from other Rocketdyne facilities where nuclear work has been conducted?**

Rocketdyne never released any radiation into the environment that exceeded airborne release limits. Protective measures to prevent excessive releases into the environment have worked. All releases that occurred were reported to the appropriate regulatory agencies. In addition, a comparison of routine environmental (soil and vegetation) monitoring data found no significant source of contamination which resulted in exposure or risk to Rocketdyne's neighbors.

**19. In light of the results of this study, what steps is Rocketdyne taking to promote the health and well-being of current and former employees?**

For all employees exposed to radiation, Rocketdyne provides convenient access to their exposure records. Medical monitoring is provided for all employees potentially at risk. For concerned employees, current job duties will be assessed and the company will work with them to minimize additional risks. Current and former employees will continue to have access to physicians who are specialists in this field of medicine.

They will be offered counseling and guidance to assist them in making healthy lifestyle choices.

***20. Where can I go for more information?***

Rocketdyne has established a toll-free number -- (800) 808-1160 -- to connect current and former employees and other interested parties with the appropriate people to address any concerns. This includes questions about the Worker Health Study, obtaining individual exposure records or talking with a medical professional or radiation protection specialist. In addition, extensive materials can be provided to private physicians to inform them about the Worker Health Study and radiation exposure at Rocketdyne.