



U.S. Department of Energy
Office of River Protection

P.O. Box 450
Richland, Washington 99352

02-OSR-0090

Mr. Ron F. Naventi, Project Manager
Bechtel National, Inc.
3000 George Washington Way
Richland, Washington 99352

Dear Mr. Naventi:

CONTRACT NO. DE-AC-01RV14136 - GEOTECHNICAL/FOUNDATIONS, FIREWATER,
AND INDUSTRIAL HEALTH AND SAFETY INSPECTION REPORT, IR-01-010

Reference: BNI letter from A. R. Veirup to M. K. Barrett, ORP, "Quality Assurance Review of
Purchase Orders," CCN 029128, dated March 11, 2002.

From December 10, 2001 – February 22, 2002, the Office of Safety Regulation performed an inspection of the Bechtel National, Inc. (BNI) construction activities associated with Geotechnical/Foundations, Firewater, and Industrial Health and Safety. The purpose of this letter is to forward the results of the inspection.

The inspection team identified two Findings, documented in the Notice of Findings (Enclosure 1). Details of the inspection, including the Findings, are documented in the enclosed inspection report (Enclosure 2). The first Finding resulted from the observation that George A. Grant, Inc. Construction Procedure CP-01 was not appropriate to the specific circumstance because the procedure failed to specify the method to be used to verify that structural loose fill layer maximum thickness requirements had not been exceeded. The second Finding resulted from the observation that fire hydrants, which had been receipt inspected, accepted, and in storage at the site, were not UL listed, as required by the Technical Specification. These issues are of concern because loose fill-height control is necessary to ensure proper soil compaction under important-to-safety and equipment structures, and UL listing for fire hydrants is required by the National Fire Protection Association code to ensure acceptable quality and performance. You are requested to provide a written response to these Findings within 30 days, in accordance with the instruction provided in the Notice of Finding.

During this inspection, the inspection team and BNI Quality Assurance and Quality Control staff identified a large number of construction and procurement related quality issues. As a result, the BNI Construction and Procurement Managers have taken steps to improve performance. The OSR was provided a brief description of the steps being considered during several meetings, and remedial actions to ensure appropriate quality of ongoing purchases were described in the above referenced letter. However, BNI has not fully described and documented its corrective actions. Please include in your response to the above Findings a description of your corrective actions and the results achieved to date.

Mr. Ron F. Naventi
02-OSR-0090

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If you have any questions regarding this inspection, please contact me or Pat Carier of my staff, (509) 376-3574. Nothing in this letter should be construed as changing the Contract, DE-AC27-01RV14136. If in my capacity as the Safety Regulation Official, I provide any direction that your company believes exceeds my authority or constitutes a change to the Contract, you will immediately notify the Contracting Officer and request clarification prior to complying with the direction.

Sincerely,

Robert C. Barr
Safety Regulation Official
Office of Safety Regulation

OSR:JWM

Enclosures

cc w/encls:
W. R. Spezialetti, BNI

NOTICE OF FINDING

Section C.6, Standard 7, "Environment, Safety, Quality, and Health," of Contract DE-AC27-01RV14136, dated December 11, 2000, between Bechtel National, Inc. (the Contractor) and the U.S. Department of Energy (DOE), defined the Contractor's responsibilities under the Contract as they relate to non-radiological worker safety and health; radiological, nuclear, and process safety; environmental protection; and quality assurance.

Standard 7, Section (e)(2)(ii) of the Contract required the Contractor to comply with the specific nuclear regulations defined in the effective rules of the 10 CFR 800 series of nuclear requirements.

Title 10 of the Code of Federal Regulations, Part 830, "Nuclear Safety Management," Subpart A, "Quality Assurance Requirements," required the Contractor to conduct work in accordance with the requirements of Subpart A and to develop a Quality Assurance (QA) Program that reflected the requirements of Subpart A.

The Contractor's QA Program was defined in 24590-WTP-QAM-QA-01-001, "Quality Assurance Manual," Rev. 0, dated August 2001 (QAM).

The QAM contained the policies that established the QA requirements for the project. QAM Policy Q-02.1, "Quality Assurance Program," Section 1.1 stated "The QA Program is binding on all project personnel, including those responsible for planning and scheduling activities and external organizations working under the direct control of BNI." QAM Policy Q-02.1, Section 1.10 stated "Suppliers who provide items, parts, materials, consumables, and/or services that are within the scope of this program shall perform work to an appropriate QA program and implementing procedures."

The Contractor's QAM Policy Q-05.1, "Instructions, Procedures, and Drawings," Section 3.1.1, states "Activities affecting quality shall be prescribed by and performed in accordance with documented instructions, procedures, and drawings of the type appropriate to the circumstances that include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished."

The Contractor's QAM Policy Q-07.1, "Control of Purchased Items and Services," Section 3.11.1, states "When receiving inspection is used to accept an item, purchased items shall be inspected as necessary to verify conformance to specified requirements...."

George A. Grant, Inc. is a contracted supplier of earthwork services to BNI. The George A. Grant, Inc., Quality Assurance Program-Basic, Revision 0, dated March 26, 2001, Section 5, "Instructions, Procedures and Drawings," states "This Program requires that activities affecting quality shall be accomplished in accordance with documented instruction, procedures or drawings appropriate to the specific circumstance. The documents shall include or reference appropriate quantitative or qualitative acceptance criteria for verifying that prescribed activities have been satisfactorily accomplished."

During the performance of an inspection of the Geotechnical/Foundations and Firewater activities conducted within the period December 10, 2001, through February 22, 2002, at the Contractor's offices and Waste Treatment Plant construction site, the Office of Safety Regulation (OSR) identified the following:

1. The George A. Grant, Inc. Construction Procedure CP-01, "Excavation and Backfill Work Control Guidelines," Revision 0, dated November 6, 2001, Section 6.2.5 states "Structural fill to be compacted by heavy equipment shall be placed in loose layers not to exceed a maximum of eight inches."

Contrary to the above, during performance of an inspection of the Test Pit 31 backfill and compaction activities, conducted January 24, 2002, the OSR identified George A. Grant, Inc. personnel were not verifying that the thickness of structural loose-fill layers did not exceed the maximum of eight inches and Grant Construction Procedure CP-01 did not specify any methods to be employed to measure, or otherwise verify, the acceptance criteria had been implemented.

This is considered an inspection Finding against the Contractor/subcontractor's QAM regarding the requirement to have appropriate procedures (see IR-01-010, Section 1.3, IR-01-010-01-FIN).

2. The Contractor's engineering specification 24590-BOF-3PS-PZ41-T0001, "Underground Fire Protection Piping Mains," Revision 1, dated 9/19/2001, specified the requirements applicable to fire hydrants. Section 4.7 of the specification, "Fire Hydrants," states "Hydrants shall be UL listed and FM approved."

Contrary to the above requirements, as of December 19, 2001, fire hydrants, which had been receipt inspected, accepted, and placed in storage at the site storage yard, were not UL listed.

This is considered an inspection Finding for failure to perform an adequate receipt inspection as required by QAM Policy Q-07.1, Section 3.11.1 (see IR-01-010, Section 1.5, IR-01-010-02-FIN).

The Office of Safety Regulation requests that the Contractor provide, within 30 days of the date of the cover letter that transmitted this Notice, a reply to the Findings above. The reply should include: (1) admission or denial of the Findings, (2) the reason for the Findings, if admitted, and if denied, the reason why; (3) the corrective steps that have been taken and the results achieved, (4) the corrective steps that will be taken to avoid further Findings, and (5) the date when full compliance with the applicable commitments in your authorization bases will be achieved. Where good cause is shown, consideration will be given to extending the requested response time.

U.S. DEPARTMENT OF ENERGY
Office of River Protection
Office of Safety Regulation

INSPECTION: Geotechnical/Foundations, Firewater, and Industrial Health and Safety
Inspection

REPORT NO: IR-01-010

FACILITY: Bechtel National, Inc.

