

ADDENDUM TO RI/FS WORK PLAN
NAVAL AIR STATION, BRUNSWICK

Prepared for:

U.S. DEPARTMENT OF THE NAVY
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ADDENDUM TO RI/FS WORK PLAN
NAVAL AIR STATION, BRUNSWICK

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1.0 RESPONSES TO USEPA CONDITIONS FOR APPROVAL

Response to Attachment I - USEPA Conditions for Approval-Remedial Investigation/Feasibility Study Work Plan, April 1988, prepared by E.C. Jordan Co. for the U.S. Department of the Navy, Naval Air Station, Brunswick, Maine.

For ease of reference, the responses to comments are listed by the RI/FS Work Plan page number, as they are in Attachment I. The Attachment I comments are included as Appendix A to this Addendum.

PAGE NUMBER

JORDAN RESPONSE

- 4-1 As discussed on page 4-1 of the RI/FS Work Plan, damaged wells will be evaluated during the Site Reconnaissance and field program. Unlocked wells will have new padlocks installed and loose casings will be recemented at ground surface. If funding is approved by the Navy, bent protective casings will be removed and PVC risers will be hydraulically tested for damage. If the risers are intact, or can be readily repaired at ground surface, the repairs will be made and new protective casings will be cemented in place at ground surface. As discussed in the Work Plan, repaired wells will be developed and measured for depth prior to obtaining any environmental samples.
- 4-2 Table 4-1 from the RI/FS Work Plan is subject to revision, within the limits of Jordan's existing contract with the Navy, if information gathered subjects stated data needs to revision.
- 4-6 As discussed with EPA and DEP, co-located test borings with continuous sampling may be drilled in a Phase II field mobilization to supplement information obtained during the Phase I RI. Selected soil samples obtained in the field will be screened with a portable gas chromatograph (GC).
- 4-6 At shallow/deep paired monitoring well borings, the shallow well will have a split-spoon sample taken in the screened interval.
- 4-6 Continuous sampling will be performed at selected boring locations on Sites 1, 4, 7, and 8. Sites 4 and 7 are former disposal pits and borings will be drilled as close to the original pit location as can be determined from historical information and geophysical exploration techniques. One source boring will also be sampled continuously at Site 8. At Site 1, borings have been located so as not to penetrate known waste disposal areas, however one boring (MW-202) is located in close proximity to the wastes and in the area of observed leachate seeps. This boring will be sampled continuously as a source location. As discussed with EPA and DEP, additional co-located test borings with



continuous sampling may be drilled in a Phase II field mobilization to supplement information obtained during the Phase I RI.

Care will be taken in the grouting of wells, especially in areas where aquitards are penetrated. Bentonite slurry seals will be installed by tremie method above wellscreen sand packs in the deeper wells, instead of the proposed bentonite pellet seals. This will be done to insure effective placement of seals. All borings will then be grouted by tremie method to ground surface (see modified Table 4-3).

Table 4-3

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- 4-7
 1. Continuous sampling discussed above (4-6)
 2. Grouting discussed above (4-6)
 3. Wellscreen lengths may range from 2 to 10 feet.

- 4-8 Wells are intended to be installed by hollow-stem augers at all locations. It is anticipated that the upward movement of soils along the auger flights during drilling, the anticipated low permeability of aquitard soils, and the low levels of contamination observed to date in groundwater at the site, should effectively minimize penetration of contaminants during drilling. Upon completion of each boring, the borehole will be tremie grouted during the removal of the augers.

- 4-8 Wellscreen lengths may range from 2 to 10 feet in all wells and screen placement will be based on lithology and GC screening data.

- 4-8 Hollow-stem augers used during the drilling program will have an I.D. of 4.25 inches. Casing, if used, will have an ID of 4.0 inches. The O.D. of Schedule 40 PVC wellscreen is approximately 2.5 inches.

- 4-8 Water level measurements, other than those made during the drilling program, will be made using an unweighted chalked steel tape with 0.01 ft divisions.

Figure 4-1

- 4-9 Concrete plugs installed around protective well casings at ground surface will not be "mushroom-shaped caps". These plugs will be as vertical-sided as possible to minimize frost heaving of the protective casings.

Figure 4-1

- 4-9 The steel protective casing is to extend to a point below the frost line. The casings are 6.0 feet in length and will be installed to a depth of 4.0 feet.



TABLE 4-3

SUMMARY OF ESTIMATED QUANTITIES FOR MONITORING WELL INSTALLATIONS
 RI/FS PROGRAM
 NAS BRUNSWICK
 (rev: July 1988)

Site	Boring ID	Estimated Depth (ft)	Sampling Intervals			Grout Backfill (ft)	Screen Length (ft)	Riser Length (ft) ¹	Bentonite Seal (ft)
			Continuous	5-Foot	None				
1	MW-201	30	0	30	0	20	10	23	3
3	MW-202	30	10	20	0	20	10	23	3
1	MW-203	30	0	30	0	20	10	23	3
1	MW-204	30	0	30	0	20	10	23	3
1	MW-205	100	0	100	0	90	10	93	3
1	MW-206A	100	0	100	0	90	10	93	3
1	WW-206B	50	0	0	50	40	10	43	3
1	MW-207A	100	0	100	0	90	10	93	3
1	MW-207B	50	0	0	50	40	10	43	3
1	MW-208	100	0	100	0	90	10	93	3
1	MW-209	50	0	50	0	40	10	43	3
1	MW-210A	100	0	80	0	90	10	93	3
1	MW-210B	50	0	0	50	40	10	43	3
1	MW-211A	100	0	100	0	90	10	93	3
1	MW-211B	50	0	0	50	40	10	43	3
2	MW-212	50	0	50	0	40	10	43	3
2	MW-213	50	0	50	0	40	10	43	3
4	MW-404	30	0	30	0	20	10	23	3
4	MW-405	30	20	10	0	20	10	23	3
7	MW-704	30	20	10	0	20	10	23	3
7	MW-705	30	20	10	0	20	10	23	3
7	MW-706	20	20	0	0	10	10	13	3
8	MW-805	50	0	50	0	40	10	43	3
8	MW-806	50	0	50	0	40	10	43	3
8	MW-807	30	20	10	0	20	10	23	3
8	MW-808	50	0	50	0	40	10	43	3
9	MW-904	30	0	30	0	20	10	23	3
9	MW-905	30	10	20	0	20	10	23	3
Total		1450	140	1110	200	1170	280	1254	84

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¹ Riser well riser stick up is 3 feet above ground surface.
 Estimated quantities are in linear feet.
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- 4-10 Wells not protruding above ground surface (flush-mounted), such as in Building 584, will have a watertight seal (unvented) in the inner casing or riser.
- 4-10 At least two variable head tests will be conducted for each new well installed.
- 4-14 Groundwater sample analytical parameters will be modified in the second and third sampling events to include carbonate, bicarbonate, dissolved oxygen, and total organic carbon.

Table 4-4

- 4-15 In addition to the general water quality parameters indicated on Tables 4-4 and 5-2 in the RI/FS Work Plan, four other analyses will be included in the sampling rounds subsequent to Round 1. These will include carbonate, bicarbonate, total organic carbon and dissolved oxygen.
- 4-24 Data on site air quality will be obtained by GC analyses and PI meter readings during site reconnaissance and the soil gas and drilling programs. These data will be presented to the Navy, EPA and DEP following completion of the field investigations. A decision will be made following submission of the field data regarding the need for more sophisticated air monitoring at NASB. A first tier air screening analysis may be recommended if estimated worst case air emissions, based on groundwater and soil contaminant concentrations, indicate there are potential risks present at a site.
- 8-1 Using available field data, Jordan will assess the need to evaluate off-site impacts based on potential risks posed to on-site receptors.
- 8-1 The selection process (for contaminants of concern) is designed to identify a manageable but representative subset of the risks posed by the site. However, all contaminants will be considered if warranted.
- 8-2
Sec. 8.1.3 The dose response assessment will include cancer potency factors for evaluation of carcinogenic effects, and the risk reference dose (RfD) for non-carcinogens.
- A-5 (Appendix B: Site Specific Health and Safety Plan)
A test boring is planned within Building 584. A site visit confirmed that this building is a storage warehouse with up to 20 feet overhead clearance, and an inside area of approximately 40 by 100 feet. A large overhead door near the boring location will be kept open during the drilling process. Although this boring is located inside a building, there is good ventilation.



