

MEMORANDUM

March 20, 1994

TO: Arthur Pinchev
Helen E. Zukin

FROM: Joel I. Cehn, (510) 268-1571, or 914-6262

RE: **Rockwell Sampling of Institute Property - Second Round**

This is my report on the second round of radiological sampling at the Institute, which was conducted the week of March 7th. Soil and water samples were taken from the same locations as the 1992 sampling, plus several new locations. The attached figure shows where and what type samples were taken. The sampling was performed by Rockwell's contractor (McLaren/Hart) and observed/assisted by myself, Greg Dempsey of U.S. EPA and Donna Sutherland of the state D.H.S. Selected samples were split in half, with half to be analyzed by Rockwell and the other half to be analyzed by either me, EPA or the state. About a third of all samples taken were split in this way. The split samples that I took are shown in the attached Table.

The next step is to have the samples analyzed. This takes about 6 weeks. After the results are in, all participants share the data. Usually, McLaren/Hart acts as a clearing-house. We review all the data and identify any problems or unusual numbers. If there are a large number of these, we'll probably have a meeting to hash things out. Following all that, Rockwell will issue a draft report on the study.

Some Background on Radioactivity

Arthur requested a brief discussion of the radioactive elements that we are looking for in these samples. So, here is a paragraph each on tritium, strontium-90 and plutonium. Also a paragraph on the "gamma scan" analysis.

Tritium

Tritium is a radioactive form of hydrogen. It behaves like hydrogen so it's usually found in the form of water (H₂O). It comes from nuclear weapons testing, natural sources

and nuclear reactors (in order of importance.) Background levels are around 100 picocuries per liter of water (pCi/l.) The contamination at the SSFL/BBI boundary is likely due to their test reactors. The safety criterion usually used for tritium in the environment is 20,000 picocuries per liter (pCi/l.) However, this value is "borrowed" from EPA's drinking water standard. This standard applies to community drinking water sources only. EPA is drafting a clean-up standard for contaminated sites that would apply to SSFL. I'll know more about this standard when it's released later in the year.

Strontium-90

This is a radioactive form of the element strontium. It is present in soil due to atmospheric testing of nuclear weapons. It's also found in seawater and occasionally in freshwater. Typical levels for this area are about 0.1 pCi per gram of soil. There is no safety criterion for radioactivity in soil, but EPA is drafting one (see above.) The drinking water standard for Sr-90 is 8 pCi/l. In 1992, we measured up to 1.8 pCi/l in two water samples taken below the RMDF. This was above background levels that were measured at the time, and is likely due to Rockwell's activities.

Plutonium

This is also present in soil due to atmospheric testing of nuclear weapons. Despite what you read in the newspapers, it is not the most toxic substance known. However, it does deserve respect. Again, there is no safety criterion for radioactivity in soil, yet. In 1992, it was detected at 0.19 and 0.22 pCi/gram, in the ravines. This may be due to Rockwell's activities--I'll know more after the latest sampling results are in. Plutonium has not been found in any water samples.

Gamma Scan Analysis

Most radioactive elements give off gamma rays. These are unique for each element. Gamma rays from each element are characteristic, and can be used to identify the presence of that element. A gamma scan looks at all the gamma rays coming from a sample and identifies the elements emitting the rays. All soil contains radioactive minerals like uranium and radium. These will turn up in a gamma scan. What we're looking for are elements related to nuclear reactors, like cesium-137. A complicating factor is the background level of cesium-137 due to atmospheric testing of nuclear weapons. This background level is

about 300 pCi/gram soil. Cobalt-60, on the other hand, is not present in weapons' fall-out. If it turns up in a gamma scan, it is likely due to Rockwell's activities.¹ A large number of radioactive elements can be detected by this one test.

Well Sampling

Per our discussion, I spoke with Pam Blandino at Rockwell about our independent or split sampling of the wells and springs on BBI property. She is willing to cooperate with us and is waiting for our specific plans. I am working on a draft sampling plan and will have one to you in a few weeks. We can finalize it and then present it to Pam.

Testing of Honey

Arthur raised the question of possible contamination of honey produced in hives at the Avocado Grove. I looked into this. Contamination of honey is rare. It occurs when radioactive fallout is present on plants and flowers. Bees pick up this fallout and concentrate it in the honey. This might have occurred at Chernobyl, but is not a concern here. There's no need to have the honey tested.

¹ In Rockwell's annual report for 1993, cobalt-60 was apparently detected in well #RD-34, at 80 pCi/liter. I'm looking into this.