LOCATION: 3000 George Washington Way
Richland, Washington 99352

DATES: December 10, 2001 - February 22, 2002

INSPECTORS: J. McCormick-Barger, Senior Regulatory Advisor, Inspection Lead
P. Carier, Verification and Confirmation Official
D. Kirsch, Consultant
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H. Doan, Consultant

APPROVED BY: P. Carier, Verification and Confirmation Official
Office of Safety Regulation

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EXECUTIVE SUMMARY
Geotechnical/Foundations, Firewater, and Industrial Health and Safety Inspection
Inspection Report Number IR-01-010

INTRODUCTION

This inspection of Bechtel National, Inc. (the Contractor) Geotechnical/Foundations, Firewater, and Industrial Health and Safety construction activities covered the following specific areas:

- Surveying Record Review (Section 1.2)
- Observation of Backfill and Compaction Activities (Section 1.3)
- Observation of Materials Testing Activities (Section 1.4)
- Fire Protection System Construction Activities (Section 1.5)
- Industrial Health and Safety Construction Activities (Section 1.6)
- Incident Response Inspection (Section 1.7)
- Follow-up on Occurrence Reports and Inspection Items (Section 1.8)

Significant Observations and Conclusions

- The records of completed surveying activities and surveyor staff training demonstrated conformance to established requirements. (Section 1.2)
- The Contractor had not provided adequate implementing procedures specifying the method to be employed in the field to verify loose fill lift thickness conformed to established requirements (Finding IR-01-010-01-FIN). For important-to safety (ITS) foundation excavation, backfill, and compaction, with the above exception, the Contractor had provided adequate: implementing procedures; design drawings; provisions to assure that only acceptable backfill would be placed; specification of backfill lift thickness and compaction; training of construction personnel; Quality Control inspections by qualified inspectors; and subcontractor procedures. (Section 1.3)
- The materials testing subcontractor had not implemented adequate measures to assure the results of testing were recorded on established test record forms as the testing was accomplished; had not assured that clearly approved testing procedures were included in the construction work order and release documentation; had not provided the Contractor with timely notification of nonconforming test results (a Contractor identified issue); and had not submitted the original records of non-ITS testing to document control. A Contractor-initiated construction hold was in effect on ITS soil testing at the time this inspection was completed. (Section 1.4)
- The Contractor had provided adequate information and requirements to ensure the firewater piping system was installed in accordance with the National Fire Protection Association (NFPA) requirements by trained craft and supervision; and the fire protection materials storage area conformed to established requirements. However, fire hydrants had been procured, receipt inspected, and stored without the required Underwriters

Laboratories (UL) listing (Finding IR-01-010-02-FIN); and firewater piping had been installed and partially covered with backfill without the completion of piping installation inspection documentation. (Section 1.5)

- Strong leadership and openness marked the industrial safety and health program. Discussions and observations of crafts, engineers, and project managers substantiated a consistently good safety attitude. No shortcuts impacting safety were noted during the inspection, and the Contractor was responsive in addressing identified deficiencies. (Section 1.6)
- In response to a water tank rollover incident, the Contractor initiated corrective actions involving training and personnel awareness regarding the subsequent operation of the remaining water tank. Following an initial problem with corrective action implementation, operational instructions were being followed. The administrative controls were appropriate and adequate for the short term. The subcontractor was installing a newly designed portable concrete base to address the unstable nature of the onsite soil. (Section 1.7)
- The Contractor implemented acceptable corrective actions to address Occurrence Report Nos. RP--BNRP-RPPWTP-2001-001, "Required Air Monitor Not In Operation While Performing Excavation Activities," and RP--BNRP-RPPWTP-2002-001, "Employee in Possession of Controlled Substance and Illegal Paraphernalia While Working at the Construction Site." The Office of Safety Regulation (OSR) accepted the Contractor's corrective actions, verified the corrective actions, and closed these Occurrence Reports in the DOE Occurrence Report Processing System. (Section 1.8)

**GEOTECHNICAL/FOUNDATIONS, FIREWATER, AND
INDUSTRIAL HEALTH AND SAFETY INSPECTION**

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GEOTECHNICAL/FOUNDATIONS, FIREWATER, AND INDUSTRIAL HEALTH AND SAFETY INSPECTION

1.0 REPORT DETAILS

1.1 Introduction

The purpose of this inspection was to verify that the Contractor had installed engineered foundations for important-to-safety (ITS) structures and firewater piping in accordance with regulatory requirements, design documents, and approved work procedures. The inspection examined the results of surveying activities to locate the buildings and the conduct of construction activities in the areas of backfill and compaction, materials testing, and underground firewater piping installations. The inspectors also reviewed the Contractor's implementation of its Industrial Health and Safety program, including observing Contractor and subcontractor work safety practices.

Details and conclusions regarding this inspection are described below.

1.2 Surveying Record Review (Inspection Technical Procedure (ITP) I-131)

1.2.1 Inspection Scope

The inspectors reviewed the Contractor's procedures for performing and documenting surveying activities, discussed completed and planned surveying activities with the Contractor's Lead Surveyor, examined surveyor drawings, verified the location of primary monuments, reviewed the training records and certifications of selected surveyors, and reviewed records of survey completion.

1.2.2 Observations and Assessments

The inspectors reviewed the procedure for construction surveying (24590-WTP-GPP-CON-3201A, *Construction Surveying*, Revision 0, dated 8/20/01) and examined the Contractor's implementation of and conformance with selected requirements.

The inspectors discussed the status of surveying activities with the Lead Surveyor; examined drawings detailing survey requirements (24590-BOF-C2-C12T-00002, *RPP-WTP Site General Arrangement Plan*, Revision 1, dated 12/4/2001 and 24590-WTP-FSK-CON-T-01-004, *Field Sketch HLW and LAW Excavation and Mudmat*, Revision 2, dated 11/19/2001); examined surveyor Field Book 021 (document number 24590-WTP-FLB-CON-01-021); examined records of completion of surveillance activities for locating the center and bottoms of six soil test pits and the envelope of excavation for the High Level Waste (HLW) and Low Activity Waste (LAW) buildings; examined the training records of six surveyors supervising and conducting survey operations; and verified the placement in the field of 4 (of a total of 6) primary

monuments. The inspectors found that the above documents and activity examinations conformed to established requirements.

The inspectors found that the training records selected for review conformed to the requirements of procedures 24590-WTP-GPP-CTRG-002, *Training*, Revision 0, dated 9/1/2001 and 24590-WTP-GPP-CON-1301, *Construction Training*, Revision 0, dated 11/12/2001.

The inspectors observed that the Lead Surveyor had not yet submitted surveying records to Project Document Control (PDC), and noted that procedures did not specify a time duration by which the records were required to be submitted to PDC. Discussions with the Lead Surveyor established that records of Total Station survey instrument calibrations and survey data were stored electronically, backed up, and printed out in hard copy. The Lead Surveyor was considering the transfer of the electronic records to PDC and was proceeding to transfer the surveyor Field Book 021, recently completed, to PDC. The inspectors considered this to be acceptable implementation of established record retention and storage requirements. However, the lack of requirements concerning the point at which records need to be transferred to PDC could result in quality records being retained in the files of the organization generating the records for some protracted period of time, during which the records would be subject to loss or damage. After discussions between the inspectors and the Contractor, the Contractor issued an e-mail to their staff, dated February 4, 2002, informing them that completed quality records were to be transmitted to PDC as early as practical.

The Lead Surveyor informed the inspectors that vendor training on the Total Station and Global Positioning System survey instruments had been provided during the week of December 3-7, 2001. The records of training completion and attendance were being finalized for inclusion in the individual training records.

1.2.3 Conclusions

The records of completed surveying activities and surveyor staff training demonstrated conformance to established requirements.

1.3 Observation of Backfill and Compaction Activities (ITP I-112)

1.3.1 Inspection Scope

The inspectors examined the Contractor's and subcontractor's programs and procedures governing the conduct of backfill and compaction activities, field engineering and quality control training and certification records, construction work documents, and field performance related to backfill and compaction activities for the Test Pit 31 (an ITS activity), and the HLW and LAW building foundations.

1.3.2 Observations and Assessments

The inspectors examined the following documents governing the conduct of excavation, backfill, and compaction of the HLW and LAW building foundations:

24590-BOF-3PS-CE01-T0001, *Technical Specification for Excavation and Backfill*, Revision 1, dated 10/1/2001

24590-WTP-GPP-CON-3202, *Excavation and Backfill*, Revision 0, dated 10/12/2001

George A. Grant, Inc. Construction Procedure CP-01, *Excavation and Backfill Work Control Guidelines*, Revision 0, dated 11/6/2001

George A. Grant, Inc. *Quality Assurance Program-Basic*, Revision 0, dated March 26, 2001

24590-WTP-GPP-CON-7101, *Construction Quality Control Program*, Revision 0, dated 10/1/2001

24590-WTP-GPP-CON-7106, *Quality Control Personnel Certification*, Revision 0, dated 10/1/2001

24590-WTP-GPP-CTRG-002, *Training*, Revision 0, dated 9/1/2001

24590-WTP-GPP-CON-1301, *Construction Training*, Revision 0, dated 11/12/2001

24590-WTP-FSK-CON-T-01-004, *Field Sketch HLW and LAW Excavation and Mudmat*, Revision 2, dated 11/19/2001

24590-WTP-EXPMT-CON-01-003, *Excavation Permit for Excavation for the HLW and LAW Buildings*, dated 11/26/2001

24590-WTP-EXPMT-CON-01-005, *Excavation Permit for Excavation of Trenches for Installation of Potable and Raw Water, Air, Sewer, Duct Bank, and Firewater Lines*, dated 12/3/2001; and the associated Work Package C-BOF-C1-001.

Based upon the above examinations the inspectors concluded that the Contractor had provided:

- Adequate implementing procedures for ITS foundation excavation, backfill, and compaction, except for specification of method to be employed to verify loose-fill lift thickness (see the discussion below, regarding this issue)
- Adequate design drawings to assure that the area, depth, sloping, and drainage of the excavations, backfill area, and mudmat for the HLW and LAW were specified
- Adequate provisions to assure that only acceptable backfill would be placed
- Adequate specification of backfill lift thickness and compaction

- Adequate provisions to assure that construction personnel were adequately trained
- Adequate measures providing for quality control (QC) inspections by qualified inspectors
- Adequate implementation of procedure requirements for allowing excavation work to proceed.

