QUARANTINE DOCUMENT SYSTEM
INDEXING PROCEDURE

INTERIM REPORT

Prepared Under
Contract NASw-2062

For
Headquarters
National Aeronautics and Space Administration
Planetary Quarantine Office
Washington, D.C. 20546

March 1972

by
EXOTECH SYSTEMS, INC.
525 School Street, S.W.
Washington, D.C. 20024
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INTRODUCTION

The Quarantine Document System (QDS) is a special purpose information system designed to collect and disseminate material pertinent to the mission of the Planetary Quarantine (PQ) Office of the National Aeronautics and Space Administration. In fulfilling its responsibility\(^1\) for the administration of the NASA Planetary Quarantine Program, the PQ Office must generate, receive and process extensive quantities of information and documentation related to the following:

- Contamination constraints and quarantine requirements
- Space Flight Project plans for fulfillment of such requirements
- Analyses and studies related to the establishment of quarantine requirements and to their fulfillment
- Execution of contamination and sterilization controls
- Verification that operational requirements have been met
- Compliance and certification of quarantine requirements.

To facilitate the handling of this information, the PQ Office contracted with Exotech Systems, Inc. for the design and implementation of the QDS\(^2\). The basic functions of this system are to systematize the handling of planetary quarantine related information and to provide the NASA Planetary Quarantine Officer with a continuous, up-to-date overview of the status and

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progress of pertinent quarantine activities in flight programs. The collection is organized to facilitate rapid access in response to general and specific queries.

An important function in the successful utilization of the QDS is the indexing procedure. Indexing must be sufficiently detailed to facilitate rapid retrieval, but not so complex that information requests must be subjected to specialized interpretation before retrievals can be conducted. A simple, yet effective QDS indexing procedure has been developed based upon a thesaurus of indexing terms evolved through actual use of the system.

This report describes the QDS indexing procedure and the thesaurus of terms used for this purpose.

The QDS consists of 6 functional elements, depicted in Figure 1, and described in the following paragraphs.

ACQUISITION

Acquisition involves identification, location, and collection (of referencing) of documents pertinent to the objectives of the system. Identification is performed through periodic searches of selected listings of potential sources such as:

Flight project files within the PQ Office
George Washington University Biological Sciences Communication Project (GWUBSCP) abstracts
Figure 1. Operations Elements of QDS
Does Material Relate to PQ?  

- Yes  
  - Does Material Exist in Ready Reference File?  
    - Yes → Discard  
    - No → Catalog, Index and Store

- No → Discard

Is Information Pertinent to Review of any of the Following?  
(a) PQ Requirement or Constraint  
(b) Flight Project PQ Plan  
(c) Flight Project Pre or Post-Launch Analysis  
(d) Certification for Launch  
(e) Request for Deviation  

- No → Discard

- Yes → Discard

Figure 2. Acquisition Criteria
The acquisition criterion presented in Figure 2 is used to screen the collected material for retention. Acquisition decisions and status are indicated by means of stamps (see Figure 3) applied to the upper right hand corner of the documents. Copies are made as necessary and collected for entry into the QDS.

<table>
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<tr>
<th>Stamp Number</th>
<th>Symbol</th>
<th>Significance</th>
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<tr>
<td>1</td>
<td><img src="image1" alt="Symbol" /></td>
<td>Document to be included in QDS</td>
</tr>
<tr>
<td>2</td>
<td><img src="image2" alt="Symbol" /></td>
<td>Copy made for inclusion in QDS</td>
</tr>
</tbody>
</table>

Figure 3. Acquisition Accounting
CATALOGING

Documents selected for inclusion in QDS are cataloged in accordance with standard library practice. Accession numbers are assigned in numerical sequence. A listing is presented as Appendix A.

INDEXING

Indexing is performed in accordance with the procedure described in the following section. The assigned index terms are noted prior to document storage, and maintained in the retrieval request file with the accession numbers of the documents to which each term applies.

The thesaurus of keywords was developed through system use; i.e., each request made for information was screened to identify the terms and types of terms used by the requester. The thesaurus which was evolved has seven broad categories of terms; viz.:

- Medium or Format
- Originator
- Recipient
- Characteristics of content (purpose, status, etc.)
- Related flight projects and planets
- Associated places, organizations, etc.
- Subject Matter
Normally, at least one keyword is assigned from each category; often several are employed, especially in the last three categories cited.

The complete listing of terms currently employed is presented in Appendix B. No attempt has been made to develop an hierarchical arrangement for the subject matter category terms, which are listed in alphabetical order.

STORAGE

Documents are stored in three-ringed loose-leaf binders in a reserved area of the Exotech Systems offices on School Street, S.W. Arrangement is in numerical order by accession number. Withdrawals are carefully controlled; when extensive use is anticipated, copies are supplied.

RETRIEVAL

Document retrieval is effected through the catalog (by accession number, author or corporate author, title, subject) or by searching the keyword index terms. The choice depends upon the extent of identification available at the time of inquiry. Document requests are referred to the designated QDS retrieval operator, who records the request and conducts the search.