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a large open interior space, and accessible escape routes in the event of an emergency. Building 584 is not a typical "confined space", although in the strictest sense it may be so defined.

2.0 RESPONSES TO USEPA RECOMMENDATIONS

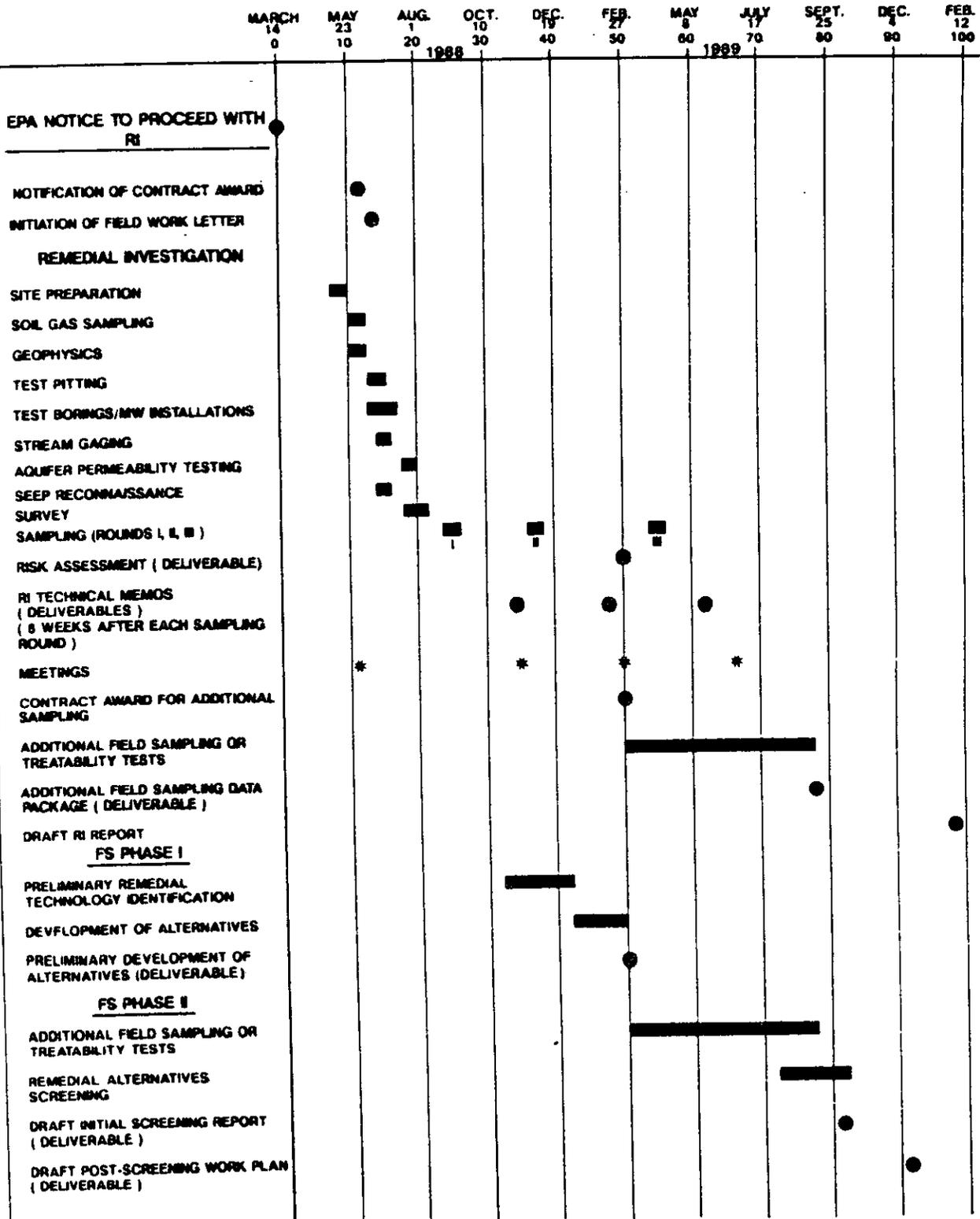
<u>PAGE NUMBER</u>	<u>JORDAN RESPONSE</u>
2-2	Modified project schedule attached (see Figure 1).
4-3	Maps of soil gas survey points will be provided by Jordan with a discussion of QA/QC procedures used in the field.
Table 4-2	
4-4	The soil gas program was completed on July 14, 1988. The proposed maximum number of sampling points was exceeded by 25%. The number of sampling points was estimated based on the size of each site, known methods of disposal, and on the contaminants anticipated from previous investigations.
4-8	The installation of additional shallow well points based on the Phase I RI field work will be considered.
Figure 4-1	
	The measuring point for water levels in monitoring wells will be marked on the PVC well risers.
4-10	The method of analysis to be used for aquifer slug test data analysis will be Hvorslev, M.J., 1951, "Time Lag and Soil Permeability in Groundwater Observation," U.S. Army Corps of Engineers Waterways, Experiments Station Bulletin 36, Vicksburg, Mississippi.
4-11	Seismic Line 2 has been relocated per discussions with EPA, and the seismic lines requested at Site 8 have been completed. The use of resistivity measurements as a possible plume delineation method will be considered in a second phase of field work.
4-13	The location and number of monitoring wells were discussed in detail with EPA and DEP at the July 8, 1988 TRC meeting at NASB.
4-14	Water levels will be obtained in all monitoring wells at all sites within one work day, prior to the commencement of field sampling.
4-17	Observed seeps will be approximately located on site maps and seep elevations estimated.



**FIGURE 1
RI/FS PHASE I + II SCHEDULE
NAS BRUNSWICK**

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WEEKS AFTER EPA'S NOTICE TO PROCEED WITH THE RI (1)



NOTES: (1) EPA NOTIFIED THE NAVY ON 13 MARCH 1988 TO PROCEED WITH THE RI AT NASB.



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- 4-17 Obtaining seep samples before the seep is exposed to the atmosphere will be considered for a second phase of field investigations.
- 4-23 Technical data from all media at the site will be reviewed and evaluated in making decisions involving air monitoring at the site.
- 4-23 Locations where ambient air measurements are taken will be recorded and mapped at each site.
- 4-23 Benzene is the most toxic VOC that has been identified to date at the site. Detection of benzene consistently at or above 1 ppm in the breathing zone will necessitate an upgrade to Level C respiratory protection.
- Personal respiratory protection will be upgraded to Level C if 1) consistent PI meter readings of 5 ppm above background are detected, 2) the compound is determined not to be benzene, and 3) the compounds have not been identified in GC screening of soil samples. Methylene chloride and vinyl chloride Draeger tubes will also be used when PI meter readings indicate contaminants are present.
- 4-24 An evaluation of air releases from other compounds will be considered.
- 4-24 Meteorological conditions including approximate temperature, wind and sunny/cloudy conditions are intended to be recorded with air monitoring data.
- 4-24 Elevations should be readily convertible to the NGVD of 1929. Map scales in technical memoranda and reports will be approximately 1:200. The Maine State grid system will be indicated on all base maps.
- Table 5-3 Trichloroethane is a typographical error. TCL table should read trichloroethene.
- 8-2 Limitations and uncertainties associated with the risk assessment and its outcome can be discussed with EPA and DEP prior to development of the risk assessment, and in the risk assessment document.
- 8-3 The May 13 memorandum from NOAA to EPA requests that the discussion of data utilization for the ecological risk assessment be expanded. NOAA states that the data to be collected is anticipated to be sufficient for completion of the ecological assessment. The data utility issues need to be resolved in direct discussions with NOAA.
- 10-1 Consideration and control of air emissions will be included in the FS alternatives evaluation.



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10-18 Potential environmental impacts from each alternative will include assessment of potential risk for current conditions and future scenarios under the no-action alternative.

A-8 The "Action Level" for additional health and safety precautions, including use of Draeger tubes and possible upgrade to Level C respiratory protection, is a steady reading (in the breathing zone) for several minutes of 1 ppm or more above background.