The inspectors examined the training and certification documentation for a Contractor Level III Civil QC inspector and a Level II Civil QC inspector and concluded that the documentation conformed to the requirements of the procedures governing QC personnel certification and construction training.

The inspectors selected four Contractor Field Engineers eligible to be assigned field engineering oversight activities of the excavation, backfill, and compaction subcontractor and examined their training records. The inspectors concluded the training records demonstrated conformance to the established requirements; the field engineers had completed the required training.

The inspectors examined the subcontractor's procedures for conducting excavation and backfill and conducting QC inspections and found these adequately repeated established engineering specification requirements: however, the procedure provided no requirement to conduct measurements to verify conformance with the eight inch maximum loose-fill depth requirement.

The inspectors examined the qualification records of the two subcontractor personnel assigned site quality assurance and QC functions and concluded these were in conformance with established requirements.

The inspectors observed the backfill, compaction, and surveying activities on Test Pit 31. This was an ITS activity because the pit extended into the footprint of the Pretreatment (PT) building, an ITS structure. The inspectors discussed the activities in progress with subcontractor personnel performing the backfill and compaction activity, the subcontractor Quality Assurance (QA) Manager, who was observing the activities, and the Contractor civil field engineer in charge of the activities. The inspectors observed the completion of backfill placement and compaction activities on two lifts.

The inspectors observed that, for the in progress backfill lift, the lift thickness was not measured or verified by any of the personnel at the pit location. The inspectors questioned the subcontractor QA Manager and the Contractor field engineer regarding how they assured that backfill lift thickness did not exceed the maximum thickness of eight inches. These discussions established that subcontractor personnel had performed no verification of backfill lift thickness; however, the Contractor field engineer stated that the first lift had been measured to be less than eight inches. The Contractor engineer also stated the average backfill lift thickness was being informally monitored by taking the difference between global positioning system (GPS) elevations and dividing this difference by the number of lifts placed between GPS measurements. However, at the time of the inspection, the field engineer was unsure of the number of lifts placed between the GPS measurements, the second of which was observed by the inspectors. The subcontractor Construction Procedure-01, *Work Control Guidelines-Excavation and Backfill*, Revision 0, dated 11/6/2001, paragraph 6.2.5, merely required "Structural fill to be

compacted by heavy compaction equipment shall be placed in loose layers not to exceed a maximum of eight inches." The inspectors determined that the procedure provided no requirements that the backfill lift thickness be verified by measurement and failed to specify the measurement method necessary to verify conformance to this acceptance criteria. In response, the Contractor, on January 25, 2002, documented this issue by Corrective Action Report number 24590-WTP-CAR-QA-02-019. Section 5, "Instructions, Procedures and Drawings," of the George A. Grant, Inc. Quality Assurance Program-Basic, stated "This Program requires that activities affecting quality shall be accomplished in accordance with instructions, procedures or drawings appropriate to the specific circumstance. The documents shall include or reference appropriate quantitative or qualitative acceptance criteria for verifying that prescribed activities have been satisfactorily accomplished." Contrary to the QA Program requirement, the George A. Grant, Inc. Construction Procedure-01 was not appropriate to the specific circumstance in that it did not provide acceptance criteria for verifying that the depth of loose-fill did not exceed eight inches, a prescribed activity. The inspectors concluded the subcontractor procedure was not adequate to ensure conformance with established acceptance criteria. This is a Finding (IR-01-010-01-FIN).

As a result of this Finding, the Contractor Construction Manager placed an administrative hold on ITS excavation subcontractor work until appropriate provisions were put in place to adequately control work activities. At the completion of this inspection, the administrative hold had not been lifted.

1.3.3 Conclusions

The inspectors concluded that the Contractor had not provided adequate implementing procedures specifying the method to be employed in the field to verify loose-fill lift thickness conformed to established requirements. This was considered a Finding (IR-01-010-01-FIN). The inspectors further concluded that, for ITS foundation excavation, backfill, and compaction, with the above exception, the Contractor had provided adequate implementing procedures; design drawings; provisions to assure that only acceptable backfill would be placed; specification of backfill lift thickness and compaction; training of construction personnel; QC inspections by qualified inspectors; and subcontractor procedures.

1.4 Observation of Materials Testing Activities (ITP I-112)

1.4.1 Inspection Scope

The inspectors examined the Contractor's and subcontractor's programs and procedures governing the conduct of material testing activities, field engineering and quality control training and certification records, construction work documents, and field performance of materials testing activities for the backfilling of Test Pit 31 (an ITS activity), and HLW and LAW building foundations.

1.4.2 Observations and Assessments

GN Northern was selected as the materials testing subcontractor, but was not initially released for ITS testing work until an assessment of readiness was performed by the Contractor's QA organization. On December 13, 2001, the Contractor completed the assessment of readiness of the materials testing subcontractor to perform ITS testing during Limited Construction Authorization Request (LCAR) construction activities. The assessment resulted in fifteen Corrective Action Reports (CARs) and six observations regarding a broad range of requirements. The Contractor determined the subcontractor was not ready to perform their contracted activities. The inspectors examined the results of the Contractor's assessment and concluded a thorough assessment had been performed; the Contractor imposed appropriate controls precluding the subcontractor from performing ITS related testing activities until the assessment issues were resolved. On January 15, 2002, the Contractor performed a limited scope audit of the material testing subcontractor to verify completion of corrective action on the CARs and concluded that the CARs had been adequately addressed and could be closed. The inspectors examined the limited scope audit and concluded the audit provided an adequate basis to close the CARs. On January 22, 2002, the Contractor released the subcontractor to perform ITS work.

The Contractor planned to perform an implementation audit of the materials testing subcontractor after they had been released to perform ITS work.

The inspectors examined the following documents governing the conduct of materials testing activities related to the HLW and LAW building foundations and underground fire protection system piping:

24590-BOF-3PS-C000-T0001, *Technical Specification for Materials Testing Services*, Revision 1, dated 10/1/2001

24590-BOF-3PS-CE01-T0001, *Technical Specification for Excavation and Backfill*, Revision 1, dated 10/1/2001

24590-BOF-3PS-PZ41-T0001, *Specification for Underground Fire Protection Piping Mains*, Revision 1, dated 9/19/2001.

On January 24, 2002, the inspectors observed the soils testing activities on Test Pit 31 to assess the degree of conformance with the above engineering technical specifications. The inspectors discussed the activities in progress with the material testing subcontractor personnel performing the testing of the compacted surfaces, and the Contractor civil field engineer in charge of the activities. The inspectors observed the completion of soils testing on two backfill lifts.

The inspectors observed that the subcontractor soils testing personnel were writing density and moisture test data on piece of folded paper for later transcription into the approved testing record. Two sets of tests had been annotated on the paper. The inspectors questioned the use of informal recording of test data and were told that the wind in the area of testing precluded the use of the approved form located in a binder with the work release and the test procedures. The subcontractor test personnel used the approved data sheets for recording test information on subsequent tests. The subcontractor testing personnel initially determined the moisture test data

on the sheet to be out-of-tolerance, and a water truck was summoned to water the area of backfill. The subsequent test was acceptable. It was later established that the initial test results demonstrated acceptable water content. The inspectors observed that the density and moisture test procedures being used by the subcontractor personnel contained no signatures approving the procedures or any identification that the procedures had been approved for use in the field. Subsequently, subcontractor personnel obtained a signed copy of the procedures and verified that the unsigned procedures were the most recent revision. The inspectors concluded that the GN Northern personnel demonstrated poor attention to detail and formality in the documentation of testing and assuring the proper, approved procedures, were in the construction work order and release book. In response, on January 25, 2002, the Contractor documented that the subcontractor was working to procedures with no evidence of approval, contrary to GN Northern's Quality Assurance Plan (QAP), Section 10.1, while performing soil testing in Test Pit 31 by issuing Corrective Action Report number 24590-WTP-CAR-QA-02018.

During an inspection of Test Pit 31 backfill activities on January 28, 2002, the inspectors were informed that two subcontractor gradation tests of fill material lifts, conducted on January 22, 2002, failed the size 200 sieve test with a value passing the 200 sieve in excess of 6.3% and 10.2% (5% was the maximum allowed to pass). The backfill lift providing the nonconforming sample had been buried under several subsequent lifts by January 28, 2002. The inspectors learned that the subcontractor had not notified the excavation subcontractor or the Contractor personnel regarding the failure until January 28, 2002. The Contractor wrote Corrective Action Report number 24590-WTP-QA-CAR-02-020 documenting the deficiency and requesting corrective action and wrote Nonconformance Report 24590-WTP-NCR-CON-02-002 to resolve the installation of out-of-specification backfill material. The inspectors examined the material testing subcontractor's QAP, Section 16, requirements regarding the handling of nonconforming conditions. The inspectors concluded that the subcontractor QAP did not require that the Contractor be notified immediately of nonconforming test results; however, discussions with the Contractor QA Manager established that the subcontractor's contract required notification of the client in all cases of nonconformance with technical requirements. The inspectors concluded, and concurred with the Contractor, that the subcontractor had not provided the Contractor with timely notification of nonconforming test results.