A significant aspect of the retrieval process is the interpretation of the request in a form commensurate with quick response to the requester. To
insure rapid and responsive retrieval we have assigned this task to a member of the Exotech Systems, Inc. professional staff who is knowledgeable in the planetary quarantine program.
APPENDIX A

A Complete Listing of the Collection

United States space science program. Report to COSPAR. May 1968.

154 p., with 3 appendices. 11th Meeting, Tokyo, Japan.

Contents: U.S. organization and facilities; international activities; astronomy (stellar, solar, and planetary); particles and fields; upper atmospheric physics; earth sciences; life sciences; technological development; satellite and rocket launchings, 1967; planned launches for 1968; biblio on space sciences, 1967.

Keywords: COSPAR; Space Science Board; Tokyo; Report; ETO

California Institute of Technology, Pasadena, California, Jet Propulsion Laboratory


10 Sections Project Document 138; 605-58

Contents: Trajectories; Aiming Point Selection Strategies; launch phase considerations; spacecraft maneuver analysis, considerations; orbit determination characteristics, introduction to; orbit determination accuracy, pre-maneuver; orbit determination accuracy, post-maneuver; orbit determination accuracy, encounter; orbit determination, special studies in.

Keywords: Mariner Mars 1969; Orbit; micrometeoroid dislodgement; efflux ejecta; JPL; Report; Maneuver
PQ-3

California Institute of Technology, Pasadena, California, Jet Propulsion Laboratory.
Preliminary flight path analysis orbit determination and maneuver strategy, Mariner Mars 1969
250 p. Project Document 138, Appendix; 605-58

I Author II Title III Project Document, Appendix IV NASA Contract no. NAS7-100

Keywords: Mariner Mars 1969; Orbit; micrometeoroid dislodgement; efflux ejecta; JPL; report; maneuver

PQ-4

California Institute of Technology, Pasadena, California, Jet Propulsion Laboratory.
9 Sections, with 3 appendices. Project Document 610-18, Part 1

I-III Authors IV Title V Project Document

Contents: Organization and Responsibilities; contamination analysis plan, probability of; documentation; data treatment; subcontractors; planetary quarantine requirements; facilities; services; schedules; technology advancements

Keywords: Mariner; Mars; Planetary Quarantine Plan; MM '71; JPL
PQ-5


I-III Authors IV Title V Project Document

Contents: Monitoring and Assay, Microbiological; microbial burden on spacecraft, estimation of;

Keywords: Mariner; Mars; Assay, plan; MM '71; JPL

PQ-6


I Author II Title III MDC Letter IV NASA Contract no. NAS1-9000

Keywords: Meeting, Minutes; Viking; Martin Marietta Corporation
Martin Marietta Corporation, Denver, Colorado.
3 p., 3 Enclosures
Martin Marietta Corporation Planetary Quarantine Working Group Minutes of Meeting, March 18, 1970

I Author II Title III MMC-PQWG Minutes

Keywords: Planetary Quarantine Working Group, Meeting, Minutes; Viking, Martin Marietta Corporation

Jet Propulsion Laboratory, Pasadena, California.
Jet Propulsion Laboratory, Pasadena, California, Meeting of Planetary Quarantine Working Group, Dec. 10-11, 1970

I Author II Title III Jet Propulsion Laboratory-Planetary Quarantine Working Group, Meeting

Keywords: Martin Marietta Corporation; Planetary Quarantine Working Group; meeting; Viking; Action items
PQ-9


5 Sections, with 2 appendices General Electric Document No. VOY-C2-TR7

Authors III Title IV Document No.

Contents: Heliocentric, transfer phase; aerocentric phase; further study, recommendations for

Keywords: GE; Mars; Micrometeoroid dislodgement; report; entry; solar wind; efflux ejecta

PQ-10

California Institute of Technology, Pasadena, California, Jet Propulsion Laboratory.


7 p., with 3 Tables and Appendix Project Document 610-18, Part III, (Preliminary)

Authors IV Title V Project Document

Contents: Monitoring and Assay, Microbiological; microbial contamination occurring on spacecraft hardware, assessment of; intramural environment of space hardware assembly, test, and launch facilities, assessment of microbial and particulate contamination in the

Keywords: Mariner; Mars; assay plan; MM '71; JPL
PQ-11 (rev.)
PQ-11

NASA/Langley Research Center, Hampton, Virginia, Viking Project Office.
Viking 75 project: Planetary Quarantine provisions, by L. P. Daspi, Jr.
March 16, 1970.
I-II Authors III Title IV NASA/Langley PQ Provisions

Contents: Requirements; PQ Constraints; Documentation and Data Requirements;
NASA Microbiological Assays

Keywords: Viking; Mars; PQ Provisions; Langley Research Center
Project Plans; Science Package

PQ-11

... NASA Planetary Provisions, Viking 75 Project M75-127-1

PQ-12

NASA/Langley Research Center, Hampton, Virginia, Viking Project Office.
Viking 75 project: Viking mission definition no. 3, (preliminary), by
A. Thomas Young. March 13, 1970.
I-II Authors III Title IV NASA/Langley Viking Mission Definition

Contents: Science Requirements; scientific objectives; landing sites; lifetime;
the use of two spacecraft, strategy for; mission definition schedule

Keywords: Viking; Mars; Langley Research Center; Mission Statement; report
National Aeronautics and Space Administration, Washington, D. C.
Viking '73 investigators.
5 p.
NASA News Release No: 69-166
Dec. 18, 1969.