A-8 GMC-H Combination cartridge

Sec 1-3 QAPP Addendum

Subtask Air Sampling should include PI meter, combustible gas indicator/O₂ meter, and dosimeter badges.

3.0 RESPONSES TO MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION (MEDEP) COMMENTS

MEDEP Comments dated June 6, 1988 are contained in Appendix C.

COMMENT NO.

JORDAN RESPONSE

1. The DEP will be included in the submission of deliverables, notifications, and review and approval of documents by the Navy's Engineer-in-Charge of Northern Division.
2. Section 3.4, Decontamination Facilities. Work will begin at each test pit or boring location in Level D. Level D does not require the identification of exclusionary, contamination reduction, or support zones. If the criteria for upgrading to Level C are met (outlined in the HASP) an exclusion zone will be established around the drill rig or borehole. The exclusion zone will be designated by flagging tape no less than 30 feet from the drill rig or backhoe. Personnel entering this zone must wear Level C protective gear and be authorized to enter. Personnel, equipment and materials exiting the exclusion zone will be considered contaminated and will be subject to decontamination or disposal as appropriate. Decontamination and disposal will take place in a contamination reduction zone. It is the responsibility of the on-site Health and Safety Officer (HSO) to determine when the protection level is to be upgraded, and the size and location of the contamination reduction zone and the exclusionary zone.
3. Section 3.5, Disposal of Investigation-Generated Wastes.

A steady PI meter reading greater than 5.0 ppm above background will be used as an indication of the presence of contamination in drill cuttings and fluids. Consistent readings above this action level will require the containerization (in drums) of drill cuttings and fluids.



4. Section 4.3.2. Exploratory Geophysics Program. Seismic refraction profiling has been completed at Site 8.
5. Section 4.3.3, Test Pits. Exact criteria to be used in selecting which test pit samples will be submitted for analysis have intentionally not been identified. Based on visual evidence, PI meter readings and field GC screening, field decisions will be made at each test pit selecting materials to be submitted for TCL analysis.
6. Section 4.3.4. Test Borings. Final exploration locations have been determined in consultation with DEP and EPA.
7. Section 4.4.1. Sites 1, 2, and 3 - Orion Street Landfill and Hazardous Waste Burial Area. Background groundwater samples were originally anticipated at the locations of MW-209, MW-211, and MW-212. Discussions at the July 8 TRC meeting in Brunswick, concerning information gathered during the soil gas investigation and site reconnaissance, raised the question as to whether these well locations will represent background. It is premature to speculate at this time what background levels should be anticipated at these locations. Wells were located at each site to obtain background information, however levels cannot be specified prior to receipt of analytical results.
8. Section 4.4.4, Site 8 - Perimeter Road Disposal Site. Groundwater flow direction is a primary purpose of the investigations at Site 8.
9. See Table 3-0, Summary of Background Samples.
10. Quality Assurance Program Plan (QAPP).

The QAPP was reviewed by MEDEP prior to issuance of RI/FS Work Plan. The QAPP Addendum attached to the RI/FS Work Plan addresses the majority of the issues raised in the April 7 letter. A summary response is provided below. Jordan will address any remaining issues in the format of a letter to MEDEP.

- o The Quality Assurance Coordinator is R.A. Steeves. His responsibilities are described in the USN-IRP QA Program Plan.
- o Quality assurance objectives are stated in the Work Plan. Generally, the use of National Contract Laboratory Program analytical protocols mandates issues regarding precision and accuracy, sample custody in the laboratory, calibration procedures and frequencies, internal quality control and corrective action trigger level, etc. The onsite analytical facility audits performed by USN for the BNAS project have resulted in approval of the laboratory in all applicable areas.



TABLE 3-0
SUMMARY OF BACKGROUND SAMPLES

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SITE	LOCATION	MEDIA	TCL INORGANICS	TCL VOA	TCL SVOA	TCL PEST/PCB
1	MW-209	GROUNDWATER SOIL	1 1	1 1	1 1	1 1
1	MW-211A,B	GROUNDWATER SOIL	1 2	1 2	1 2	1 2
2	MW-212	GROUNDWATER SOIL	1 2	1 2	1 2	1 2
4	MW-403	GROUNDWATER	1	1	1	1
7	MW-705	GROUNDWATER	1	1	1	1
8	MW-804	GROUNDWATER	1	1	1	1
9	MW-901	GROUNDWATER	1	1	1	1



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- o The analytical program, including methods, is specified in Section 5.0 of the BNAS Work Plan.
- o A project audit is planned following the receipt of analyses for the first groundwater sampling episode. External audit by USN or its subcontractors is continually possible.
- o Periodic assessment of data is contained in each data set's "case narrative" and is also indicated by data quality modifiers, in accordance with USEPA's "Functional Guidelines for the Evaluation of Organics Data" and "Functional Guidelines for the Evaluation of Inorganics."

11. Appendix A. Site-Specific Health and Safety Plan.

- o Health issues reported by Mr. Mack Stokes (former NASB marine) have been conveyed to the HSO and field personnel on site.
- o Detailed description of various levels of personnel protection recommended by OSHA are attached as Appendix D. Jordan field personnel will wear appropriate equipment to protect employees working on the site, based on OSHA's recommended guidelines.
- o Pesticides have been included as contaminants of concern on Table 2 of the Site Specific Health and Safety Plan (See Appendix B).
- o A "steady" PI meter reading is not a time period but a constant non-fluctuating reading.

Personnel decontamination procedures:

LEVEL D

1. If uncoated tyvek (optional) are used they will be disposed in plastic garbage bags prior to leaving the site.
2. Disposable gloves will be disposed in plastic trash bags prior to leaving the site.
3. Personnel will wash hands prior to leaving the site or consuming food.

LEVEL C

Decontamination will proceed in a station by station process in a contamination reduction zone located immediately outside the exclusion zone.



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Station 1. Equipment Drop

Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios etc.) on plastic drop cloths.

Station 2. Boot and Glove Wash

Station will included a tub of detergent and water with a long handled scrub brush. Gloves and boots will be washed here.

Station 3. Boot and Glove Rinse

Rinse decon solution from Station 2 using fresh water in a tub with a long handled scrub brush.

Station 4. Garments Removal

Protective clothing will be removed and disposed in plastic garbage bags.

Personnel will wash hands prior to leaving the site or consuming food.

Decontamination fluids will be disposed of (containerized) in the same manner as contaminated drilling fluids and drill cuttings.

Drilling and backhoe equipment will be decontaminated by steam cleaning at each boring or test pit location. Decontamination fluids will only be collected if, during drilling or test pitting, it is determined that drill cuttings must be drummed. In this case decontamination fluids will be collected and drummed.

- o Base and local officials will be notified of activities taking place that may pose a hazard.
- o Heat stress for workers wearing tyveks will be closely monitored.



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APPENDIX A

USEPA COMMENTS ON
RI/FS WORK PLAN

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ATTACHMENT I - U.S. EPA

Conditions for approval - Remedial Investigation/Feasibility Study Work Plan, April 1988. Prepared by E.C. Jordan Co. for the U.S. Department of the Navy, Naval Air Station, Brunswick, Maine.

<u>Page Number</u>	<u>Condition</u>
4-1	Criteria for repairing broken or loose wells shall be described in greater detail in the QAPP. Other tests recommended include a check of total depth and a pressure test of blank casing for cracks.
4-2	State that Table 4-1 is subject to revision, as information gathered may subject data needs stated to revision.
4-6	As requested at the February 10, 1988 technical meeting and as reflected in comment D.3 in our letter of March 15, 1988, continuous split-spoon sampling is to be used in the deepest well at each cluster location or each single well location. Samples are to be screened at 2' intervals for VOCs using a portable GC unit. Among the uses of this information shall be a field decision as to the location of each well screen. If continuous split-spoon sampling cannot be utilized in these well locations during the first phase of the field activity, it is likely that co-located borings and wells developed with continuous split-spoon sampling will be required in the next phase of the field work unless adequate location-specific information was obtained to properly screen wells and understand subsurface strata and contamination. An acceptable alternative to the split-spoon sampling in the RI/FS Work Plan is to use a 5' split-spoon to achieve continuous split-spoon sampling. Continuous split-spoon sampling will be required at future locations during the RI/FS.
4-6	At shallow/deep paired borings, the shallow well should have a split-spoon sample taken opposite the screen.
4-6	It is stated that subsurface soil sampling will be performed continuously in the unsaturated zone in "source areas". The extent of the source of contamination has not been determined. Consideration should be given to continuous split-spoon sampling for monitoring wells 201, 210, 404 and 806 since they are in the immediate proximity of delineated "proposed remedial areas".