During a review of the material testing subcontractor records at the Contractor's records storage area, the inspectors observed that subcontractor submitted records of testing that had been transcribed from the original data sheets and, apparently, retained the original data sheets at the subcontractor's home office facilities. The Contractor had not yet received any records of ITS testing activities and the records reviewed documented non-ITS testing. However, it was clear from discussions with the contract administrator that the same process would be used for ITS testing. The records at the Contractor's facility failed to provide necessary information such as the name of the technician performing the test, backup calculations, and measuring and test equipment used. The inspectors brought these records and deficiencies to the attention of the Contractor's QA Manager. The Contractor's QA and QC staff performed a surveillance of the subcontractors records at the subcontractor's offices and found numerous deficiencies. In response to this issue, on January 30, 2002, the Contractor's QA organization evaluated the records and issue and documented the situation by Corrective Action Report 24590-WTP-CAR-QA-02-023 and stopped ITS work until the record deficiencies were corrected and the program for records generation and submittal were brought into conformance with the Contractor's

specification requirements. The Office of Safety Regulation (OSR) determined that this situation would not be identified as a Finding because the OSR did not identify any ITS records which were nonconforming and the Contractor took prompt and comprehensive corrective action to evaluate and correct the discrepant records and records program once they were made aware of the potential for inadequate ITS records of materials testing.

At the completion of this inspection, the materials testing subcontractor was still not released to perform ITS testing activities.

1.4.3 Conclusions

The inspectors concluded that the materials testing subcontractor had not implemented adequate measures to assure the results of testing were recorded on established test record forms as the testing was accomplished; had not assured that clearly approved testing procedures were included in the construction work order and release documentation; had not provided the Contractor with timely notification of nonconforming test results (a Contractor identified issue); and had not submitted the original records of non-ITS testing to project document control. Based on these issues, the inspectors found that the Contractor's decision to continue to maintain a hold on any ITS material testing was appropriate to the circumstances.

1.5 Fire Protection System Construction Activities (ITP I-137 and I-138)

1.5.1 Inspection Scope

The inspectors examined selected procurements of fire protection piping system materials, associated receipt inspection documentation, the material storage locations, and fire protection piping material to determine whether fire protection procurement activities had been conducted as required by approved procedures. The inspectors examined field installation and testing activities for the firewater piping system for conformance with established requirements.

1.5.2 Observations and Assessments

The inspectors examined the following documents governing the installation of the firewater piping system:

24590-WTP-GPP-CON-7101, *Construction Quality Control Program*, Revision 0, dated 10/1/2001

24590-WTP-GPP-GCB-00100, *Field Materials Management*, Revision 0, dated 10/16/2001

24590-BOF-3PS-PZ41-T0001, *Underground Fire Protection Piping Mains*, Revision 1, dated 9/19/2001

Drawing DWG-24590-BOF-C2-FPW-00002, *Fire Water Yard Piping Sections and Details*, Revision 0, dated 9/25/2001

Drawing DWG-24590-BOF-M6-FSW-00001, *Piping & Instrument Diagram Fire Protection System Fire Water Main Loop System FSW*, Revision 1, dated 11/12/2001

24590-WTP-GPP-CON-3502, *Underground Piping Installation*, Revision 0, dated 10/19/2001

24590-WTP-GPP-CON-1201, *Construction Work Packages*, Revision 0, dated 9/28/2001

24590-WTP-GPP-CON-3504, *Pressure Testing*, Revision 0, dated 10/12/2001

NFPA 24, *Standard for the Installation of Private Fire Service Mains and their Appurtenances*, 1995 Edition

P-BOF-A-930-001, Construction Work Package-Firewater Piping in BOF Area A, dated 12/3/2001

P-BOF-B-930-001, Construction Work Package-Firewater Piping in BOF Area B, dated 12/3/2001

P-BOF-C1-930-001, Construction Work Package-Firewater Piping in BOF Area C1, dated 12/3/2001

C-BOF-C1-001, Civil Construction Work Package-Install Firewater Piping in Area C1 Trench, dated 12/3/2001.

The inspectors concluded that the above documents provided adequate information and requirements to ensure that the firewater piping system was installed in accordance with NFPA requirements by trained craft and supervision.

The inspectors examined documentation of fire protection system piping and components at the site and examined the site material storage area to assess the storage conditions of fire protection system consumables. The inspectors concluded storage area maintenance, housekeeping, and layout conformed to requirements of the Field Materials Management procedure.

On December 19, 2001, during an inspection of fire protection system equipment in the storage yard at the site, the inspectors observed that the received and inspected fire hydrants in storage were not UL approved, in that they were not embossed with the UL approval lettering. Specification 24590-BOF-3PS-PZ41-T0001, *Underground Fire Protection Piping Mains*, Revision 1, dated 9/19/2001, Section 4.7, requires that "Hydrants shall be UL listed." The Contractor's QAM Policy Q-07.1, "Control of Purchased Items and Services," Section 3.11.1, states: "When receiving inspection is used to accept an item, purchased items shall be inspected as necessary to verify conformance to specified requirements." The above specification specified the requirements applicable to fire hydrants. This is a Finding (IR-01-010-02-FIN).

During the tour of the site storage areas, the inspectors observed several hermetically sealed cans of E7018 welding electrodes within one of the enclosed container trailers. The inspector observed that the weld rod was stored on dunnage and was located in such a way that identification and control of the material was clear. The inspectors established that the material storage and identification conditions conformed to the requirements of the QA Manual and Field Materials Management instructions. The inspectors examined the Material Receipt Inspection documentation for the weld rod and concluded that the documentation conformed to established requirements.

The inspectors discussed the application of American Society for Testing and Materials (ASTM) Standards to the installation and testing necessary to support the installation of the fire protection system ground loop. Specification 24590-BOF-3PS-CE01-T0001, *Technical Specification for Excavation and Backfill*, Revision 1, dated 10/1/2001, Section 3.4, provided requirements for the placement and testing of bedding material covering buried piping in trenches. Engineering stated the following ASTM standards and Contractor specifications were applicable:

ASTM D 3740, *Standard Practice for Minimum Requirements for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction*, 2001 Edition

ASTM D 2922, *Standard Test Method for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)*, 1996 Edition

ASTM D 3017, *Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)*, 1996 Edition

24590-BOF-3PS-CE01-T0001, *Technical Specification for Excavation and Backfill*, Revision 1, dated 10/1/2001

24590-BOF-3PS-C000-T0001, *Technical Specification for Material Testing Services*, Revision 1, dated 10/1/2001.

The inspectors examined the above documents and concluded that they provided adequate requirements governing the installation of the firewater piping system.

During an inspection of fire protection piping installed in a trench, on January 28, 2002, the inspectors observed several sections of firewater piping that was not supported uniformly by compacted backfill beneath the piping as evidenced by gaps between the bottom of the piping and the backfill. The inspectors brought the concern to the attention of the firewater systems field engineer. The piping in question had not been inspected and accepted and was located in a trench just east of the site entry guard shack and extended south for about 500 feet. The specification 24590-BOF-3PS-CE01-T0001, *Technical Specification for Excavation and Backfill*, Revision 1, dated 10/1/2001, Section 3.4.7, required that "Recesses in the bedding shall be excavated to accommodate the bells and joints so that the pipe will be uniformly supported for its entire length." The Contractor stated that the discrepancy would be corrected using controlled density fill to fill in the gaps between the piping and bedding, as permitted by the engineering specification for Excavation and Backfill, Section 2.1.4, and stated that the status of piping

installed previously would be evaluated to determine whether similar deficiencies had been identified during the final inspection process. The inspectors concluded that the Contractor's actions were acceptable.

The inspectors observed that several hundred feet of firewater piping had been installed previously and was buried under fill, and questioned the basis for confidence that the buried piping had been installed as required by specification requirements. In response, the Contractor wrote Corrective Action Report 24590-WTP-CAR-QA-02-32 identifying that firewater piping had been partially backfilled and that no inspection reports had been completed to document the release for backfill and that, although the pipe had been inspected prior to backfill, no record had been made in the inspection forms. The corrective actions specified were to complete the inspection records to document that the required piping inspections had been carried out prior to verbal release for backfill and revise the procedure for Underground Piping Installation to require inspection documentation prior to partial backfilling. The inspectors concluded the corrective actions specified were adequate to resolve the discrepancies. The corrective actions were still in progress at the conclusion of the inspection.

The inspectors observed the performance of Area C1 firewater piping hydrostatic testing on February 14 and 19, 2002. During the February 14 test, the BNI test engineer terminated the test because of a leak on an elbow before the final test pressure had been reached. The leak was repaired and the system was hydrostatically tested again on February 19, 2002. The February 19 test also failed because a thrust restraint had moved resulting in a piping separation before the final hydrostatic test pressure had been reached. The Contractor was evaluating and repairing the piping system at the conclusion of the inspection.

1.5.3 Conclusions

The inspectors concluded the Contractor had provided adequate information and requirements (defined by engineering technical specifications, procedures, and drawings) to ensure that the firewater piping system was installed in accordance with the NFPA codes by trained craft and supervision; and the fire protection materials storage area conformed to established requirements. The inspectors further concluded that fire hydrants had been procured, receipt inspected, and stored without the required UL listing (Finding IR-01-010-02-FIN); and firewater piping had been installed and partially covered with backfill without the completion of piping installation inspection documentation.

