Support of Synchrotron-based Research at the Advanced Light Source, the Advanced Photon Source, the National Synchrotron Light Source, and the Stanford Synchrotron Radiation Laboratory

J. Bargar[1], J. Fitts[2], S. Hubbard[3], K. M. Kemner[4], P. Northrup[2], B. Ravel[4], D. K. Shuh[3], and S. Webb[1]

[1]Stanford Synchrotron Radiation Laboratory, Menlo Park, CA; [2]Environmental Sciences Department (National Synchrotron Light Source), Upton, NY; [3]Chemical Sciences and Earth Science Divisions (Advanced Light Source), Berkeley, CA; [4]Environmental Research Division (Advanced Photon Source), Argonne, IL

To develop effective and efficient remediation strategies, a better understanding is needed of:

- How and what microbiological and geochemical species are distributed relative to contaminants and within natural geological material;
- Biogeochemical processes that occur within that system and the influence that they have on hydrological properties that govern flow; and
- The rates at which those processes occur.

Synchrotron radiation (SR) approaches have become integral and powerful tools for investigating the speciation, spatial distribution, reactivity, and chemical transformations of contaminants and their relations to chemical, geological, microbiological, and hydrological properties. SR methods enable a wide range of investigations, including the study of solute-solvent systems, poorly crystalline materials, heavy metal interactions with biogeochemical materials, heavy metal interactions with biogeochemical surfaces, and radioactive materials. SR permits investigations at the scale where these processes occur and often under natural conditions. Such studies, coupled with environmental investigations performed at larger length scales, can increase our fundamental understanding of environmental materials and processes. This improved knowledge provides the basis for improved environmental risk assessment, management, and remediation.

This presentation describes a new Environmental Remediation Science Division (ERSD) Program that is being developed at the Advanced Light Source (ALS) of LBNL, the Advanced Photon Source (APS) of Argonne National Laboratory, the National Synchrotron Light Source (NSLS) of BNL, and the Stanford Synchrotron Radiation Laboratory (SSRL) of SLAC. The program will facilitate the use of synchrotron radiation for environmental researchers and, in particular, NABIR and EMSP researchers. Support includes assisting users in identifying the appropriate light source, navigating the light source proposal process, choosing appropriate SR techniques given the problem at hand, providing assistance in running samples and, in some cases, analyzing data and assessing the results.

This presentation will describe this new program, introduce representatives and points of contact from each light source, and provide examples of recent highlights from each light source that are relevant to NABIR and EMSP research. Additional information on how to gain access to each facility and on upcoming workshops designed to educate the novice user about the use of synchrotron radiation in NABIR-related research (SES-III Conference) will also be provided.