ATTACHMENT I - U.S. EPA

Conditions for approval - Remedial Investigation/Feasibility Study Work Plan, April 1988. Prepared by E.C. Jordan Co. for the U.S. Department of the Navy, Naval Air Station, Brunswick, Maine.

<u>Page Number</u>	<u>Condition</u>
	Near-surface aquitards containing leachate may exist in the vicinity of sites 1,2,3 and 8. Special concern for detecting these contaminated zones should be given to monitoring wells 203, 204, 205, 805 and 808, in order to avoid potentially contaminating uncontaminated zones.
Table 4-3	Modify Table 4-3 to reflect:
4-7	<ol style="list-style-type: none">1. continuous split-spoon sampling on deepest wells of clusters and all other wells or to otherwise conform with previous comment.2. all wells are to be grouted from top of bentonite seal to land surface unless the well is a shallow well point (water table 5 ft. or less).3. screen length should be 5 or 10 feet to accommodate a thin aquifer or very shallow water table conditions.
4-8	Where subsurface geophysical data or information from other subsurface data indicates an aquitard separates a contaminated upper zone from a potentially uncontaminated lower zone, the use of a temporary outer casing or double-cased well installation procedure is to be used. Detail methods and procedures in QAPP.
4-8	The selection of the screened interval at each location is to be based on lithology and VOC field data (portable GC). The screen length (not to exceed 10 feet) should be commensurate with the thickness of the zone of interest and not promote cross contamination between contaminated and uncontaminated zones.
4-8	Specify that hollow-stem auger (HSA) or temporary casing will have an inside diameter at least 2" greater than the finished well diameter.
4-8	All water level measurements are to be made using a chalked steel tape with 0.01 ft divisions and not weight.



ATTACHMENT I - U.S. EPA

Conditions for approval - Remedial Investigation/Feasibility Study Work Plan, April 1988. Prepared by E.C. Jordan Co. for the U.S. Department of the Navy, Naval Air Station, Brunswick, Maine.

<u>Page Number</u>	<u>Condition</u>
Figure 4-1 4-9	Do not construct a "mushroom" cap of concrete at the land surface in order to avoid frost-heaving problems.
Figure 4-1 4-9	The steel protective casing is to extend to a point below the frost line.
4-10	Any wells not protruding from the ground will have a water-tight seal of the inner casing (not vented).
4-10	At least two variable head tests are to be run for each well.
4-14	Analyze groundwater samples for carbonate and bicarbonate, dissolved oxygen and total organic carbon, in addition to parameters already listed.
Table 4-4 4-15	Modify table to reflect above changes in analytes of general water quality.
4-24	Specify what criteria will be used to determine if more sophisticated air methods are needed.
8-1	Assess risk to receptors on and off-site due to inhalation of contaminants being released from the sites.
8-1	Rewrite the second sentence to read "The objective of this task is select contaminants that have <u>any</u> potential to cause harm to public health and/or are representative of site conditions."
8-2 Sec. 8.1.3	Dose - response assessment needs to include cancer potency factor for evaluation of carcinogenic effects and the risk reference dose (RfD).
A-5	Acknowledge that the potential for work in confined spaces exists at site 4, building 584.



ATTACHMENT II - U.S. EPA

Recommendations - Remedial Investigation/Feasibility Study Work Plan, April 1988. Prepared by E.C. Jordan Co. for the U.S. Department of the Navy, Naval Air Station, Brunswick, Maine.

<u>Page Number</u>	<u>Recommendations</u>
2-2	Modify the schedule for the RI/FS to reflect the schedule for sampling as discussed in the TRC meeting of May 17, 1988.
4-3	Provide maps to EPA for locations proposed for soil gas survey for each site. Describe grid network spacing, depth(s) to be sampled, timing of sampling after precipitation, and QA/QC procedures.
Table 4-2 4-4	Justify numbers shown for the maximum estimated sampling points.
4-8	Based on the results of the first phase of the RI field work, consider the installation of shallow well points at the following locations: MW-101, 401, 703, 804, 901, 903 in order to obtain water level and chemical data in the shallow water table aquifer. These could be stainless steel driven points.
Figure 4-1 4-9	Mark the measuring point on PVC casing
4-10	Indicate methods of aquifer permeability test data analyses to be used. Provide references.
4-11	Realign a portion of seismic line 2 to provide more information upgradient (west) of site 2. DC resistivity soundings should be considered for the next phase of field activity at strategic locations along the new lines.
4-13	Proposed locations and number of wells cannot be confirmed until after geophysical survey work is completed. Quantities should be viewed as the minimum required and subject to change as data needs dictate.
4-14	Measure water levels in all wells at the start of field work. Sample wells after all water levels have been determined.
4-17	Map all observable seeps and determine the approximate elevation of each.



ATTACHMENT II - U.S. EPA

Recommendations - Remedial Investigation/Feasibility Study Work Plan, April 1988. Prepared by E.C. Jordan Co. for the U.S. Department of the Navy, Naval Air Station, Brunswick, Maine.

<u>Page Number</u>	<u>Recommendations</u>
4-17	For the next phase of field activity, consider obtaining a seep sample before the sample is affected by the atmosphere. A 2-foot stainless steel well point should be driven to the same horizon as the seep and within .5 to 10 feet upgradient of the breakout.
4-23	Site characterization and results from other media sampling activities should be used in addition to PI meter results and soil gas air blank results to determine if a more sophisticated air monitoring program should be conducted at any phase of the RI/FS.
4-23	All locations where ambient air measurements are taken whether detected or not, should be recorded and mapped.
4-23	Provide an explanation as to why benzene and not other compound-specific Draeger tubes will be used if PI meter readings are consistently above background.
4-24	An evaluation of potential air releases of other types of compounds besides VOCs should be considered.
4-24	Specify what meteorological conditions will be measured and how they will be recorded during all air sampling activities.
4-24	Elevations are to be given in terms of National Geodetic Vertical Datum (NGVD) 1929. Map scale should not exceed 1:200. Show Maine State grid coordinates on all maps.
Table 5-3	Ensure that trichloroethane is not intended to be trichloroethene.
8-2	Limitations and uncertainties associated with the risk assessment and its outcome need to be elaborated.
8-3	As expressed in NOAA's memo to EPA of May 13, 1988, expansion on discussion of data utilization for the ecological risk assessment is requested.



ATTACHMENT II - U.S. EPA

Recommendations - Remedial Investigation/Feasibility Study Work Plan, April 1988. Prepared by E.C. Jordan Co. for the U.S. Department of the Navy, Naval Air Station, Brunswick, Maine.

<u>Page Number</u>	<u>Recommendations</u>
10-1	The FS workplan presents several possible remedial alternatives that would result in air emissions. Control options for these emissions should be evaluated in the FS. Examples of sources of air emissions include excavation, soil vapor extraction, air stripping, and emissions of VOCs discharged to a POTW.
10-18	Clarify that baseline site conditions include assessment of <u>potential</u> risk for both current conditions and future scenarios under the no-action alternative.
A-8	A value representing the level above background detected by the PI meter should be stated as the Action Level.
A-8	State the cartridge types to be used when the respirators are required as a result of level upgrade.
Sec. 1-3, QAPP Addendum	Subtasks should include under "Air Sampling" PI meter, combustible gas indicator/O2 meter, and dosimeter bags.