1.6 Industrial Health and Safety Construction Activities (ITP I-160)

The inspection in this area focused on the Contractor's implementation of the Contract specified industrial health and safety requirements described in Office of River Protection Manual (ORP M) 440.1-2, *Industrial Hygiene and Safety Regulatory Plan for the Waste Treatment Plant Contractor*. Specifically, the inspectors assessed compliance to the requirements of the Contractor's *Non-Radiological Worker Safety and Health Plan for the River Protection Project-Waste Treatment Plant*, ISO 0001, which had been reviewed and approved by the OSR, along with applicable requirements specified in ORP M 440.1-2. Areas reviewed included the Worker

Protection Program, Safety Training, Industrial Hygiene, Hearing Conservation, Respiratory Protection, Personal Protective Equipment, Signs and Barricades, Excavations, Tools, Fall Protection, Troubled Contractor Program, Reactive Incident and Follow-up Program, and Blood Borne Pathogens/Occupational Medicine.

1.6.1 Inspection Scope

The inspection included a review of Limited Construction Authorization Agreement construction activities, use of related tools and equipment, and safety controls applied to the waste treatment plant construction site and Pit 30 mining site (Rock crushing activities). The inspectors toured the sites, observed several in-process activities, and examined the implemented hazard controls. The inspectors also reviewed applicable Job Hazards Analyses (JHAs) and training documents, and interviewed safety and health representatives and craft-persons on site.

1.6.2 Observation and Assessments

1.6.2.1 Worker Protection Program (RPP-WTP construction site)

Based upon a review of policies and practices for soliciting and encouraging input from workers regarding safe job planning, the inspectors determined that the Contractor's program and activities in this area were adequate and met applicable requirements. The Contractor's prompt action to assess and resolve employee safety concerns, expressed during pre-job Safety Task Analysis Risk Reduction Talk (STARRT) meetings, demonstrated that safety was a high Contractor priority and taken seriously by employees. For example, the inspectors observed, on one open item tracking form, during a STARRT meeting, an employee raised a concern regarding inadequate lighting. The concern was resolved/closed through the Contractor's procurement and employment of auxiliary lighting in critical areas. The employment of the lighting was witnessed by the inspectors. The inspectors separately interviewed the laborer's foreman and an excavation operator. Both individuals independently told the inspectors that concerns regarding safe working requirements around excavating equipment were emphasized in pre-job STARRT card meetings. Two STARRT cards were inspected and both emphasized excavation safety.

The inspectors interviewed a safety and health representative, and reviewed his training records. From this, the inspectors determined the safety and health representative had adequate training and experience in construction safety and health.

The Contractor's program to communicate employee safety rights and responsibilities was adequate. This was demonstrated through literature provided to all new employees and the verbal direction provided at the employee safety orientations. The capability of an employee to stop work for immediate danger was emphasized in the new employee training session attended by the inspectors, and was further emphasized in Contractor's policy "*Our Commitment*" which was distributed to all students. However, although the Contractor had posted the mandatory U.S. Department of Energy Occupational Safety and Health Administration rights and responsibilities poster on site (at the gate entrance), the inspectors observed that signs had not been placed in the

craft meeting/gathering area. Further, information regarding the location(s) of the Material Safety Data Sheet (MSDS) file had not been provided within the craft meeting area. A safety and health bulletin board was subsequently posted in the craft meeting/lunch room to direct crafts-persons to the locations of the MSDS book and health and safety plan.

During interviews with safety and health representatives, the inspectors were informed that they regularly provided input to construction activities to ensure that worker safety was considered. On several occasions the inspectors observed safety and health representatives touring the site and providing input to workers regarding worker safety. For example, during the inspection, the inspectors observed the initiation of a change to a work procedure, which eliminated working at elevated levels, as a result of safety and health representative input. This was documented in a safety and health representative's review of a JHA (*JHA to build and install roofing sections between conex boxes*, dated December 20, 2001). Based on review of this and other JHAs, the inspectors determined on-site safety reviews were conducted to reduce risk.

Although safety and health representatives and construction foremen stated they regularly conducted job site safety inspections, the inspectors learned that documentation of these inspections was not being generated. The inspectors informed the safety and health staff that ORP M 440.1-2 specifically required the Contractor to document safety and health inspections, including those of subcontractors. Prior to the completion of this inspection, the Contractor developed a process requiring that safety and health representatives document their inspections of work site activities in a logbook. The inspectors verified that the logbook was being utilized and that documentation of subcontractor activities was included.

The inspectors found that open or unresolved safety and health issues identified by the safety and health representatives were not being tracked until closure as specified in Section 4.5 of the Contractor's health and safety plan. However, after bringing this to the Contractor's attention, the Contractor developed a system to track significant employee safety and health concerns and open safety and health representative issues. This included developing an open item tracking system that tracked concerns that could not be corrected on the spot. The tracking system identified the concern, date generated, the individual identifying the issue, and the individual responsible for closure. The inspectors determined this system met the requirements of the Contractor's health and safety plan.

1.6.2.2 Industrial Hygiene (Pit 30)

The inspectors examined the manner in which the subcontractor identified, assessed, and mitigated Industrial Hygiene issues, as required by ORP M 440.1-2. During discussions with subcontractor management at the Pit 30 site, the inspectors learned that some baseline industrial hygiene monitoring and sampling had recently been conducted for sound pressure levels and ambient air particulate levels, as required by the Mine Safety and Health Administration (MSHA). The inspectors reviewed the results of the sampling and analysis and concluded they were adequate and compliant with the requirements of ORP M 440.1-2.

1.6.2.3 Hearing Conservation)(Pit # 30)

Pit 30 sound pressure level exposures had been measured in early December 2001. The Pit 30 subcontractor superintendent/safety person selected employees to carry the hearing dosimeters. The inspectors determined that the employee selection ensured a representative sampling was obtained. According to the superintendent, all personnel were covered under the hearing conservation program, as specified within MSHA, and received annual audio evaluations, to track their history, and specific training on hearing protection.

The inspectors observed hearing protection requirements being enforced at the job site. The JHA specifically indicated the measured sound levels within the plant and the requirement for approved hearing protection to be worn. All personnel observed during the inspection were wearing hearing protection within the plant area.

1.6.2.4 Respiratory Protection (Pit 30)

The inspectors examined the subcontractor's respiratory protection program for compliance with procedure 24590-WTP-GPP-SIND-010-0, *Respiratory Protection*. No respirators were being used or available on the River Protection Project Waste Treatment Plant (RPP-WTP) job site, other than some dust masks. Based upon the results of the particulate sampling/analysis, the inspectors determined the silica concentration levels were closely approaching the prescribed permissible exposure levels (PEL). The Contractor's safety and health personnel had reviewed the monitoring data and additional monitoring/sampling was underway. The Contractor stated they planned to monitor subcontractor exposure and methods of employee protection. Based upon the above, the inspectors determined the respiratory protection program conformed to MSHA requirements.

1.6.2.5 Safety Training (WTP Construction Site)

The inspectors examined the safety and health training provided to address the requirements of ORP M.440.1 Appendix A. Based upon the type of work in progress, safety training was adequate. The new employee safety-training program covered necessary elements of instruction needed for this phase of work. The Contractor stated as work continued, and other work activities occurred, additional training, such as fall protection, would be provided.

The inspectors attended the above mentioned construction safety class when applicable subjects such as wearing of PPE, motor vehicle safety, emergency response, STARRT cards, etc., were clearly discussed. The class was relevant and well presented, and was tailored for the risks that employees would encounter during this phase of construction.

For subcontractor employee training, the inspectors were informed QA staff was verifying specialized safety training during QA subcontractor program audits.

1.6.2.6 Personal Protective Equipment (PPE) (RPP-WTP Construction Site)

The inspectors examined site operations for compliance with applicable PPE requirements specified within ORP M 440.1-2, "Industrial Health and Safety Oversight Plan for the Waste Treatment Plant Contractor." The inspectors observed onsite personnel were wearing necessary personnel protective equipment. The Contractor was prepared to provide vests, safety eyewear, and hardhats at the guard station. The JHAs clearly specified the type of personal protective equipment required on the site based on the applicable hazards. All personnel observed were wearing appropriate personal protective equipment. Specialized equipment such as welding apparel and hoods were both issued by the Contractor and brought by the individuals as personal equipment. The Contractor stated personally supplied safety equipment was required to be inspected by the Contractor prior to use.

1.6.2.7 Signs and Barricades (RPP-WTP Construction Site)

The inspectors observed that appropriate signs and warnings were provided around the general construction site and conformed to procedural requirements. Stop and warning signs were provided where construction traffic moved across the access road. However, the inspectors observed that additional lighting of these areas was not provided during periods of poor visibility and darkness. In response, the Contractor installed temporary lighting at critical crossing areas within the site.

