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Subject Yellow Alert - Near Miss While Drilling Postholes

The following Bechtel Jacobs Company, LLC Lesson Learned Yellow Alert was generated as the result of a recent incident at the East Tennessee Technology Park (ETTP). This lesson learned is distributed to communicate the importance of field verification as part of the review of excavation/penetration permits. If you have any questions, please contact Joanne Schutt at (423)483-0554, e-mail=s6u@ornl.gov .

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TITLE: Near Miss Involving the Potential of Striking a 480-V Underground Line While Drilling Postholes

IDENTIFIER Y-1999-OR-BJCETTP-1003 DATE October 7, 1999

LESSON LEARNED STATEMENT: Field verification surveys are essential to achieve an acceptable level of certainty that an excavation will not breach an underground, embedded, or concealed utility.

DISCUSSION OF ACTIVITIES: Subcontractor personnel were drilling postholes in preparation for fence installation along the Northeast Patrol Road near Mitchell Branch. While drilling, the groundwater transfer line to the Central Neutralization Facility (CNF) was breached. Water flowed from the line and entered Mitchell Branch which constitutes an unpermitted discharge per the National Pollutant Discharge Elimination System (NPDES) permit and was reported in the monthly Discharge Monitoring Report to the State of Tennessee. This incident was classified as a potential concern/issue because at the time of the event there was thought to be a 480-volt line immediately adjacent in the same trench. Subsequently it was learned that there was a separation of approximately 13 feet between the transfer line and the 480-volt circuit, and that the 480-volt line was encased in a six-inch diameter concrete conduit. The subcontractor had been issued a penetration permit, but the permit did not indicate the presence of the 480-volt circuit or the transfer line, both of which had been installed approximately two years ago. All pumps to the transfer line were shut down by CNF personnel which stopped the flow from the pipe. Environmental Compliance personnel were notified to evaluate the water discharge as a potential noncompliance. The subcontractor ceased all drilling activities until the transfer line was located and identified. Subcontractor Technical Representatives (STRs) initiated repairs to the transfer line, and the transfer line was repaired. As-built drawings were reviewed, the pipeline location was flagged, underground locating surveys were performed and the drilling was resumed.

ANALYSIS: The drawings provided with the excavation permit did not reflect the presence of underground lines in the vicinity of the drilling activity. The direct cause was determined to be personnel error because the Excavation/Penetration Permit procedure was not used or used incorrectly. The procedure requires that the issuing authority "Request the Facility Owner sign the permit. (If they will not sign, list their name.)" The Facility Owner was aware of the existence of the underground lines and had a copy of the as-built drawings showing their location. The facility owner's name was neither signed nor listed on the permit.

The root cause was determined to be a procedure problem. The Excavation/Penetration Permit procedure requires that the issuing authority "Request the Facility Owner sign the permit. (If they will not sign, list their name.)" The Facility Owner was aware of the existence of the underground lines and had a copy of the as-built drawings showing their location. Had the procedure required that the Facility Owner sign the permit, the breach of the groundwater line could have been avoided. The procedure does not require locating surveys such as ground penetrating radar, electrical detection surveys, or other methods be used to provide indications of concealed utilities. The Excavation/Penetration Permit form has check boxes for indication as to whether a survey is required. Excavation/Penetration Permit - Utilities Identification states "As required, have a subsurface survey(s) conducted, to detect the presence of concealed utilities and when appropriate, provide markings to show the location of concealed utilities as accurately as possible based on the survey method(s) used." Other than a warning that survey results "should not be considered as positive proof of the absence of utilities or the exact position of a utility.", no guidance is provided for determining the criteria for requiring a survey. The header preceding states "On the basis of information available, underground, embedded, utilities marked "Yes" in the table below are known to exist at or adjacent to the excavation(s) or penetration(s) covered by this permit. This listing may not be a complete description of all obstructions. Site utility drawings are not complete and may contain inaccuracies. Those performing excavation/penetration work must be alert to encountering uncharted or inaccurately charted underground obstructions. Stop work immediately and contact the permit issuer if obstructions other than those defined are encountered." While there will always be a finite possibility that an unknown concealed line could be breached, every feasible means of ensuring that none exist should be employed. The tenets of both the Integrated Safety Management System and Zero Accident Policy must be fully incorporated into the procedure for Excavation/Penetration Permits. Field verifications must be mandated and appropriate detection technologies employed.

RECOMMENDED ACTIONS

1. Revise excavation/penetration permit procedure, to require the following
 - 1) The Facility Owner review and sign the permit;
 - 2) a field verification survey be performed; and
 - 3) the same team that performs the field verification shall perform the drawing review.

2. Issue a lesson learned to communicate the importance of field verification and that it would be a good idea to perform a review of one's excavation/penetration permit to ensure that proper personnel are required to perform field verification and drawing review.

PRIORITY DESCRIPTOR Yellow/Caution

FUNCTIONAL CATEGORY(S) (DOE) Conduct of Operations; Quality

FUNCTIONAL CATEGORY(S) (USER-DEFINED) OP - Conduct of Operations; PC - Planning & Controls; EL - Electrical; QA - Quality Assurance

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NAME OF AUTHORIZED DERIVATIVE CLASSIFIER J. S. Paris

NAME OF REVIEWING OFFICIAL J. F. Preston

KEYWORDS drilling, verification, permit, penetration, 480-V, subcontractor, drawing

REFERENCES Occurrence Report Number ORO--BJC-K25GENLAN-1999-0013

HAZARDS Electrical/NEC; Excavation & Trenching

WORK ACTIVITY Construction

FOLLOW-UP ACTION: Information in this report is accurate to the best of our knowledge. As means of measuring the effectiveness of this report please notify Joanne E. Schutt at (423) 574-1248, e-mail at schuttj@pwtor.com of any action taken as a result of this report or of any technical inaccuracies you find. Your feedback is important and appreciated.