Keywords: Viking; Mars; science; mission statement; NASA; news release

COSPAR, Panel on Planetary Quarantine.
COSPAR, Panel on Planetary Quarantine Meeting held in Leningrad
on May 23, 1970

Keywords: COSPAR; Contamination log; Leningrad; Meeting; N; Pg; minutes
Pj; Jovian

Exotech Incorporated, Washington, D.C., Summary Report no. TRSK 70-42

Keywords: Exotech; Mars; P(N); Post-COSPAR; report; PQ requirements


Keywords: Exotech; PQ constraints; Mars; Venus; P(N); N; Pre-COSPAR; report
PQ-17

Martin Marietta Corporation, Denver, Colorado, Denver Division.
Contract NAS1-9000, WBS 1.3, Planetary Quarantine Working Group (PQWG) agenda.
Nov. 4, 1970.
1 p. Martin Marietta Corporation, Denver Division, Memorandum, from A. A. Rothstein, Manager Planetary Quarantine, Viking Project, to Viking Project Office-NASA/Langley, Nov. 4, 1970

Author Title III MEM Memorandum

Keywords: Martin Marietta Corporation; Viking; Agenda; Planetary Quarantine Working Group; Meeting; Pasadena

PQ-18

NASA/Ames Research Center, Moffett Field, California.
Pioneer F/G planetary quarantine plan. N.D.
13 p. NASA/Ames Research Center Document No. PC-204(Draft)

Author II Title III NASA/Ames Document

Keywords: Ames; Pioneer F/G; Planetary Quarantine Plan; Jupiter
Roper, W. D.

Keywords: GWUBSCP; Spacecraft; Contamination; Thermal Vacuum; JPL

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.

Contents: Requirements, planetary quarantine constraints, decontamination, microbiology constraints; Documentation and Data Requirements, planetary quarantine specifications, pre-launch analysis, post-launch analysis; Management, project development plan review

Keywords: NASA; PQ Provisions; directive; report; policy
National Aeronautics and Space Administration, Washington, D. C.
Office of Space Science and Applications.
Planetary quarantine provisions for unmanned planetary missions (Rough Draft).
20 p., with 1 appendix NASA Handbook NHB 8020.12 (Rough Draft)

I Author II Title III NASA Handbook

Contents: Requirements, planning, PQ constraints, decontamination, microbiology constraints; Documentation, data requirements; Management

Keywords: NASA; PQ Provisions; directive; report; policy

Fox, D.
Joint planetary quarantine program/Viking '73 operating agreement for implementation of planetary quarantine requirements. Dec. 8, 1969.
Draft of VPO/PQO "Interface" Agreement, Received from D. Fox on January 19, 1970

I Author II Title III Draft

Keywords: Viking; Interface; Management; Agreement
NASA/Langley Research Center, Hampton, Virginia, Viking Project Office.

Viking project: Planetary quarantine provisions, by L. P. Daspit, Jr.

I-11 Authors III Title IV NASA PQ Provisions

Contents: Applicability; Conflicting Requirements, deviations; Requirements, planning, planetary quarantine constraints, decontamination, microbiology constraints, launch operations constraints; Documentation and Data Requirements, planning documents, pre-launch analysis, post-launch analysis of planetary contamination

Keywords: Viking; Planetary Quarantine Provisions; Viking 75 Project; M75-127-1

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NASA/Langley Research Center, Hampton, Virginia, Langley Station.

Viking lander system and project integration. March 1, 1969.
22 p., with 6 Figures NASA/Langley Statement of Work

I Author II Title III NASA/Langley Statement of Work

Contents: Project Objectives, description; Government-furnished Data, equipment, facilities, and support; Contractor Tasks; NASA participation

Keywords: Viking; Integration; Langley Research Center; Report; Lander; RFP

I Author II Title III Unsolicited Proposal

Contents: Proposed Work Statement; (quarantine document system for Viking, design and operation of); Viking, quarantine assurance evaluation studies for; Personnel and Organization

Keywords: Exotech, proposal, studies, support


I Author II Title III MMC Proposal

Keywords: Martin Marietta Corporation; Proposal; Viking
PQ-27

Martin Marietta Corporation, Denver, Colorado.
92 p. Martin Marietta Corporation, Denver Division, Coordination Draft no. PL-3701009

I Author II Title III NASA Draft
Contents: Applicable documents; Organization and responsibilities; Program controls; Planetary quarantine documentation; PQ analysis; Real time data management; Viking facilities, services; New technology; PQ schedules

Keywords: Viking; Planetary Quarantine Plan; Draft; Langley Research Center; Mars; MMC

PQ-29

National Aeronautics and Space Administration, Washington, D. C., Planetary Quarantine Office.


I Author II Title III NASA/Washington, Summary

Keywords: Planetary Quarantine Plan; Viking; Review; Comments; Memorandum; Exotech
National Aeronautics and Space Administration, Washington, D. C., Planetary Quarantine Office.

Summary of comments compiled during review of January 14 of Coordination Draft of PQ Plan (PL-3701009).