The inspectors observed caution signs were used at barricades for the ironworker performing rebar pre-assembly. The inspectors questioned whether the hazards associated with bending and cutting the rebar constituted an immediate hazard from iron fragments, cuttings, etc., thus requiring a danger sign. On January 3, 2002, the Contractor upgraded the signs to "danger" after performing a hazard evaluation.

1.6.2.8 Excavation (WTP Construction Site)

On January 8, 2002, the inspectors examined construction operations, procedural compliance, and pre-job planning associated with site excavations to determine if the Contractor was complying with the applicable safety and health requirements of ORP M 440.1-2. The inspectors interviewed the foreman of the operating engineers, an excavator operator, and the Contractor's designated competent person.

Based upon a physical examination of the trenching methods and controls (specifically at the C1 trench located at the southwest end of the WTP site), coupled with an inspection and evaluation of the daily trench safety report (dated January 8, 2002), the completed STARRT card of January 8, 2002, and Excavation Permit # 24590-WTP-EXPMT-CON-01-005, the inspectors concluded the program implementation met ORP M 440.1-2 requirements.

In order to safely plan for an excavation, the Contractor was required to seek locations and identification of buried utilities and other potential hazards prior to digging. The excavation permit was developed, signed, and approved to commence excavation in the C1 trench. The

locations of near-by buried electrical utilities and a monitoring well had been identified and located on the excavation permit drawings. Appropriate instructions to avoid the objects were included on the excavation permit. The permit required "laying back" the soil on all trenches greater than four feet in depth at an angle of 1.75:1. With one exception, discussed below, the inspectors observed that trench slopping conformed to established requirements.

Safe means of access and egress to the trench were provided and the risks of working around excavation machinery, while working in the trench, were checked and covered in the above referenced STARRT card. The operating engineer foreman stated the above-mentioned safety issues had been emphasized at the crew pre-job meeting.

The inspectors interviewed the Contractor's designated excavation-competent person and reviewed excavation permit 24590-WTP-EXPMT-CON-01-005, and the associated Daily Trench Safety Report completed by the competent person. The permit was being completed in accordance with the requirements of ORP 440.1-2.

As a result of this review and discussions with workers and the safety and health representative, the inspectors determined a competent person inspected trenches daily or more frequently depending upon weather conditions.

The inspectors observed a deeper trench/pit on the C1 excavation project where a manhole was being constructed (about nine feet in elevation from the bottom of the trench). The actual working face of the trench slope may have been less restrictive than required by the excavation permit (1.75:1). Survey stakes were placed on the determined top of the slopes to be cut. However, based upon field observations and some "pacing" by the inspectors (in order to approximate lateral distance) it was not clear if the calculations and survey requirements for excavation were based on the centerline of the pit or trench or the estimated toe of the working slope. The Contractor was requested to verify the manner in which this and other manhole or vault excavations were calculated. The Contractor determined that the trench/pit required rework and verified that the slope was graded from the toe of the actual working slope. During a subsequent site tour, the inspectors verified that the trench/pit 1.75:1 slope requirement was met.

1.6.2.9 Tools (Pit 30)

The inspectors examined the Contractor's use, storage, inspection, and maintenance of tools for conformance with the requirements of ORP M 440.1-2.

The inspectors walked through the entire plant site and observed operations with the superintendent and the corporate safety manager. Work areas and tool storage areas were assessed, and the following observations were made:

- One tool found in the operations yard, a ten-pound sledgehammer with an extensively cracked handle near the head, was unsuitable for safe use and was taken out of service.
- One protective shield was missing from a bench grinder within the tool area. Another shield on the same bench grinder was too dirty to see through and had been moved away

from the disc housing or the point of operation. This shield was inoperable. The shields were subsequently cleaned and correctly installed.

- The remainder of the tools observed within the operations yard and the tool room were being properly maintained, cleaned, stored, and protected.

Based on the above and following correction of the items identified, the inspectors found the tool care and maintenance program was in accordance with the requirements of ORP M 440.1-2.

1.6.2.10 Fall Protection (Pit 30)

The inspectors examined the Contractor's compliance with the relevant and appropriate requirements of worker fall protection hardware, operation, and tools, and the maintenance and care of the fall protection systems. The inspectors observed the following situations did not conform to applicable requirements of 29 CFR 1926, Safety and Health Regulation for Construction, Subparts M, Fall Protection, N, Cranes, Derricks, Hoists, Elevators and Conveyers, and X, Stairways and Ladders, (specified and referenced within ORP M 440.1-2).

- No top or mid-rail guards were provided for one work platform that was > 6' above ground level.
- Several work platforms or landings > 6' above ground level were missing mid-rails. The inspectors observed brackets were fixed to the posts for the purpose of attaching mid-rail guards.
- Wooden ladders found on the job site were defective. The ladder rungs were defective and loose or the wood rails were split or badly chipped. The visual damage was extensive requiring that they be tagged and taken out-of-service.
- Many of the semi-permanent industrial ladders, used for gaining access to work platforms, were significantly bent and twisted to the point that the side rails were deflected from the center of the ladder. The bending also caused changes in distance between steps. The ladder damage presented a hazard to employees and required repair.

After bringing these observations to the attention of the Contractor's safety and health representative, the Contractor/subcontractor took actions to correct the above deficiencies. On January 10, 2002, the inspectors performed a follow-up inspection and verified the deficiencies had been corrected.

The inspectors observed, at the Pit 30 site, the subcontractor's Job Safety Analysis, which was required to be read by every worker and on-site visitor, was simple and descriptive, and did an excellent job of alerting anyone to the potential risks associated with the plant operations. Also, the subcontractor had reduced the elevation from the operating floor to the top of the mining working face by 10 feet below that required by MSHA in order to enhance operator safety.

1.6.2.11 Troubled Contractor Program

The Contractor had requested a waiver to the industrial safety "hurdle" rates that a subcontractor must meet to be qualified to work at the WTP construction site. The rates are based upon the accident and injury claims history of the company over previous years. The rates were looked upon as one indicator of safety performance. The Contractor reported that it was difficult to find qualified subcontractors to provide necessary services that met Contract established safety related rates. The Contractor sent a letter to DOE requesting approval for a waiver for these rates on September 10, 2001, titled "Request for Waiver of Certain Terms of Clause H.22, *Subcontractor Environment, Safety, Quality, and Health Requirements*."

The Contractor issued specific guidance in how they would enhance the troubled Contractor safety program in 24590-WTG-GPD-SIND-009_0: *Mitigation Plan for Assisting Subcontractors Unable to Meet Contract Safety Performance Requirements*. The inspectors reviewed the guide, discussed the guide with the Contractor's safety manager, and reviewed other supporting documents to determine how the program was implemented. The specific emphasis of the inspection focused on the Contractor's ability to adequately enhance or "shore up" the troubled subcontractor's safety program once they were mobilized.

The Contractor's guide or mitigation plan provided specific requirements for Contractor oversight, the degree and amount of dedicated safety and health oversight by the subcontractor, training requirements, etc. Overall, the document provided the necessary guidance to Contractor personnel to acceptably assist the on-site troubled subcontractor. One provision in the guide required the proposed subcontractor safety person's credentials and experience be evaluated and approved by the Contractor. The inspectors reviewed documents of the Contractor's approval/disapproval actions on one subcontractor and determined the documentation demonstrated this element of the program was being implemented.

The inspectors met with the Contractor to discuss the mitigation plan and the implementation. The guide mentioned the existence of subcontractor mitigation plans when, in fact, the Contractor meant and used the subcontractors' submitted health and safety plans for assessment, not a mitigation plan. The Contractor stated they reviewed the submitted health and safety plans, reviewed the credentials of the key subcontractor personnel, and then requested, where necessary, that changes be made in the plans or submittals to meet the intent of the Contractor's guidance. The inspectors observed that the mitigation plan did not fully reflect what was actually being done. The Contractor corrected the document to reflect actual practice. Documentation, reviewed by the inspector, indicated that Contractor management was taking action on troubled Contractor submittals to ensure that adequate safety controls and leadership capability was provided prior to mobilization. Further, the Contractor planned to provide a brief subcontractor specific safety and health enhancement plan to provide the measurable performance activities necessary for the "troubled contractor" to enhance their safety and health program after mobilization. In addition, the mitigation plan contained an inconsistency regarding site safety coverage. One sentence indicated that site safety coverage would be based upon a graded approach and another stated coverage would be on a continual basis. The Contractor stated that some flexibility in allowing troubled subcontractors to provide safety personnel with joint/full-time (but compatible) on-site safety responsibilities was appropriate.

The Contractor stated they were using a graded approach when considering Contractor and subcontractor safety oversight coverage.

The Contractor was forthright in pointing out that the site safety coverage provided to troubled contractors was not substantially different from the site safety coverage provided to other Contractor and subcontractor activities. This was because they had three full-time safety and health representatives dedicated to site activities and made regular inspections of site construction activities. Based on a review of this coverage, the inspectors had no further questions in this area.

