

DOE-ID NEPA CX DETERMINATION

Idaho National Laboratory

SECTION A. Project Title: Water Security Test Bed (WSTB)

SECTION B. Project Description:

This project was extensively described in Environmental Checklists (ECs) Idaho National Laboratory (INL)-13-014 (Overarching [OA] 5) and INL-13-014 Revision (R) 1 (OA 5). Upon review, it was determined that additional planning and detail was required to fully describe the project and associated activities. Both INL-13-014 and R1 to that EC are canceled; this EC will replace them. Future revisions may address additional project details regarding design, construction, and operational details and limitations as they become known through the project planning process.

Background

Since its inception, the Environmental Protection Agency's (EPA) Homeland Security Research Program (Sponsor) has been providing water professionals with information and technology that aid in assessing vulnerabilities and detecting contamination in water distribution systems. While this work will continue, future research will also focus on helping with contingency planning, decontamination of water infrastructure and designing future infrastructure to be more resilient to intentional damage and damage from natural disasters.

Contamination of drinking water distribution systems could result in adverse public health and economic consequences. The magnitude of consequences could be reduced if contaminant detection is rapid and accurate. While emerging technologies for the detection of chemical, biological, and radiological contaminants in drinking water are promising, existing technologies can be improved. The focus of this project is to test and evaluate commercially available technologies, as well as emerging and pre-commercial technologies. The resulting data would provide water utilities with information to make decisions on which technologies to utilize. This project will also provide rigorous scientific data to identify gaps in technology performance that can be resolved through enhancements.

The Long Term Goal of this work is to create a WSTB at the INL Power Burst Facility (PBF)/Critical Infrastructure Test Range Complex (CITRC) area. Battelle Energy Alliance, LLC (BEA) would install an above-ground piped water system using six to eight inch cast iron pipe. The piping material would be no less than thirty years old with significant corrosion and tuberculation inside. It would be designed to allow the study of phenomena associated with intentional or accidental contamination of the water and piping system by a variety of contaminants – radiological, biological and chemical. EPA scientists would cooperate with BEA scientists and possibly scientists from the Department of Defense (DOD), Department of Homeland Security (DHS) and Health and Human Services (HHS) to design and conduct the experiments. BEA's operating systems would simulate the diurnal flow demand of a typical water distribution system in a square pipe lay out above ground with dimension of approximately 300 feet by 600 feet. Contaminants would be introduced into the WSTB via a chemical feed pump and then its progress would be tracked by taking samples from various sampling points which are installed throughout the pipe system to simulate household service connections.

The WSTB would not be connected to existing INL drinking water systems; water from the PBF potable water system would be pumped into a clean WSTB supply tank via an air gap and then removed from the system. The WSTB would include tanks and piping to allow for system pressure control, receipt of continuous water flow for several hours, system sampling, tankage for clean water, contaminated water, filters, ion exchange units, and other treatment tanks. The WSTB system would be designed and operated to recycle/reuse water to the maximum extent practicable. Test bed assembly/operation and discharge permits/agreements would be obtained, as required. Tankage would be above-ground and may be purchased or rented (including frac tanks up to 50,000 gal capacity). Water in the system may be heated or cooled, as necessary to maintain conditions typical of buried distribution piping. It is possible the WSTB would be drained during the winter. Office, lab, and control-room trailers would be required. Supervisory Control and Data Acquisition (SCADA) control systems could be installed.

Scope of Work for this EC

The source of old piping for the WSTB is expected to be abandoned drinking water pipe in the PBF/CITRC area. The initial source of piping would be abandoned piping between PBF-632 and the former reactor site for PBF-620. If required, abandoned piping between PBF-632 and other PBF facilities may be excavated. The pipe would be excavated and removed under the direction and guidance of both Cultural Resource and Biological Resource personnel. While pipe removal would be performed with as little environmental disturbance as possible, excavation areas may require revegetation. Excavated piping which does not meet project needs due to size or condition would be disposed or recycled after sampling has shown it to be free of contaminants.