APPENDIX B

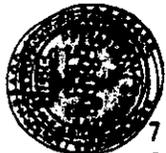
TABLE 2, CONTAMINANTS OF CONCERN
(SITE SPECIFIC HEALTH AND SAFETY PLAN)



TABLE 2
CONTAMINANTS OF CONCERN

Chemical	Approximate Odor Threshold (ppm)	TIV (ppm)	Physical Characteristics	Dermal Toxicity	Remarks
Methyl ethyl ketone	4.7-50	200	Colorless liquid, fragrant mint-like moderately- sharp odor.	low	Moderate inhalation toxicity. A strong irritant. Symptoms: Narcotic or anesthetic effects eye irritation, headache, dizziness. dizziness. Target organs: CNS, lungs.
Trichloroethylene	50	50	Sweet odor; colorless liquid. sol. = 0.1% density = 1.47		A strong skin and eye irritant. Moderate toxicity via inhalation and dermal routes Penetrates the skin. Symptoms: Headaches, vertigo, visual visual disturbance, tremors, somnolence, nausea, vomiting, irritated eyes, dermatitis, cardiac arrhythmias, paresthesias. Target organs: Respiratory system, heart liver, kidneys, CNS, and skin.
Toluene	1	100 (skin)	Aromatic odor	Local + Systemic +	Penetrates through the skin.
Methylene chloride [CH ₂ Cl ₂] dichloromethane methylene dichloride	500	100	colorless liquid	local systemic	Dangerous to eyes. It induces narcosis; can cause dermatitis with prolonged exposure highly volatile. It can decompose by contact with hot surfaces and open flame and produce toxic fumes. Symptoms: fatigue, weak, sleepy; limbs numb or tingling Target organ: skin, CVS, eyes, CNS <u>First Aid:</u> Swallow: Ipecac, vomit Incompatibilities: reacts violently with Li, Na, K, tertbutoxite; strong oxidizers and caustics.

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TABLE 2 (Continued)
CONTAMINANTS OF CONCERN

Chemical	Approximate Odor Threshold (ppm)	TLV (ppm)	Physical Characteristics	Dermal Toxicity	Remarks
Aldrin (skin)	Information not available	0.25 mg/m ³	Light to dark brown solid crystals or solution. Mild Chemical Odor VP=6x10 ⁻⁶ mm Hg insoluble in water	Can be absorbed through the skin	Ingestion, inhalation, or skin absorption of toxic dose will cause nausea, vomiting, hyper-excitability, and convulsions
Dieldrin (skin)	0.041 ppm	0.25 mg/m ³	Light brown solid mild chemical odor VP=1.8x10 ⁻⁷ mm Hg Sol=110 ppb	Can be absorbed through the skin	Inhalation, ingestion, or skin contact causes irritability, convulsions, and/or coma, nausea, vomiting and headaches
Chlordane (skin)	Information not available	0.5 mg/m ³	Brown liquid with a sharp odor VP=1x10 ⁻⁵ mm Hg Insoluble in water	Can be absorbed through the skin	Moderately irritating to the eyes and skin. Ingestion, absorption through the skin, or inhalation of mist or dust may cause excitability, convulsions, nausea, vomiting, diarrhea and irritation of the gastrointestinal tract.
4,4-DDD	N/A	None	White solid		Ingestion causes vomiting and delayed symptoms similar to those caused by DDT. Contact with eye causes irritation. Experimental carcinogen.



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TABLE 2 (Continued)
CONTAMINANTS OF CONCERN

Chemical	Approximate Odor Threshold (ppm)	TLV (ppm)	Physical Characteristics	Dermal Toxicity	Remarks
DDT (skin)	N/A	1.0 mg/m ³	Colorless solid odorless solubility= 1.0x10 ⁻⁵ VP=1.7x10 ⁻⁷ mm Hg		Very large doses are followed promptly by vomiting, and diarrhea may occur. With smaller doses, symptoms appear 2-3 hrs after ingestion. Symptoms include tingling of tongue and lips, and face; malaise, headache, sore throat, fatigue, tremors of neck, head, and eyelids. Convulsions and coma may occur.
DDE	Only limited information available, assumed to be similar to DDD and DDT				Experimental carcinogen
Endosulfan (skin)		0.1 mg/m ³	Brown solid crystals or solution sulfur dioxide odor	Can be absorbed through the skin	Ingestion, inhalation, and skin absorption will induce headache, dizziness, and vomiting. CNS symptoms: hyper-irritability, convulsions, and/or coma. Skin: in solution, may cause irritation.
Endrin (skin)	N/A	0.1 mg/m ³	Colorless to tan solid or solution odorless. VP=2x10 ⁻⁷ mm Hg Solubility: 160 ppb	Can be absorbed through the skin	Inhalation causes moderate irritation of the nose and throat. Prolonged breathing may cause some toxic symptoms as for ingestion. Contact with liquid causes moderate irritation of eyes and skin. Prolonged contact with skin may cause the same symptoms as for ingestion. Ingestion causes frothing of the mouth, facial congestion, convulsions, violent muscular contractions, dizziness, weakness, and nausea.

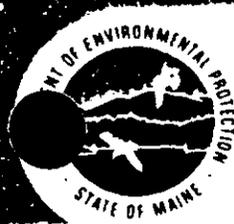


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APPENDIX C

MEDEP COMMENTS ON
RI/FS WORK PLAN





STATE OF MAINE

Department of Environmental Protection

MAIN OFFICE: RAY BUILDING, HOSPITAL STREET, AUGUSTA
MAIL ADDRESS: State House Station 17, Augusta, 04333
207-289-7688

JOHN R. MCKERNAN, JR.
GOVERNOR

DEAN C. MARRIOTT
COMMISSIONER

June 6, 1988

NAS BRUNSWICK NPL
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Captain E.B. Darsey, U.S. Navy
Commanding Officer
Naval Air Station
Brunswick, Maine 04011

RE: Remedial Investigation/Feasibility Study Work Plan
for the Brunswick Naval Air Station

Dear Captain Darsey:

The Department of Environmental Protection (DEP) has completed its review of the revised Remedial Investigation/Feasibility Study Work Plan for the Brunswick Naval Air Station prepared by E.C. Jordan Co., and dated April 1988.

The Department found that the majority of its earlier comments had been addressed and that overall the document was acceptable. Therefore, the Department approves of the revised work plan and the initiation of field work with the following conditions:

1. The DEP must be included in all submissions of deliverables, notifications and review and approval of documents (for example on pages 2-1, 2-4, 4-24, 6-1 and A-10);
2. Section 3.4, Decontamination Facilities. Provide additional information as to the criteria which will be used to identify and establish decontamination zones and uncontaminated areas at each site and by whom;
3. Section 3.5, Disposal of Investigation-Generated Wastes. Provide information as to what photoionization meter readings will indicate the presence of contamination in drill cuttings and fluids.
4. Section 4.3.2, Exploratory Geophysics Program. Provide a rationale for not doing seismic refraction profiling or ground penetrating radar at Site 8;
5. Section 4.3.3, Test Pits. Provide exact criteria to be used in choosing which test pit samples will be submitted for analysis (what reading on the photoionization meter, what visual evidence etc.);
6. Section 4.3.4, Test Borings. Final exploration locations must be determined in consultation with DEP and EPA;



REGIONAL OFFICES
• Bangor •

• Presque Isle •

• Portland •

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7. Section 4.4.1, Sites 1, 2, and 3 - Orion Street Landfill and Hazardous Waste Burial Area. Provide information for determining background for groundwater at each site - are wells MW 209, 211 and 212 considered background or is background assumed to be zero?;
8. Section 4.4.4, Site 8 - Perimeter Road Disposal Site. Include determination of groundwater flow direction as a purpose of the investigation or provide an explanation as to why it is not included;
9. Provide an additional table and figure or expand an existing table and figure to show number, location and scheduled analysis of background samples for each media;
10. Quality Assurance Program Plan (QAPP). The Department's comments of April 7, 1988 on the QAPP must be addressed either in an addendum to the QAPP or the work plan or in letter to the Department; and
11. Appendix A. Site - Specific Health and Safety Plan.

- there has been a report of health problems associated with exposure to surface water near Site 3 by a former marine, which should be mentioned in the history section on page A-4,

- provided detailed descriptions of the various levels of personnel protection which are mentioned,

- include pesticides associated with Sites 1, 2, and 3 as contaminants of concern on Table 2,

- define the length of a "steady (PI meter) reading above background" sufficient to upgrade the level of personnel protection,

- provide a more detailed description of the personnel decon procedures and drilling and backhoe decon procedures,

- provisions must be made for notification of Base officials and local fire, police and water district personnel of activities taking place which may pose a hazard,

- the possibility of heat stress must be anticipated for workers in Tyvek coveralls,

The Department was encouraged by the cooperative atmosphere at the May 17, 1988 TRC meeting and is anxious to see site work proceed. As discussed at that meeting, we feel it is of utmost importance to avoid compromising the usefulness of the data by compressing the monitoring well sampling schedule.