1.6.2.12 IH&S Program Reactive-Incident Follow-up

The necessary actions that must be taken in reporting, controlling, and managing an accident scene on a construction site, in the event of a significant industrial safety accident/event, are detailed in DOE Manual 232.1-1A, *Occurrence Reporting and Processing of Operations Information*, and DOE Order 225.1A, *Accident Investigations*. Both of these documents address requirements of ORP M 440.1-2. The inspectors interviewed a Contractor site representative at the Pit 30 site to determine how he would respond to a significant industrial injury or injuries. The Contractor site representative was verbally presented with an industrial accident situation and asked to go through the reporting, controlling, and investigation that he and other site leaders would perform. The responses received from the Contractor's site representative were consistent with requirements of the above manual and order. The Contractor site representative adequately discussed how the incident would be handled, i.e., reporting, response, notification, stabilization etc.

1.6.2.13 Blood Borne Pathogens/Occupational Medicine-Construction Site

The inspectors assessed the Contractor's level of compliance with health and safety requirements in the areas of occupational health and the protection from blood-borne pathogens. Specifically, applicable requirements contained within ORP M 440.1-2 were used as a basis of this inspection.

The occupational health facility was located in the main onsite visitor trailer. The facility was equipped to provide audio baseline evaluations, pulmonary function tests, and first aid response to site injuries. The level and type of care rendered was dependent upon the capabilities of the on shift medical provider, i.e., nurse practitioner, nurse, or physician. A working arrangement was in effect for the Hanford Fire Department to respond with Emergency Medical Technicians to assist a serious site injury.

To date, the only industrial injury case treated at this facility was for an office worker from a Richland facility. Construction site employee treatments have been limited to sore throats and headaches.

Medical practitioners within the local community conducted pre-employment medical evaluations. The health records were then provided to the occupational medicine facility and kept under locked and protected files. The occupational health nurse indicated that she was in

regular contact with the safety and health representative. Also, "return to work" permits, for personnel with prolonged sickness or ailments, were being processed through the occupational health office.

The occupational health nurse indicated body fluids in the form of urine and blood were present within the office. Further, bleeding can occur within the office and close proximity from a cut. In most cases, the cut can be cleaned and dressed in this office and the employee may then be returned to work and then monitored. In some cases, depending upon the circumstances, the injured worker would be stabilized and then transported to a local medical facility by the supervisor or transported by the Hanford Fire Department.

The environmental barriers, shields, and personal protective equipment such as gowns, drapes, cloths, respirators, glasses, and gloves were inspected. Further, the nurse described (from the company checklist) how the protective devices would be employed. The methods and equipment met applicable requirements.

The existing arrangements and facility was temporary and lacked running water for cleaning the patient, the health care provider, and the contaminated surfaces. The provider also kept lunch and a coffee pot in the treatment room. The above deficiencies were not in compliance with Contactor procedure 24590-WTP-GPP-SIND-011_0, "Bloodborne Pathogens," dated September 28, 2001. Further, the nurse had not visited the Pit 30 site and was not aware of the operations, which was not in compliance with ORP M 440.1-2. On the inspectors' return visit on February 11, 2002, these issues had been satisfactorily resolved. The subcontractor was required to provide a formal procedure, to be placed in the "turn-over" log, which describes how warm water is to be obtained and used in the event that decontamination of personnel or surfaces is required. All of the food and liquid beverages had been re-located out of the nurse's station. Further, all nurses were being shown the various sites and operations so that they were better informed of the potential risks. The inspectors concluded the program was being implemented in accordance with the requirements of ORP M 440.1-2.

1.6.3 Conclusions

Strong leadership and openness marked the industrial safety and health program. Discussions and observations of crafts, engineers, and project managers substantiated a consistently good safety attitude. No shortcuts, impacting safety, were noted during the inspection and the Contractor was responsive in addressing identified deficiencies.

1.7 Incident Response Inspection (ITP-161)

1.7.1 Event Description

During this inspection, an elevated water tank, used for storing and filling water distribution vehicles on the construction site, rolled over causing tank damage and minor flooding of an excavated trench. No personnel were injured during the event. The rollover occurred following the failure of a float valve designed to control the automatic filling of the tank during continuous

use. The valve failure resulted in the tank overflowing and the overflow water degrading the soil at the foot of the tank. Substantial tank base erosion caused the tank to rollover. At the time of the incident, the Contractor had two elevated water tanks in operation.

1.7.2 Observations and Assessments

Shortly following the event, the Contractor submitted a preliminary occurrence report to the DOE Occurrence Report Processing System (ORPS). The inspectors obtained a copy of the preliminary report and observed that the immediate corrective actions described were not being implemented. Specifically, the Contractor and subcontractor had discontinued providing continuous monitoring of the remaining elevated water tank when the automatic fill valve system was in operation. The inspectors discussed the change in operation with a Contractor industrial health and safety representative and the Contractor committed to re-establish continuous coverage until more extensive corrective actions could be taken (planned in the near future when the tank was to be moved to a new location).

Following re-implementation of the immediate corrective actions discussed above, the inspectors performed an in-depth review of the Contractor's mitigation, investigation, and recovery actions associated with the rollover incident. The inspectors focused on the Contractor's actions taken and planned to prevent recurrence. The inspectors reviewed the Contractor's preliminary occurrence report, RP-BNRP-RPPWTP-2002-0002, and performed an inspection of the remaining operational water tank's support, stability, operational procedures, and planned actions. The inspection included examining the base, footings, and surrounding stability of the ground below the remaining tank as well as interviewing and discussing mitigation actions with a teamster (water truck driver), Contractor's safety and health representative, subcontractor equipment superintendent, and the subcontractor's Project Manager. The following observations were made:

A procedure was developed and put in place requiring the water truck driver to shut off the tank fill valve to the remaining water tank at the manifold when no other driver was waiting in line or within the immediate area of the tank with interest in the valve operation.

A procedure was developed and put in place requiring the mechanic to turn off the hydrant valve feeding the tank manifold at the end of each shift and to turn the hydrant feed valve on prior to the start of shift, including partially filling the tank and testing the float valve shutoff system.

The existing tank base ground support was filled in and covered to within approximately 5' from the edge of the tank supports with heavy mil plastic sheeting under dirt. The base near the front of the tanks was also "cribbed" with timbers and backfilled as well as lined with plastic. No erosion or sloughing was noted which would have an adverse effect on the tank stability. A shallow and narrow channel had been water scoured from the manifold, during hydrant drainage operation. However, the channel was static in direction and depth and was 10-15 feet from the nearest tank support member. The existing ground was stable.

From discussions with the subcontractor superintendent and Project Manager, the inspectors learned that the location of the operational tank was temporary, as the area would be the site of

the sanitary sewer line. The remaining tank location was to be moved.

The subcontractor sketched a substantial portable base that was being designed by their engineering staff, which was to be composed of a reinforced concrete base laid on crushed gravel. Additionally, the tank support base was to be sloped on the edges and equipped with additional erosion prevention blocks on the ends. By the end of this inspection, the subcontractor had poured the portable base and was completing site preparation for the tank's new location. Follow-up of the Contractor's Occurrence Report documenting this incident will be tracked as incident notification report (INR) inspection follow-up number 02-002-INR.

1.7.3 Conclusions

Following initial problems adhering to stated immediate corrective actions, the Contractor had initiated training and awareness of the water tank rollover incident and improved the subsequent operation of the remaining water tank. Operational instructions were being followed. The administrative controls were appropriate and adequate for the short term. The subcontractor was installing a newly designed base that should address the unstable nature of the onsite soil. Based upon the above, the actions taken by the Contractor and subcontractor were adequate.

1.8 Adequacy of Closure of Inspection Items (Inspection Administrative Procedures (IAP) A-105 and A-106)

The following occurrence reports and inspection follow-up items were reviewed to determine if they could be closed. The inspectors reviewed the Contractor's description of the occurrences and open items, the corrective actions documented in the occurrence reports, and other information provided. The inspectors verified by work observation, records review, and other means as appropriate, that the corrective actions stated in the occurrence reports or associated corrective action documents were appropriately completed.

1.8.1 (Closed 01-001-INR) Occurrence Report No. RP--BNRP-RPPWTP-2001-0001, "Required Air Monitor Not In Operation While Performing Excavation Activities." On Monday, October 22, 2001, the Contractor notified the OSR of a reportable occurrence regarding failure (for 15 minutes) to have two ambient air monitors operational during RPP-WTP excavation activities as required by the State of Washington Department of Health (WDOH) approved Notice of Construction for excavation work permit. The Contractor stopped work until both air monitors were made operational, notified WDOH of the event (at 12:30 p.m. on October 22), and entered this occurrence in the DOE ORPS.

On Friday, October 19, 2001, just prior to the occurrence, the Contractor had disabled one of the ambient air monitors and moved it to a new location while excavation work was not in progress. However, the technician performing the relocation work had failed to restore the monitor to operation before leaving the site. Although Contractor environmental field representatives later identified the monitor was left inoperable and informed construction management not restart excavations activities until the monitor was restored to operations, excavation work had indeed started at 7:00 a.m. on Monday October 22, 2001, without the second monitor being made

operational. Once discovered at 7:15 a.m. on October 22, the Contractor suspended excavation work until the monitor was restored to operations.