NASA/Washington, Planetary Quarantine Office Summary of Coordination Draft of PQ Plan (PL-3701009), Jan. 27, 1970

I Author II Title III NASA/Washington, Summary

Keywords: PQ Plan; Viking; Review; Comments; Memorandum; revision; NASA

---

National Aeronautics and Space Administration, Washington, D. C.

Viking planetary quarantine plan. NASA Memorandum, from SB/Dr. Donald G. Fox.

I Author II Title III NASA Memorandum

Keywords: Memo; Viking; Planetary Quarantine Plan; Review; PQO; comments
PQ-32

Sterilization procedures for planetary landers, by Donald G. Fox, Ph.D.

I-II Authors III Title IV Jn. cit.

Keywords: Report; Fox; Sterilization; Viking; thermal radiation; diffusion

PQ-33

NASA/Langley Research Center, Hampton, Virginia, Langley Station.
Planetary quarantine requirements for inclusion in the Viking project procurement package.

NASA/Langley Research Center Memorandum from Viking Project Manager to NASA, Code SL, Attn: Mr. W. Jakobowski

I Author II Title III NASA/Langley Memorandum

Keywords: Viking; Requirements; Planetary Quarantine provisions; memo; LRC
PQ-34

Neill, Arthur H.


I Author II Title III Draft

Keywords: COSPAR; post-launch; analysis; MM '69; NASA; draft; report

PQ-35

Martin, James S.


I Author II Title III Memorandum

Keywords: Memorandum; Viking; Planetary Quarantine Plan; Comments; Deviations; LRC; Martin
California Institute of Technology, Pasadena, California, Jet Propulsion Laboratory.
1 p. Letter from Dan Schneiderman, Manager Mariner Mars 1971 Project, to SL/Earl W. Glahn, MM '71 Program Manager, NASA

I Author II Title III Jet Propulsion Lab. Letter
Keywords: JPL; NHB 8020.12; MM '71; Mars; budget; letter; assay

National Aeronautics and Space Administration, Washington, D. C.
Clarification of NHB 8020.12, paragraph 2.2.4.3.1. Oct. 1, 1970.
1 p. NASA Memorandum, from SL/Manager, Mariner Mars '71, Planetary Programs to SB/Planetary Quarantine Officer, Bioscience Programs

I Author II Title III NASA Memorandum
Keywords: Memorandum; NHB 8020.12; MM '71; assay; NASA; approval
PQ-38

National Aeronautics and Space Administration, Washington, D. C.
Mariner Mars 1971 planetary quarantine plane - PD 610-18, dated
11 February 1970.
2 p. NASA Memorandum, from SB/Planetary Quarantine Officer,
Bioscience Programs, to SL/Program Manager, Mariner Mars '71 Mis-
sion, Planetary Programs

I Author II Title III NASA Memorandum

Keywords: Memorandum; Approval; Mars; Planetary Quarantine
Plan; comments; PQO; MM '71

PQ-39

California Institute of Technology, Pasadena, California, Jet Propulsion
Laboratory.
Response to SB/Deputy Planetary Quarantine Officer's comments on prelimi-
Memorandum on Assay & Monitoring Plan, from A. R. Hoffman/M. R. Christensen, to N. R. Haynes

I Author II Title III Jet Propulsion Lab. Memorandum

Keywords: JPL; MM '71; Mars; assay; plan; comments;
efficiency factor; Memorandum
PQ-40

National Aeronautics and Space Administration, Washington, D. C.
Reallocation of \( P_c \) to Viking 1975.
Aug. 12, 1970.
1 p. NASA Memorandum from Lawrence B. Hall, Planetary Quarantine Officer, to SL/Walter Jakobowski, Viking Program Manager

I Author II Title III NASA Memorandum

Keywords: Viking; Mars; Memorandum; N; P(N); PQO; allocation

PQ-41

National Aeronautics and Space Administration, Washington, D. C.
Reallocation of \( P_c \) to Mariner 1971.
Aug. 12, 1970.
1 p. NASA Memorandum from SB/Lawrence B. Hall Planetary Quarantine Officer to SL/Earl Glahn, Mariner '71 Program Manager

I Author II Title III NASA Memorandum

Keywords: Mariner '71; Mars; Memorandum; N; P(N); allocation; PQO; approval
PQ-42

National Aeronautics and Space Administration, Washington, D. C.
1 p. NASA Memorandum from SB/Lawrence B. Hall, Planetary Quarantine Officer to SL/Walter Jakobowski, Viking Program Manager

I Author II Title III NASA Memorandum

Keywords: $P_C$; Mars; Memorandum; Woods Hole; SSB; Viking; PQO; review; value; confidence; approval

PQ-43

Exotech Systems, Inc., Washington, D. C.
Viking meeting September 10 and 11, 1970 at Langley Research Center.

I Author II Title III Exotech Systems, Inc., Memorandum

Keywords: Viking, meeting; LaRC; MMC; Planetary Quarantine Requirements; Math Model; Sterilization; repairs
Neill, Arthur H.
Comments on preliminary microbiological assay and monitoring plan.
May 27, 1970.
2 p. Memorandum, from Arthur H. Neill, SB/Deputy Planetary Quarantine Officer, to SL/Program Manager, Mariner Mars '71, May 27, 1970

I Author II Title III Memorandum

Keywords: MM '71; Memorandum; Comments; Microbiological Assay and Monitoring Plan; estimation; # samples; Neill; PQO

---

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.