It is acceptable to the DEP to have only the first 2 rounds of sampling data included in the 50 week deliverable. Groundwater sampling must occur on a quarterly basis and be designed to represent the variation in groundwater levels from one season to the next.

If you have any questions regarding these comments please feel free to contact me .

Sincerely,

Cynthia M. Kuhns

CYNTHIA M. KUHNS, ES III
Division of Licensing & Enforcement
Bureau of Oil & Hazardous Materials Control

CMK:flh

cc: Ron Springfield, Northern Division
Commander Cullison, Public Works, BNAS
Dave Gulick, ... C. Jordan
Dave Webster, E.P.A.
Charlotte Head, E.P.A.

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CKDARSEY



APPENDIX D

LEVELS OF PERSONNEL PROTECTION

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EQUIPMENT NECESSARY FOR EACH LEVEL
OF PROTECTION - AS PER 29 CFR 1910.120

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Level A

1. SCBA - pressure demand
or
supplied air respirator - pressure demand with escape mask
2. Totally encapsulating suit
3. Coveralls (optional)
4. Long underwear
5. Gloves - outer, chemical resistant
6. Gloves - inner, chemical resistant
7. Boots, chemical resistant, steel toe, steel shank
8. Hard hat (optional)
9. Disposable protective suit, gloves & boots - to be worn over or under encapsulating suit
10. Two way radios

Level A protection should be used when:

1. The hazardous substance has been identified and requires the highest level of protection for skin, eyes and the respiratory system based on either measured (or potential for) high concentrations of atmospheric vapors, gases, or particulates; or the site operations and work functions involve a high potential for splash immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to the skin or capable of being absorbed through the intact skin.
2. Primarily used for emergency situations or when exposed to:
 - a. Vapors/mists of strong acids.
 - b. Known or probable IDLH atmospheres with dermally active compounds.
 - c. High atmospheric concentrations of dermally active toxins.
 - d. Confined spaces.



Level B

1. SCBA - Pressure demand

or

Supplied air respirator - pressure demand with escape SCBA

2. Hooded chemical resistant clothing (coated tyvek)
3. Coveralls (optional)
4. Gloves, outer, chemical resistant
5. Gloves, inner, chemical resistant
6. Boots - chemical resistant, steel toe, steel shank
7. Boot covers, chemical resistant (optional)
8. Hard hat
9. Two way radio (to be worn under outside protective clothing)
10. Face shield (optional)

Level B protection should be used when:

1. The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection.
2. The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin.

The primary piece of equipment here is the respirator. Not as much splash protection required as for A.

Level C

1. Full face respirator, cartridge
2. Hooded chemical resistant clothing (coated tyvek)
3. Coveralls (optional)
4. Gloves - inner, chemical resistant
5. Glove - outer, chemical resistant
6. Boots - chemical resistant, steel toe, steel shank
7. Boot - covers, chemical resistant (optional)

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8. Hard hat
9. Escape mask (optional)
10. Two-way radios (worn under outside protective clothing)
11. Face shield (optional)

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Level C protection should be used when:

1. Atmospheric contaminant, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin.
2. The types of air contaminants have been identified, concentrations measured, and an air purifying respirator is available that can remove the contaminants.
3. All criteria for the use of air purifying respirators are met.

Same splash protection as Level B, but cartridge respirators can be used instead of SCBA's.

Level D

1. Coveralls
2. Gloves (optional)
3. Boots - chemical resistant, steel toe, steel shank
4. Boot - outer, chemical resistant (optional)
5. Safety glasses or chemical splash goggles (optional)
6. Hard hat
7. Escape mask (optional)
8. Face shield (optional)

Level D protection should be used when:

1. The atmosphere contains no known hazard.
2. Work functions preclude splashes, immersion or the potential for unexpected inhalation of or contact with hazardous levels of any chemical.



NAS BRUNSWICK NPL
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RECORD

TELEPHONE CONVERSATION RECORD		Time: 1100	ROUTING	
		Date: Aug-1-88	Code	Initials
ORIGINATOR (name)	(organization)			
R. Springfield	Code 1421/RLS			
PERSON CALLED (name)	(organization)			
C. Head	EPA Reg 1			
SUBJECT				
Drilling at NAS Brunswick				

SUMMARY OF CONVERSATION

1. I called Charlotte to discuss the drilling problems that EC Jordan had encountered at NAS Brunswick. She suggested that our technical people, Dick Willey (EPA) and Rick Beringer (NDiv), also be a part of the call.
2. The specific problem discussed were the marine clay at Site 1 & 8. EC Jordan has had great difficulty drilling through the clays because once they are disturbed they tend to "run" up through the auger. This problem is not allowing the drillers to get a representative sample of the clay.
3. Rick discussed the problem and suggested that it may not be wise to penetrate these clays at this time. He cited three primary reasons. First, due to the apparent upward hydrostatic pressure it is not likely that any contaminants would be find their way down to the lower aquifer. Second, he was concerned about any voids that may be formed in the clay layer due to the clay running into the bore holes. Third, due to the thickness of the clay encountered to date (30 to 60 feet) it seems very unlikely that contaminants would be able to reach the lower aquifer.
4. Rick is very concerned that by punching holes in the marine clay layer that we will be creating conduits for the contamination in the upper aquifer to flow easily into the lower aquifer.
5. Dick Willey agreed with the Navy's assessment of the situation. He suggested that we not try to drill through the clay layer during this phase of the field work. He would like to obtain samples from the clay layer, however. One sample should be taken at the interface

ACTION REQUIRED

ACTION TAKEN

SIGNATURE

DATE:



NAS BRUNSWICK NPL
ADMINISTRATIVE
RECORD

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TELEPHONE CONVERSATION RECORD
CONTINUATION SHEET

=====

Page: 2 of 2
Date: Aug-1-88

=====

SUBJECT

Drilling at NAS Brunswick

=====

SUMMARY OF CONVERSATION -- CONTINUED

of the sand and clay layers; while another sample should be taken a few feet lower than the first. If the samples of the clay show contamination the decision to not drill through the clay will have to be re-evaluated in the next phase of field work.

6. Dick also asked that a detailed description of the drilling situations encountered be carefully documented by the field geologist. He also asked that any comparisons be made to any other similiar situations EC Jordan may have encountered, if applicable.

7. I asked Dick his opinion on moving the monitoring well currently scheduled to be drilled inside Bldg 584. I briefly explained to him some of the logistical problems we were encountering. I explained that the proposed location would be outside of the building, approximately 20 feet from the original location. The proposed location also coincides with the "hottest" of the soil gas survey points inside the DRMO yard. Dick agreed with the move with the understanding that more soil gas work may have to be done at the site, in addition to some work may be required inside the building in the next phase of field work.



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TELEPHONE CONVERSATION RECORD

Time: 14:25
Date: Aug-1-88

ROUTING

ORIGINATOR (name)
R. Springfield

(organization)
Code 1421/RLS

Code Intials

PERSON CALLED (name)
Cynthia Kuhns

(organization)
Maine DEP

SUBJECT

Drilling at NAS Brunswick

SUMMARY OF CONVERSATION

1. I informed Cynthia of my call to the EPA Region I regarding drilling through the marine clay at the sites at Brunswick.
2. I briefly told her of my discussions with the technical people at NorthDiv and at EPA Region I. She agreed with the reasoning behind the decision. She told me she would like to run the decision by her technical people as well. She told me that if we didn't hear anything from her to keep on going the way that was discussed with Region I.

ACTION REQUIRED

None.

ACTION TAKEN

None.