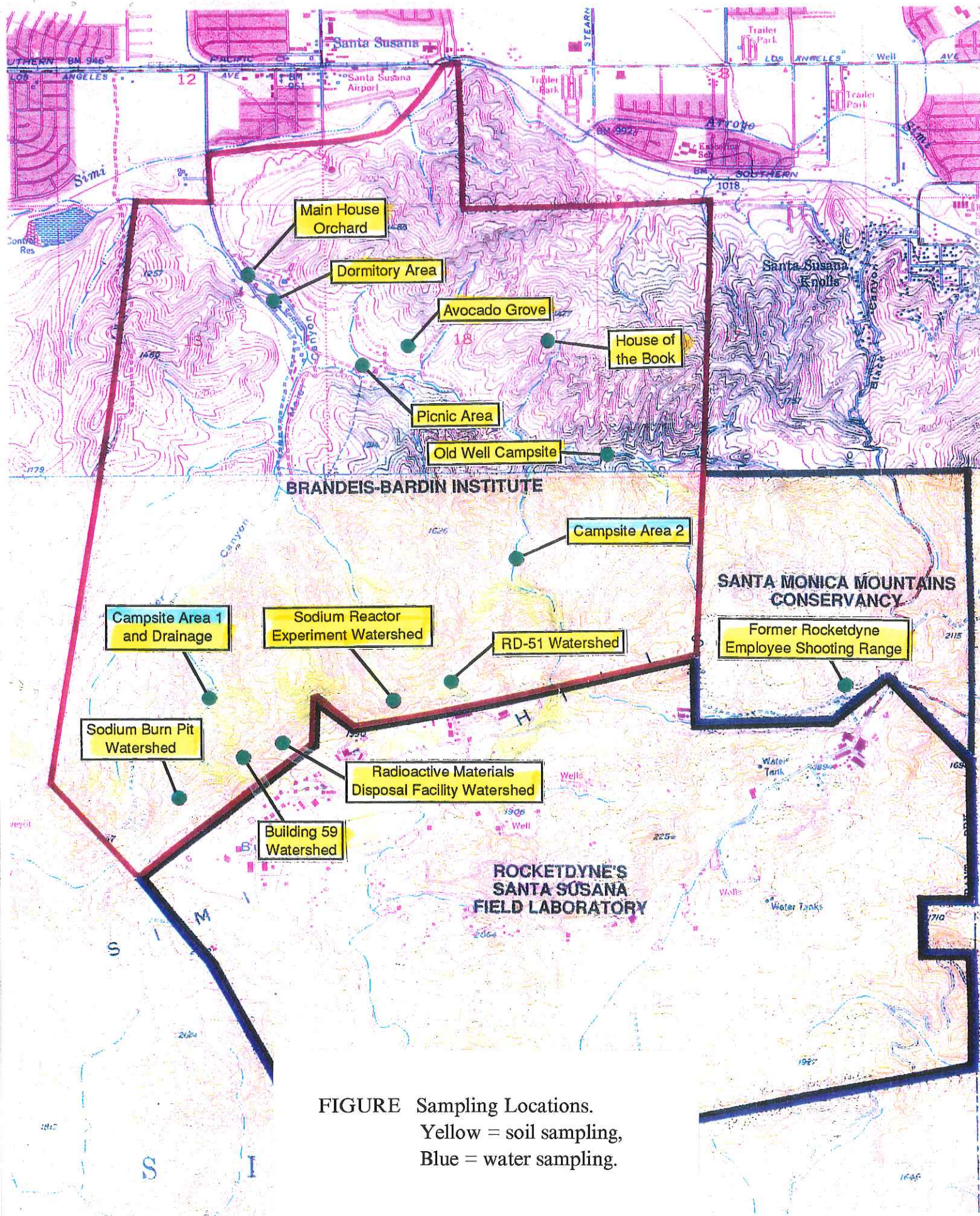


FIGURE Sampling Locations.
 Yellow = soil sampling,
 Blue = water sampling.

TABLE Samples Taken for Analysis by BBI ("splits")

CODE	LOCATION (see map)	TYPE (number)	ANALYSES
BB14	Old Well Campsite	soil	tritium
BB04	Campsite #2	soil, water	
BB06	House of the Book	soil	
BB13	Avocado Grove	soil	
BB05	Picnic Area	soil	
BB02	Dormitory Area	soil	
BB12	Main House Orchard	soil	
BB03	Campsite #1	soil (2)	
BB20	Ravines above Campsite #1	soil (3)	tritium, strontium-90, gamma scan
BB16	Ravines below RMDF	soil (2)	
BB15	Ravines below well #RD-51	soil (2)	tritium, plutonium
BB19	Ravines below sodium reactor	soil	strontium-90, gamma scan
BACKGROUND LOCATIONS			
BG02	Santa Susana Park	soil	tritium, strontium-90, gamma scan, plutonium
BG10	Wildwood Park ravine	soil	
BG12	Tapia Park ravine	soil	