Biological sampling for Viking '73

1 p. NASA/ Washington Memorandum from SB/Planetary Quarantine Officer to LaRC/Viking Project Manager

I Author II Title III NASA Memorandum

Keywords: Viking; microbiological assay; memorandum; sampling; # samples; agreement; PQO
PQ-46

Dr., Fox, Donald G.


1 p. Minutes of Bi-weekly Meeting, from Dr. Donald G. Fox to Memo-

randum For The Record, Jan. 6, 1970

I Author II Title III Minutes

Keywords: Viking; Meeting; Bi-weekly; Minutes; Fox; interface; correspondence

PQ-47

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications.


1 p. NASA/Washington Memorandum, from SB/Lawrence B. Hall -
Planetary Quarantine Officer to SL/Walter Jakobowski - Viking Pro-
gram Manager

I Author II Title III NASA Memorandum

Keywords: Viking; Planetary Quarantine Provisions; Comments; P(N); Memorandum; review; approval; PqO
PQ-48

3 p. PQAC Summary Report, February, 1969

I Title II PQAC Report
Keywords: D-values; PQAC; summary report; P; Sneath; error; action; N, recommendations; conservation; ETO; P(vt)

PQ-49

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.
Allocation of P to Pioneer F. Aug. 12, 1970.
1 p. NASA/ Washington Letter, from SB/Lawrence B. Hall, to SL/Gleen Reiff, Pioneer Program Manager

I Author II Title III NASA Letter
Keywords: Pioneer; P(N); T; N; Requirement; Jupiter; Memorandum; PQO; P(g); parameter; values; approval
PQ-50

Martin Marietta Corporation, Denver, Colorado, Denver Division.

I Author II Title III MMC Letter
Keywords: Bioburden; MMC; letter; Mated; surface; definitions; VPO; FA cycle; parachute

PQ-51

California Institute of Technology, Pasadena, California, Jet Propulsion Laboratory.
August 20, 1970.

I Author II Letter

Keywords: Mercury; Venus; MM '73; Letter; JPL; Planetary Quarantine Plan; Planetary Quarantine Requirements; relaxation; funds
PQ-52

Strobel, G. K.
4 p. Memorandum, from G. K. Strobel, SL/Program Engineer, Mariner

I Author II Title III Memorandum

Keywords: MVM '73; Planetary Quarantine Plan; Planetary Quarantine re-
requirements; Mercury; Venus; Memorandum; SL; request; relaxation

PQ-53

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications.
Guidelines for preparation of implementation of Mariner Venus/Mercury '73
3 p. NASA/Washington, D. C., Office of Space Science and Applications
Memorandum, from SB/Planetary Quarantine Officer to SL/Program Manager, Ma-
riner Venus/Mercury '73, Oct. 16, 1970

I Author II Title III NASA Memorandum

Keywords: Memorandum; Mariner; Venus; Mercury; Planetary Quarantine
Plan; guidelines; P(N); Pq; PQO; MVM '73
PQ-54

3 p. NASA/Washington, D. C., Letter from Lawrence B. Hall to Dr. Wolf Vishniac, pertaining to Dr. Sneath's "Memorandum on Estimating Probability Parameters", presented to the 1970 COSPAR Panel on Planetary Quarantine

I Author II NASA Letter

Keywords: Letter; Vishniac; Sneath; Conservatism; P_g; error; Hall

PQ-55

The University of Rochester, Rochester, New York, Department of Biology. August 17, 1970.
1 p. The University of Rochester, Rochester, N. Y., Dept. of Biology Letter, from Wolf Vishniac to Lawrence Hall pertaining to the definition of planetary contamination

I Author II Letter

Keywords: P_c; definition; letter; Vishniac; Antarctic
PQ-56

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.
Aug. 27, 1970.
2 p. NASA/Washington, D. C., Office of Space Science and Applications Letter, from Lawrence B. Hall to Dr. Charles R. Phillips

I Author II NASA Letter

Keywords: Venus; $p_g$; letter; Hall; request; comments; experiments; clouds; aerosols

PQ-57

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.

Comments on Pioneer F/G planetary quarantine plan, undated Preliminary Draft PC-204.
Aug. 12, 1970.
2 p. NASA/Washington, D. C., Memorandum, from SB/Lawrence B. Hall to SL/Glen Reiff, Aug. 12, 1970

I Author II Title III NASA Memorandum

Keywords: Pioneer; Jupiter; Memorandum; Planetary Quarantine Plan; Comments; requirements; Hall
Letter from Lawrence B. Hall to Dr. Carl Sagan, July 31, 1970

Keywords: Letter; Sagan; jupiter; pioneer; Hall; outer planets; requirements

Memorandum on estimating probability parameters, by P. H. A. Sneath.