Excavated pipe, not immediately needed would be stockpiled within the PBF/CITRC area. Excavations from which pipe was removed would be backfilled and managed in accordance with direction from Biological Resource personnel. It is understood that revegetation, if required, may be a multi-year effort.

The aboveground WSTB would be assembled based on American Waterworks Association (AWWA) standards for pipe installation and materials. Pipe would be installed on above-ground supports such as "jersey barriers." Fresh water would be introduced to the piping assembly under passive pressure prior to and during an EPA inspection visit. EPA would physically inspect the yet-to-be functional test bed assembly for obvious leaks, pipe movement and other visual observations during a site visit. EPA would approve the installation in writing to INL. EPA would notify INL in writing of any modification or adjustments needed.

At the end of leak testing, the system would be drained. Potable water could be drained into a tank for future use or it could be discharged to the asphalt/ground in accordance with PLAN (PLN)-8104.

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A diagram of the proposed WSTB is shown in Fig 1:



Figure 1. WSTB Proposed Location

Future activities and projects using the WSTB may require individual environmental checklists, and would be reviewed by Environment, Safety, and Health (ESH) for compliance with this checklist.

Some of the experiments would require use of pesticides, short-lived radionuclides, heavy metals and other contaminants at the mg/l or pCi/liter concentrations. Contaminants would not be added to the water in concentrations which would result in generation of a Resource Conservation and Recovery Act (RCRA) hazardous waste. The chemical, biological, and radiological tracers/contaminants currently identified are:

Chemical:

1. fluoride,
2. calcium chloride,
3. sodium chloride,
4. lithium chloride,
5. rhodamine, or
6. deuterium.

Hydrolysis products of selected chemical contaminants:

1. 1,4-dithiane
2. 1,4-thioxane,
3. Thiodiglycol sulfoxide
4. Ethyl methyl phosphonic acid
5. Diethyl phosphoramidate
6. Pinacolyl methylphosphonate
7. Thiodiglycol
8. Formamide
9. Aldicarb
10. Diesel fuel

Biological:

One or more gram negative rod bacteria, (such as certain strains of *Escherichia coli*). A gram positive spore forming *Bacillus* species (*Bacillus atrophaeus*, subsp. *globigii* for example). A bacteriophage (for example, as a surrogate for virus).

Radiological:

Short lived Atomic Energy Act (AEA) By-Product radionuclides such as copper 64 (half-life 13 hrs), or bromine 82 (half life 36 hrs). Each decays directly to naturally occurring, stable isotopes. Other AEA By-Product radionuclides will be limited to those with a half life of no more than 72 hrs for decay to a stable, naturally occurring daughter product.

Water samples may be analyzed at the WSTB, at on-INL labs, sent to off-INL labs, or sent to BEA in-town lab facilities.

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At the end of each test introducing contaminants to the WSTB, water would be drained from the system to a holding tank pending treatment to meet criteria for disposal of the treated wastewater at an INL wastewater facility, such as the Central Facilities Area (CFA) sewage treatment plant.

Additions to this list would require a review by ESH personnel prior to use. The review must include a determination of the maximum allowable concentration for use in the WSTB, possible treatment methods, and identifying the required treatment levels prior to discharge. Treatment levels for discharge would be identified through PLN-8104.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions - Pipe excavation has the potential to generate fugitive dust. Actions to minimize fugitive dust, such as application of water spray, shall be implemented, as necessary, to minimize fugitive dust. As required in the INL Title V Air Permit, fugitive dust suppression efforts must be logged by the Principal Investigator (PI), including the date, time, method, and amount of suppressant applied. These records may be inspected by state regulators. System assembly may require ephemeral use of mobile or portable generators. While emissions are exempt from permitting requirements, records must be available regarding the annual hours of use and preventive maintenance; contact the Program Environmental Lead (PEL) for details if generators will be used.