SIGNATURE

DATE:



NAS BRUNSWICK NPL
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RECORD

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TELEPHONE CONVERSATION RECORD

Time: 12:15
Date: Aug-1-88

ROUTING

=====

ORIGINATOR (name)
R. Springfield

(organization)
Code 1421/RLS

Code Intials

PERSON CALLED (name)
Dave Gulick

(organization)
EC Jordan

SUBJECT
Drilling at NAS Brunswick

=====

SUMMARY OF CONVERSATION

1. I called Dave to inform of the decision reached in a conference call with EPA Region I regarding not drilling through the marine clay.
2. I explained the reasoning of Dick Willey (geologist at EPA) concerning taking samples of the clay. It was agreed that the remaining deep wells at Site 1 would be drilled until the marine clays are reached. The clay would then be sampled according to the recommendations of EPA. The hole would then be backfilled and the screen set in the sand layer just above the clay layer.
3. At Site 8, MW 808 will be installed in the same manner as the remaining deep wells at Site 1. MW's 805 and 806 would be deleted because a shallow well already exists at the location they were to be installed.
4. Dave requested that I call the Maine DEP to inform them of the decision. I replied that I had already left a message for Cynthia Kuhns to return my call.
5. The change order submitted by EC Jordan to use casing at the remaining deep wells at Site 1 and 8 is no longer required.

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ACTION REQUIRED

Contact Maine DEP

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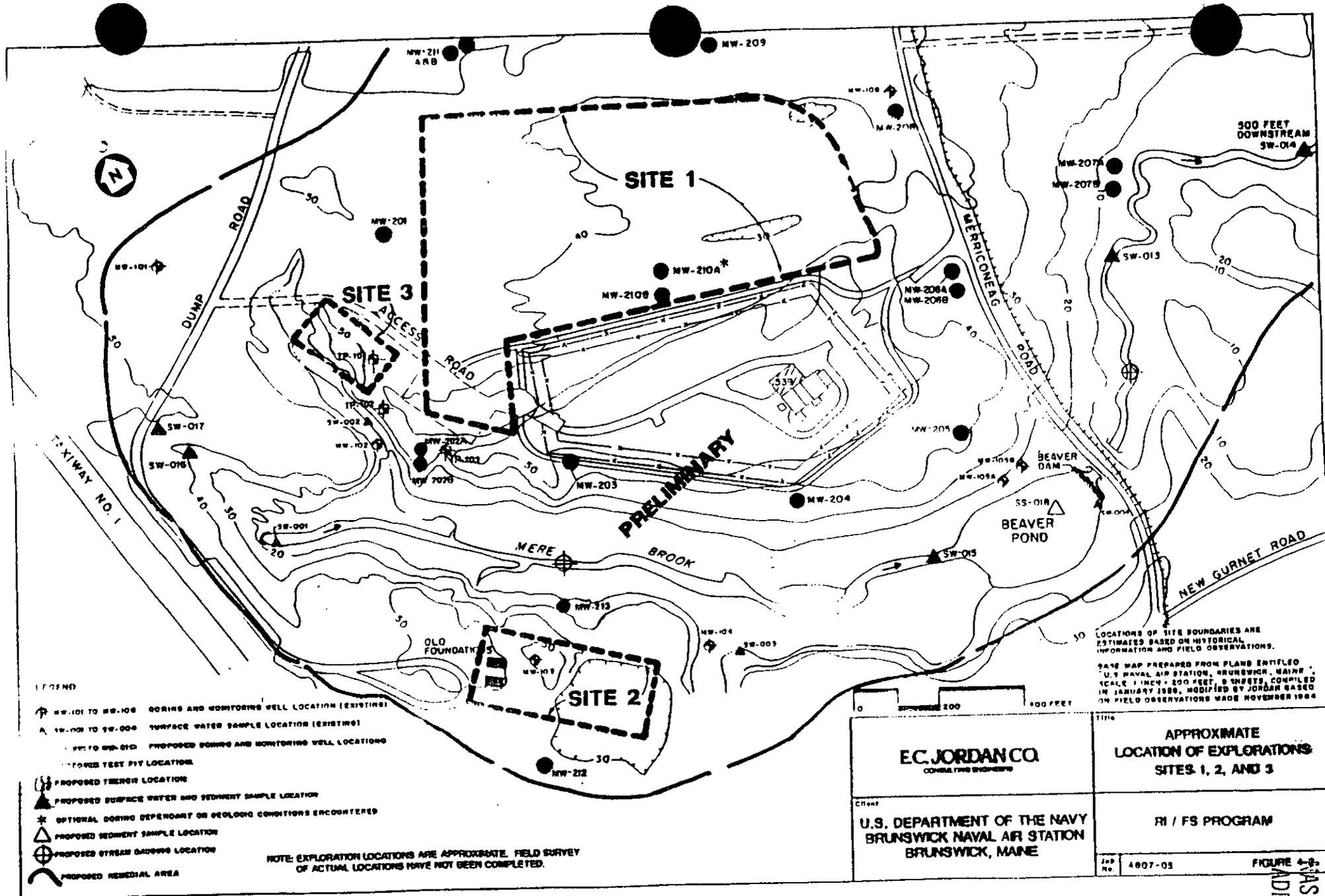
ACTION TAKEN

Message already left at Maine DEP to return my call.

SIGNATURE

DATE:

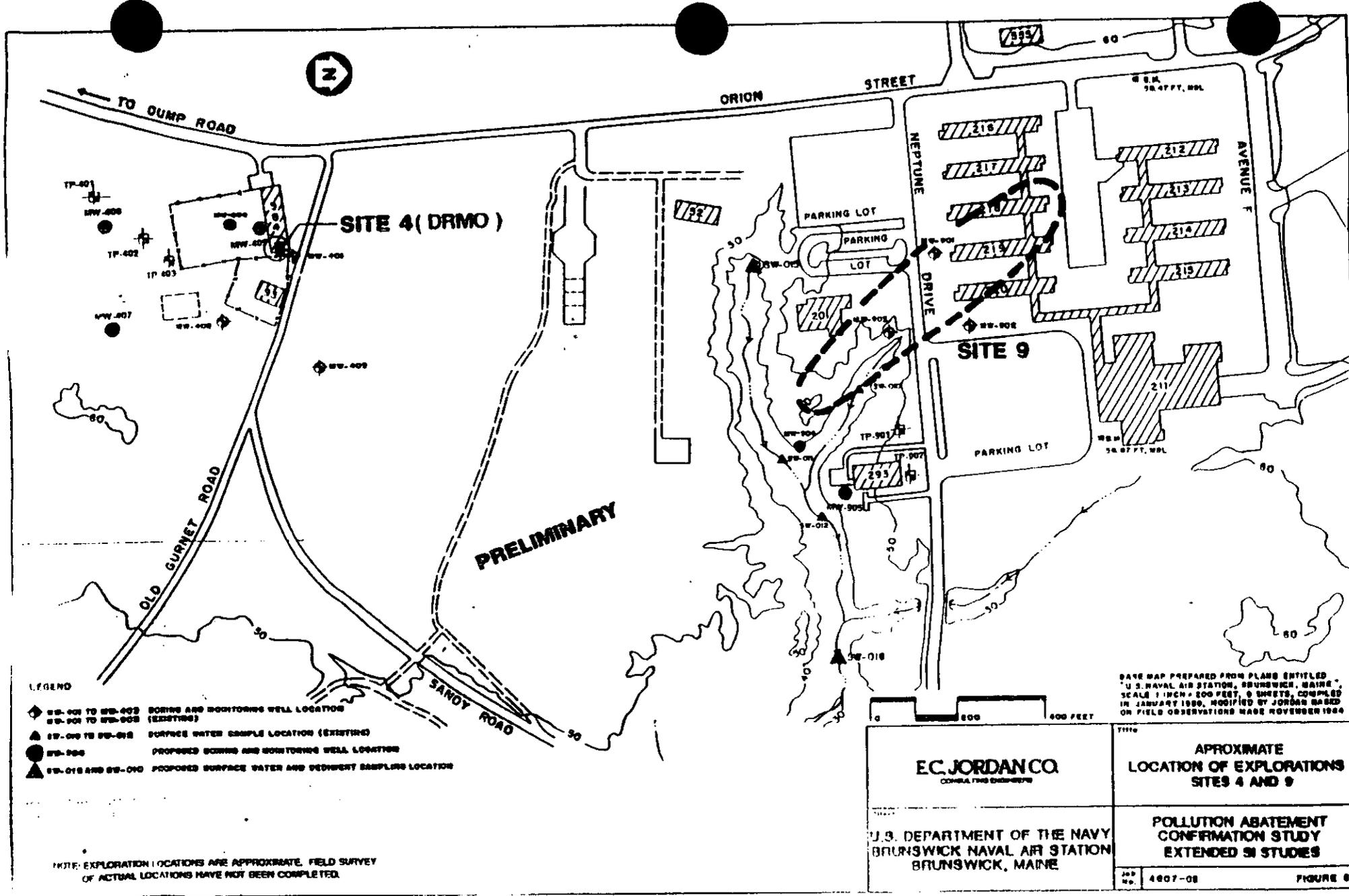




E.C. JORDAN CO. CONSULTING ENGINEERS		APPROXIMATE LOCATION OF EXPLORATIONS SITES 1, 2, AND 3	
U.S. DEPARTMENT OF THE NAVY BRUNSWICK NAVAL AIR STATION BRUNSWICK, MAINE		RI / FS PROGRAM	
Sheet No.	4007-05	FIGURE	U.S. BRUNSWICK NPL