Keywords: Sneath; COSPAR; paper; estimation; error
PO-60

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications,
June 23, 1970.
1 p. NASA/Washington, D. C., Office of Space Science and Applications
Letter, from Lawrence B. Hall to Dean P. Kastel, June 23, 1970

I Author II NASA Letter

Keywords: SSB; Letter; N; P(N); Hall; outer planets; Jovian

PQ-61

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications,
April 10, 1970.
2 p. NASA/Washington, D. C., Office of Space Science and
Applications, Letter from Lawrence B. Hall to Dean P. Kastel, April
10, 1970.

I Author II NASA Letter

Keywords: SSB; Palo Alto; N; P(N); letter; Hall; allocation
PQ-62

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications.
2 p. NASA/Washington, D. C., Office of Space Science and Applications
Memorandum, from Lawrence B. Hall to SL/Director

I Author II Title III NASA Memorandum

Keywords: Memorandum; requirements; relaxation; Mars; buried; PQO;
sterilization

PQ-63

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications.
SB concurrence on Mariner Mars 1971 project development plan. July
22, 1969.
1 p. NASA/Washington, D. C., Office of Space Science and Applications,
Memorandum, from Orr E. Reynolds, to Director/SL, July 22, 1969

I Author II Title III NASA Memorandum

Keywords: Mariner '71; Mars; Project Plan; Memorandum; approval; PQO

I Author II Title III NASA Memorandum

Keywords: SSB; Palo Alto; Memorandum; agenda; meeting; PQQ


I Author II Title III Memorandum

Keywords: Viking; Langley Research Center; Planetary Quarantine Requirements; Model; Sterile repair; MMC; Bioburden model; Sterilization model; memo; Bacon; meeting; minutes
Stanford University School of Medicine, Stanford, California, Stanford University Medical Center, Dept. of Community and Preventive Medicine.

Comments on Sneath's memorandum on estimating probability parameters by Byron Wm. Brown, Jr., August 20, 1970.

3 p. with Enclosure

I-II Authors

Keywords: Brown; Sneath; Bayesian statistics; parameter estimation; COSPAR; evaluation; comments; safety factors; confidence


Letter from Kenneth R. Dirks, M.D., Colonel, MC Commanding to Lawrence Hall, September 10, 1970.

I Author

Keywords: USAMRDC; Briefing; AD Little; Hospital; Sterilization; Aug. 11, 1970; Letter; appreciation

I Author II Title III Minutes IV Contract no. NAS1-9000

Keywords: Martin Marietta Corporation; Planetary Quarantine Working Group; Viking; Meeting; Minutes; assay


I-II Authors III Title IV Abstract

Keywords: GMUBSCP, abstract; radiation; sterilization; Sandia, report
Exotech Systems, Inc., Washington, D. C.

I Author II Title III Exotech Systems, Inc. Report IV NASA Contract no. NASw-2052

Keywords: Report; Exotech; P; SSB; Woods Hole; Mars; implications

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PQ-71

Exotech Systems, Inc., Washington, D. C.

I Author II Title III Exotech Systems, Inc., Memorandum

Keywords: Pioneer; P; P(N); Quarantine Period; Jupiter; Bacon; memo; requirements
NASA Letter from Lawrence B. Hall, Planetary Quarantine Officer to Dr. Wolf Vishniac, University of Rochester, Dept. of Biology, July 28, 1970.

Keywords: SSB; P; Definition of terms; Vishniac; Woods Hole; COSPAR; letter; Hall


Keywords: Viking; Bio Burden; model; estimation; prediction; Martin Marietta; Control Divg.; report; Nelson
PQ-75

Jet Propulsion Laboratory, Pasadena, California.
Minutes of planetary quarantine meeting at JPL on 6-7 May 1970, by
A. A. Rothstein and Richard H. Green. N.D.

I-III Authors IV Title V Minutes (JPL)

Keywords: Viking; Planetary Quarantine Working Group; Meeting;
Minutes; allocation

PQ-76

Jet Propulsion Laboratory, Pasadena, California.
Planetary Quarantine Working Group meeting of July 16-17, 1970,
by A. A. Rothstein, R. H. Green, and L. P. Daspit, Jr. N.D.

I-IV Authors V Title VI Minutes (JPL)

Keywords: PQWG; Meeting; Minutes; Models; Viking
PQ-77

Martin Marietta Corporation, Denver, Colorado, Denver Division.
Invitation of Viking 73 planetary quarantine working group meeting.
1 p. Martin Marietta Corporation, Denver Division Letter from
A. A. Rothstein, Manager Planetary Quarantine to NASA Headquarters,
Planetary Quarantine Office (Mr. L. B. Hall)

I Author II Title III MCC Letter

Keywords: Martin Marietta Corporation; Planetary Quarantine Working
Group; Meeting; Agneda; Viking; minutes

PQ-78

American Institute of Biological Sciences, Washington, D. C.
Review: Viking planetary quarantine plans.
3 p. American Institute of Biological Sciences, Washington, D. C.,
Memorandum from Mary Frances Thompson-Coordinator, Special Science Pro-
jects to Viking Consultants, Dec. 5, 1969

I Author II Title III AIBS Memorandum

Keywords: AIBS; Planetary Quarantine Plan; Review Schedule; (Viking)
memo
Exotech Systems, Inc., Washington, D. C.
July 22, 1970.

2 p.