Disturbing Cultural or Biological Resources - Excavation and removal of old drinking water piping in the PBF area has the potential to disturb both biological and cultural resources. Excavation routes must be surveyed by both Cultural and Biological Resource personnel prior to beginning work and work shall be conducted in accordance with direction provided by those personnel. Depending on the time of year, a breeding bird survey may be required no more than two weeks prior to beginning work.

Disturbance of vegetation during pipe excavation may require revegetation of disturbed areas. Revegetation at the INL is often a multi-year effort and may require irrigation during part of the process. A final determination regarding revegetation will be made by Biological Resource personnel.

The PBF area is known to be rich in Cultural and Historical artifacts. Excavation activities may require routine monitoring and direction by Cultural Resource personnel. Discovery of some types of Cultural artifacts may require halting work pending a complete investigation.

Generating and Managing Waste - Construction and leak-testing of the basic piping system is expected to generate industrial waste. Industrial waste is expected to include scrap metal, common trash, and approximately 50-100 gallons of water released during leak-testing the system. Scrap metal will be recycled/excessed to the maximum extent practicable. Potable (approximately 50-100 gallons) water from initial leak testing would be discharged directly to the asphalt or ground surface in accordance with PLN-8104.

At the end of each experiment in which contaminants are introduced into the WSTB, water would be drained from the system to a holding tank pending treatment to meet criteria for disposal of the treated wastewater at an INL wastewater facility, such as the CFA sewage treatment plant. Experiments must be reviewed by ESH personnel prior to use of the WSTB. The review must include a determination of the maximum allowable concentration for use in the WSTB, possible treatment methods, and identifying the required treatment levels prior to discharge. Treatment levels for discharge shall be identified through PLN-8104.

There is a potential to create hazardous waste as part of the wastewater treatment process. All waste would be characterized and disposed by WGS.

Using, Reusing, and Conserving Natural Resources - Waste water will be re-used the maximum extent practicable. Scrap metal will be recycled/excessed to the maximum extent practicable. All applicable waste will be diverted from disposal in the landfill when possible. Project personnel will use every opportunity to recycle, reuse, and recover materials and divert waste from the landfill when possible. The project will practice sustainable acquisition, as appropriate and practicable, by procuring construction materials that are energy efficient, water efficient, are bio-based in content, environmentally preferable, non-ozone depleting, have recycled content, or are non-toxic or less-toxic alternatives. New equipment will meet either the Energy Star or Significant New Alternatives Policy (SNAP) requirements as appropriate (see <http://www.sftool.gov/GreenProcurement/ProductCategory/14>).

SECTION D. Determine the Recommended Level of Environmental Review (or Documentation) and Reference(s): Identify the applicable categorical exclusion from 10 CFR 1021, Appendix B, give the appropriate justification, and the approval date.

For Categorical Exclusions (CXs) the proposed action must not: 1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, or similar requirements of DOE or Executive Orders; 2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment or facilities; 3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; 4) have the potential to cause significant impacts on environmentally sensitive resources (see 10 CFR 1021). In addition, no extraordinary circumstances related to the proposal exist which would affect the significance of the action, and the action is not "connected" nor "related" (40 CFR 1508.25(a)(1) and (2), respectively) to other actions with potentially or cumulatively significant impacts.

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CX Posting No.: DOE-ID-INL-13-012

References: 10 CFR 1021, Appendix B to Subpart D categorical exclusion B3.6 "Small-scale research and development, laboratory operations, and pilot projects"

Justification: The proposed action is consistent with 10 CFR 1021, Appendix B to Subpart D categorical exclusion B3.6 "Siting, construction, modification, operation, and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than two years) frequently conducted to verify a concept before demonstration action, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment."

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) Yes No

Approved by Jason Sturm, Acting DOE-ID NEPA Compliance Officer on: 7/17/2013