U.S. BRUNSWICK NPL
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LEGEND

- ◆ SB-001 TO SB-003 BORING AND MONITORING WELL LOCATION
- ◆ SB-004 TO SB-005 (EXISTING)
- ▲ SB-006 TO SB-008 SURFACE WATER SAMPLE LOCATION (EXISTING)
- SB-009 PROPOSED BORING AND MONITORING WELL LOCATION
- ▲ SB-010 AND SB-011 PROPOSED SURFACE WATER AND SEDIMENT SAMPLING LOCATION

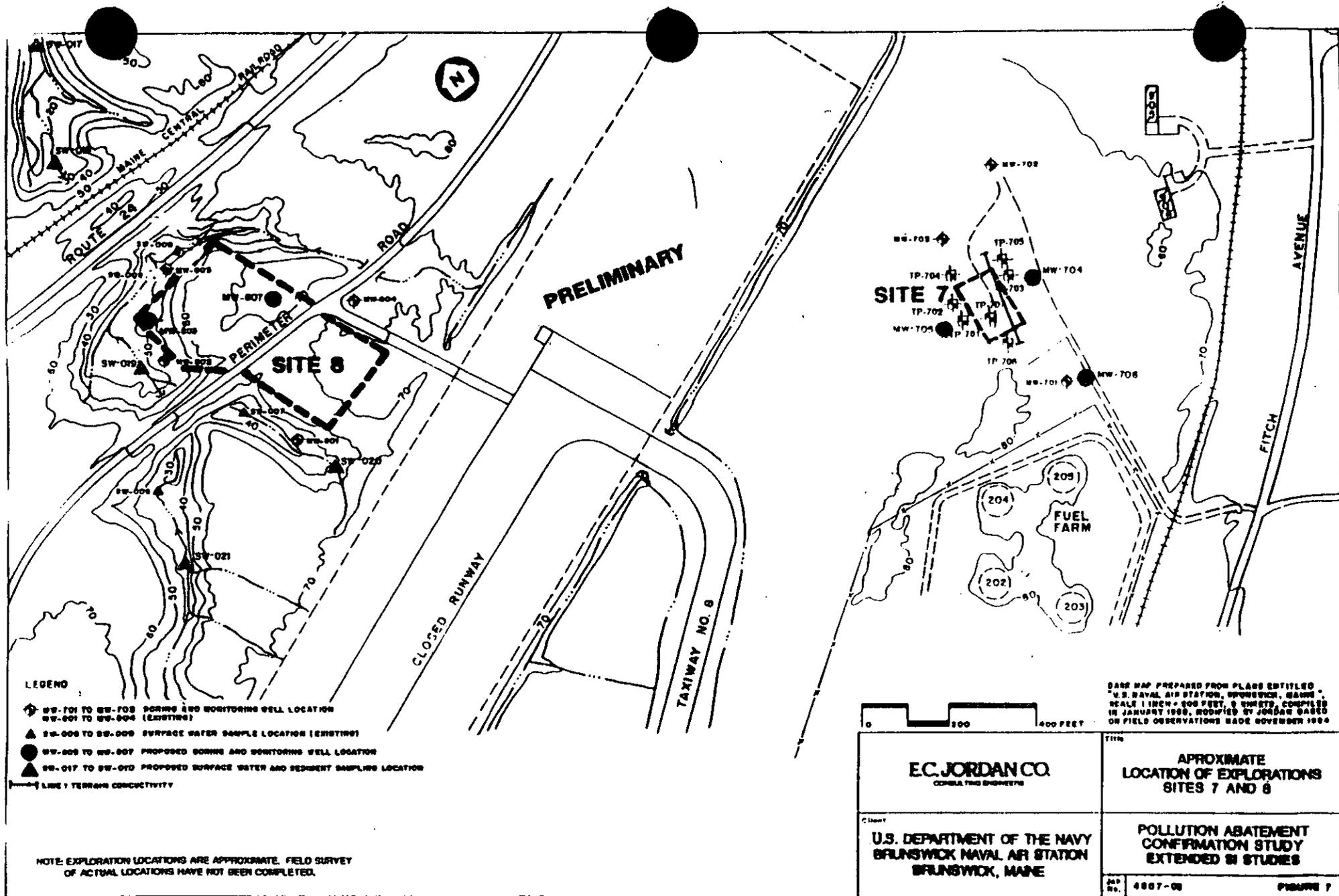
NOTE: EXPLORATION LOCATIONS ARE APPROXIMATE. FIELD SURVEY OF ACTUAL LOCATIONS HAVE NOT BEEN COMPLETED.

DATE MAP PREPARED FROM PLANS ENTITLED "U.S. NAVAL AIR STATION, BRUNSWICK, MAINE", SCALE 1 INCH = 200 FEET, 6 SHEETS, COMPLETED IN JANUARY 1986, MODIFIED BY JORDAN BASED ON FIELD OBSERVATIONS MADE NOVEMBER 1984

<p>E.C. JORDAN CO. CONSULTING ENGINEERS</p>	<p>TITLE APPROXIMATE LOCATION OF EXPLORATIONS SITES 4 AND 9</p>
<p>U.S. DEPARTMENT OF THE NAVY BRUNSWICK NAVAL AIR STATION BRUNSWICK, MAINE</p>	<p>POLLUTION ABATEMENT CONFIRMATION STUDY EXTENDED SI STUDIES</p> <p>NO. 4807-08 FIGURE 8</p>



NAS BRUNSWICK NPL ADMINISTRATIVE RECORD



LEGEND

- ◆ MW-701 TO MW-708 BORING AND MONITORING WELL LOCATION
- ▲ MW-001 TO MW-004 (EXISTING)
- ▲ MW-005 TO MW-008 SURFACE WATER SAMPLE LOCATION (EXISTING)
- MW-009 TO MW-007 PROPOSED BORING AND MONITORING WELL LOCATION
- ▲ MW-017 TO MW-020 PROPOSED SURFACE WATER AND SEDIMENT SAMPLING LOCATION
- LINE : TERRAIN CONDUCTIVITY

NOTE: EXPLORATION LOCATIONS ARE APPROXIMATE. FIELD SURVEY OF ACTUAL LOCATIONS HAVE NOT BEEN COMPLETED.

BASE MAP PREPARED FROM PLANS ENTITLED "U.S. NAVAL AIR STATION, BRUNSWICK, MAINE", SCALE 1 INCH = 800 FEET, 8 SHEETS, COMPILED IN JANUARY 1960, MODIFIED BY JORDAN & CO. BASED ON FIELD OBSERVATIONS MADE NOVEMBER 1964

E.C. JORDAN CO. <small>CONSULTING ENGINEERS</small>	<small>Title</small> APPROXIMATE LOCATION OF EXPLORATIONS SITES 7 AND 8
<small>Client</small> U.S. DEPARTMENT OF THE NAVY BRUNSWICK NAVAL AIR STATION BRUNSWICK, MAINE	POLLUTION ABATEMENT CONFIRMATION STUDY EXTENDED IN STUDIES
<small>Map No.</small> 4887-08	<small>Figure</small> 7



NAS BRUNSWICK NPL
 ADMINISTRATIVE
 RECORD