I Author II Title III Exotech Systems, Inc., Letter

Keywords: Organic Inventory; Principal Investigators; Letter; Questionnaire; Shubin; request

COSPAR, Panel on Planetary Quarantine.
COSPAR abstracts at Seattle meeting. March 5, 1971.
COSPAR, Panel on Planetary Quarantine, Abstracts at Seattle Meeting, March 5, 1971

I Author II Title III COSPAR Abstracts

Keywords: COSPAR; Memorandum; Seattle; Paper; Approval; presentation; Neill
PQ-81

Mitchell, R. T.
Errata to preliminary flight path analysis orbit determination and maneuver strategy Mariner Mars 1969.
May 7, 1968.

I Author II Title III Paper

Keywords: Mariner Mars '69; Mars; Jet Propulsion Lab.; orbit; memo; revision; analysis

PQ-82

National Academy of Sciences-National Research Council, Washington, D. C.,
Space Science Board.

1. NAS-NRC, Washington, D. C., Space Science Board, Memorandum, (Concerning Review of Sterilization Parameter Probability of Growth (P_g), from D. P. Kastel, Secretary to Participants, Sterilization Parameter Review: Probability of Growth (P_g), Sept. 17, 1970

I Author II Title III NAS-NRC, Space Science Board, Memorandum

Keywords: Space Science Board; Meeting; Woods Hole; P_g; Conservatism
minutes; Kastel; draft
PQ-83


I Author II Title III Memorandum (NASA/Washington)

Keywords: Planetary Quarantine provisions; (Viking); Flight Project Document; Approval; memo; Reynolds

PQ-84

Martin Marietta Corporation, Denver, Colorado, Denver Division. Contract NAS1-9000, Meeting of planetary quarantine working group. March 5, 1970. 1 p. with 2 Enclosures Martin Marietta Corporation, Denver Division Minutes, March 5, 1970

I Author II Title III MMC Minutes

Keywords: Viking; MMC; meeting; PQWG; minutes
PQ-85

Exotech Systems, Inc., Washington, D. C.


I Author II Title III EXI Memorandum

Keywords: Viking; Sterilization Plan; Review; Comments; Memorandum; Overkill; Exotech

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IQ-86

NASA/Ames Research Center, Moffett Field, California.


I Author II Title III NASA/Ames Document #

Keywords: Pioneer; Planetary Quarantine Plan; Jupiter; report; analysis; Ames; model
FQ-87

Exotech Systems, Inc., Washington, D.C.

I. Author II Title III ESI Memorandum

Keywords: P(N); N; Mars; COSPAR; Viking; memo; Bacon; allocation; non-landers; landers

FQ-88

National Aeronautics and Space Administration, Washington, D.C.
Trajectory acceptance and planetary quarantine certification - Mariner 1969 Mars mission.
1 p. NASA/Washington Memorandum from Orr E. Reynolds, SB/Director of Bioscience Programs to S/Associate Administrator for Space Science and Applications

I. Author II Title III NASA/Washington Memorandum

Keywords: Mariner '69; Mars; Memorandum; pre-launch analysis; approval; Reynolds; certification
National Aeronautics and Space Administration, Washington, D. C.
Planetary quarantine certification of Mariner 1969 mission. N.D.
1 p. NASA/Washington Memorandum from John E. Naugle, S/Associate
Administrator for Space Science and Applications to A/Administrator

I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; Mariner '69; Mars; Naugle

Horowitz, N. H.
Planetary contamination I: The problem and the agreements, by

I-III Authors IV Title V Jn. Cit.

Keywords: publication; analysis; ZOND; Venus; Mars; bus deflection
Horowitz; science; report; relaxation; history
PQ-91

NASA/Langley Research Center, Hampton, Virginia.

Planetary quarantine working group meeting of January 12-13, 1970

Langley Research Center/Viking Project Office.


I Author II Title III Minutes (LaRC)

PQWG

Keywords: Planetary Quarantine Working Group; Meeting; Minutes; Charter; Viking

PQ-92

Hagen, C. A.


I-IV Authors V Title VI GWUBSCP Abstract

Keywords: GWUBSCP; abstract; ultraviolet = UV; sterilization; Mars; P(uv)
Reynolds, M. C.
Optimizing thermal and radiation effects for bacterial inactivation, by M. C. Reynolds and D. M. Garst.

I-II Authors III Title IV GWUBSCP Abstract

Keywords: thermal radiation; GWUBSCP; abstract; Sandia; radiation; sterilization

Pflug, I. J.

I Author II Title III GWUBSCP Abstract

Keywords: GWUBSCP; abstract; Minnesota; sterilization; D-value; Pflug; surface; mated; buried
PQ-95

Martin Marietta Corporation, Denver, Colorado.

I-II Authors III Title IV GWUBSCP Abstract

Keywords: GWUBSCP; abstract; bioburden; prediction; model; JPL; MMC

PQ-96

U. S. Dept. of The Army, Frederick, Maryland, Fort Detrick.

I-VII Authors VIII Title IX GWUBSCP Abstract

Keywords: GWUBSCP; abstract; ETO; sterilization; Detrick; Phillips; tests

Keywords: GWUBSCP; abstract; General Electric; aseptic; maintenance; pressurization

Jet Propulsion Laboratory, Pasadena, California.