Shortly after OSR notification of the occurrence, the inspectors toured the site with a Contractor field engineer and observed the two ambient air monitors operating as required. The field engineer explained the corrective actions put in place to ensure the monitors were operational prior to start of excavation work each day. These actions included starting the monitors each morning and notifying the excavation subcontractor of the monitors' operational status before work could start. The monitors were checked at least three times each day excavation work was in progress to ensure the Contractor remained in compliance with the WDOH Notice of Construction permit.

On November 15, 2001, the Contractor submitted to ORPS the final report regarding this occurrence, including the corrective actions taken to address the occurrence. The inspectors verified that the actions stated in the occurrence report were completed as stated. This included verifying that meeting attendance records supported the Contractor's stated corrective actions to hold meetings with Contractor and subcontractor staff to discuss WDOH permit requirements, and the plans to ensure the monitors were operational before start of excavation work. As discussed above, the inspectors also discussed with the assigned field engineer, the actions being taken to ensure the monitors were operational during excavation work. The field engineer discussed the process described in the occurrence report for ensuring operability. Based on the above actions, this occurrence report follow-up item is closed.

1.8.2 (Closed 02-001-INTR) Occurrence Report RP--BNRP-RPPWTP-2002-0001, "Employee in Possession of Controlled Substance and Illegal Paraphernalia While Working at the Construction Site." On January 8, 2002, a Benton County Sheriff's Department deputy discovered, during investigation of a non-work related hit and run accident, that a Contractor employee had in possession an illegal controlled substance while at the RPP-WTP construction site. During search of a forklift the employee operated, the deputy discovered illegal drug paraphernalia.

Immediate actions taken included the deputy arresting and escorting the employee off the site. The Contractor subsequently terminated the employee's employment and the employee's access badge was confiscated. Additional corrective actions included taking steps to post at all gates, appropriate bulletin boards, and associated construction areas on the job site, a sign indicating that "the use, possession, distribution, purchase, sale, or being under the influence of illegal drugs/or alcohol and the misuse of legal drugs on the project is prohibited..." The Contractor committed to develop a purchase requisition to have the signs manufactured. The inspector verified that a purchase requisition had been generated.

The Contractor stated New Employee Orientation Training included notification of the Contractor's drug and alcohol program. The inspectors reviewed training records that indicated the employee attend the orientation training on December 3, 2001. The Contractor also stated new employees are drug screened by urine testing before being allowed to work at the site. The inspectors verified the employee had been urine tested and the results were negative for drugs and alcohol.

Although not described in the Occurrence Report, the Contractor stated they randomly sampled 60 site employees after the incident and the results were all negative.

Based on the above, this occurrence report follow-up item is closed.

1.8.3 (Closed IR-01-008-01-IFI) Verify Contractor QA organization performed a review of the soil testing subcontractor's QA Manual against ASTM D 3740. The Contractor completed, on December 13, 2001, an assessment of readiness of the materials testing subcontractor to perform ITS testing during LCAR construction activities. As part of the audit sampling process, ASTM D 3740 was selected to determine the effectiveness of the subcontractor Quality Assurance Program for meeting the ASTM requirements. Seven deviations from the ASTM requirements were identified and documented in Supplier CAR number 24590-WTP-SCAR-QA-01-29. The assessment resulted in fifteen CARs and six observations regarding a broad range of requirements. The Contractor determined the subcontractor was not ready to perform their contracted activities. The inspectors examined the results of the Contractor's assessment and concluded a thorough assessment had been performed; the Contractor imposed appropriate controls precluding the subcontractor from performing quality related testing activities until the assessment issues were resolved. On January 15, 2002, the Contractor performed a limited scope audit of the subcontractor to verify completion of corrective action on the CARs and concluded that the CARs had been adequately addressed and could be closed. The inspectors examined the limited scope audit and concluded the audit provided an adequate basis to close the CARs. On January 22, 2002, the Contractor released the subcontractor to perform ITS work. Based upon the above actions, this inspector follow-up item is closed.

1.8.4 (Closed IR-01-008-02-IFI) "Review soil testing subcontractor testing procedures required by BNI's soil testing specification during Geotechnical Inspections of field activities." Some soil testing standards specified in the Contractor's soil testing specification were not addressed in the soil testing subcontractor's procedures.

The inspectors examined the subcontractor's set of revised soil testing procedures and found the subcontractor's procedures contained the soil testing procedures required for limited construction geotechnical/foundation activities. Based on this, this item is closed.

2.0 EXIT MEETING SUMMARY

The inspectors presented preliminary inspection results to members of Contractor management at an exit meeting on February 22, 2002. The Contractor acknowledged the observations and conclusions. The inspectors asked the Contractor whether any materials examined during the inspection should be considered limited rights data. The Contractor stated no limited rights data were examined during the inspection.

3.0 REPORT BACKGROUND INFORMATION

3.1 Partial List of Persons Contacted

R. Naventi, Project Manager
 J. Betts, Deputy Project Manager
 D. Klein, Nuclear Safety Manager
 T. Meagher, Industrial Safety Manager
 G. Palm, Field Safety Manager
 M. Jewell, Procurement Manager
 E. Smith, Safety Program Engineer
 M. Ensminger, Quality Control Supervisor
 R. Amos, Project Field Engineering Manager
 W. Clements, Site Manager
 C. Cerda, Civil Field Engineer
 C. Herbert, Construction Training Coordinator
 S. Thieme, Subcontract Administrator
 S. Diaz, Lead Surveyor
 G. Shell, QA Manager
 B. Niemi, Safety Program Engineer
 B. Houghton, G. A. Grant, Inc., QA Manager
 D. Owen, Site Procurement Manager
 J. Gorski, Senior Project Materials Supervisor
 G. Kump, Piping Field Engineer
 S. Horn, CS&A BOF Supervisor
 J. Lewis, GN Northern Subcontract Coordinator
 M. Peterson, GN Northern Project Manager
 F. Boozer, Quality Control Engineer
 T. Widener, Sprinkler Fitter

3.2 List of Inspection Procedures Used

Inspection Administrative Procedure A-105, "Inspection Performance"

Inspection Administrative Procedure A-106, "Verification of Corrective Actions"

Inspection Technical Procedure I-106, "Personnel Training and Qualification Assessment"

Inspection Technical Procedure I-112, "Geotechnical/Foundations Inspection"

Inspection Technical Procedure I-130, "Procurement Program Inspection"

Inspection Technical Procedure I-131, "Document Control and Records Management Program Inspection"

Inspection Technical Procedure I-137, "Inspection of Fire Protection System Construction"

Inspection Technical Procedure I-138, "Inspection of Fire Protection System Inspection, Testing, and Maintenance"

Inspection Technical Procedure I-160, "Industrial Health and Safety Program Inspection"

3.3 List of Items Opened, Closed, and Discussed

Opened

IR-01-010-01-FIN	Finding	Excavation and Backfill subcontractor procedure was not adequate in that it did not specify a means to verify loose-lift maximum height requirements. (Section 1.3)
IR-01-010-02-FIN	Finding	Contractor did not perform adequate receipt inspection of fire hydrants in that they were not UL listed as required by engineering technical specification. (Section 1.5)

Closed

01-001-INR	Incident Notification Report	Occurrence Report RP--BNRP-RPPWTP-2001-0001, "Required Air Monitor Not In Operation While Performing Excavation Activities." (Section 1.8.1)
02-001-INR	Incident Notification Report	Occurrence Report RP--BNRP-RPPWTP-2002-0001, "Employee in Possession of Controlled Substance and Illegal Paraphernalia While Working at the Construction Site." (Section 1.8.2)
IR-01-008-01-IFI	Inspection Follow-up Item	Verify Contractor QA organization performed a review of soil testing subcontractor's QA Manual against ASTM 3740. (Section 1.8.3)
IR-01-008-02-IFI	Inspection Follow-up Item	Review soil testing subcontractor testing procedures required by BNI's soil testing specification during Geotechnical Inspection of field activities. (Section 1.8.4)

Discussed

02-002-INR Incident Notification Report Occurrence Report RP--BNRP-RPPWTP-2002-0002, "Damage to 12,000 Gallon South Water Stand Tower." (Section 1.7.1)

3.4 List of Acronyms

ASTM	American Society for Testing and Materials
BOF	Balance of Facilities
BNI	Bechtel National, Inc.
CAR	Corrective Action Request
DOE	U.S. Department of Energy
FIN	Finding
GPS	Global Positioning System
HLW	High Level Waste
IAP	Inspection Administrative Procedure
IFI	Inspection Follow-up Item
INR	incident notification report
IR	Inspection Report
ITP	Inspection Technical Procedure
ITS	important-to-safety
JHA	Job Hazard Analysis
LAW	Low Activity Waste
LCAR	Limited Construction Authorization Request
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
M&TE	Measuring and Test Equipment
NFPA	National Fire Protection Association
ORP	Office of River Protection
ORPS	Occurrence Report Processing System
OSR	Office of Safety Regulation
PDC	Project Document Control
PEL	permissible exposure levels
PPE	personal protection equipment
PT	Pretreatment
QA	Quality Assurance
QAM	Quality Assurance Manual
QAP	Quality Assurance Plan
QC	Quality Control
RPP-WTP	River Protection Project – Waste Treatment Plant
STARRT	Safety Task Analysis Risk Reduction Talk
WDOH	Washington Department of Health

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