Keywords: JPL; Mars; entry; GWUBSCP; abstract; Jet Propulsion Laboratory; facility; atmosphere; simulation
PQ-99

Puleo, J. R.

I-IV Authors V Title VI GWUBSCP Abstract

Keywords: Puleo; detection; GWUBSCP; bioburden; Apollo; Abstract

PQ-100

Sandia Laboratories, Albuquerque, New Mexico.

I-IV Authors V Title VI GWUBSCP Abstract

Keywords: GWUBSCP; thermoradiation; sterilization; Sandia; abstract
COSPAR, Panel on Planetary Quarantine.
Potentially harmful effects of space experiments from the panel on planetary quarantine.
COSPAR, Panel on Planetary Quarantine, Report to the Consultative Group, Prague, May 17, 1969

I Author II Title III COSPAR, PQ Panel Report

Keywords: COSPAR; Planetary Quarantine Panel; N; Prague; Planetary Quarantine Requirements; SSB; meeting; minutes; T; deflection

COSPAR, Panel on Planetary Quarantine.
Interim Report of the Panel on planetary quarantine (Item 12), by Dr. Heda.
COSPAR, Interim Report of the Panel on Planetary Quarantine

I Author II Title III COSPAR Report

Keywords: COSPAR; Contamination log; Leningrad; Jovian; PQ Panel; P(g); meeting; minutes
National Aeronautics and Space Administration, Washington, D. C.
Clarification of NHB 8020.12, paragraph 2.2.4.3.1. Sept. 2, 1970.
2 p. NASA/Washington Memorandum from SB/Planetary Quarantine
Officer Lawrence B. Hall to SL/Program Manager, Mariner Mars 1971,
Sept. 2, 1970

I Author II Title III NASA/Washington Memorandum

Keywords: NHB 8020.12; Memorandum; verification; MM '71;
assay; sampling; PQO; clarification; order; scope; PHS

National Aeronautics and Space Administration, Washington, D. C.
A study of the probability of deposits viable organisms on Mars during
the Mariner 1964 mission.
7 p. NASA/Washington Letter from Homer E. Newell, Associate Administra-
tor for Space Science and Applications forwarding a NASA report to Professor
Harry H. Hess, Chairman Space Science Board - National Academy of Sciences,
Washington, D. C.

I Author II Title III NASA/Washington Letter-Report

Keywords: SSB; MM'64; pre-launch analysis; impact; Mars; Newell
FQ-105

National Aeronautics and Space Administration, Washington, D. C.
May 8, 1969.


I Author II Title III NASA/Washington Letter

Keywords: SSB; MM'69; Mars; post-launch analysis report; letter; transmittal

FQ-106

California Institute of Technology, Pasadena, California, Jet Propulsion Laboratory.

Mariner Venus 67 prelaunch analysis of contamination probability, by Norman R. Haynes.

May 1, 1967.

23 p. Jet Propulsion Laboratory, Pasadena, California, JPL Project Document 123

I-II Authors III Title IV JPL Document

Contents: Mathematical Model; Contaminating Venus, probability of; Mission profile; accidental vehicle impact, probability of; spacecraft ejecta contaminating Venus, probability of

Keywords: MV'67; prelaunch analysis; Jet Propulsion Laboratory; report
National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications,
5 p. NASA/Washington Memorandum, from Orr E. Reynolds, Director, Bioscience Programs, Office of Space Science and Applications to Mr. George Derbyshire, Secretary-Space Science Board of the National Academy of Sciences, Washington, D. C., Jan., 1969

I Author II Title III NASA/Washington Memorandum

Keywords: D values; letter; status; SSB; \( P_c \); \( P_g \); letter; Reynolds; Derbyshire
PQ-109

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications.
Planetary quarantine allocation for Mariner Mars '71 (MM '71) pro-
1 p. NASA/Washington Memorandum from Orr E. Reynolds, SB Director,
Bioscience Programs, Office of Space Science and Applications to SL/
Director, Jan., 1969

I Author II Title III NASA/Washington Memorandum

Keywords: P(N); Mars; MM '71; Memorandum; SB; N; Viking; allocation; T;
Reynolds; official

PQ-110

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications, Bioscience Programs.
1 p. NASA/Washington Memorandum, from SB/Donald G. Fox, Steri-
lit; Control Officer to SB/Lawrence B. Hall, Feb., 1969

I Author II Title III NASA/Washington Memorandum

Keywords: Viking; Memorandum; SB; Schedule; contractor; procurement; Fox
PQ-111

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.
Biological sampling for Viking '73. Feb. 8, 1969.
1 p. NASA/Washington Memorandum, from SB/Lawrence B. Hall, Planetary Quarantine Officer to LaRC/Viking Project Manager, Feb., 1969

I Author II Title III NASA/Washington Memorandum

Keywords: Sampling; Viking; Memorandum; SB; assay; agreement; LaRC

PQ-112

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.
Viking project document, M73-109-0. March 5, 1969.
1 p. NASA/Washington Memorandum, from Orr E. Reynolds, Director, Bioscience Programs, to SL/Director, March, 1969

I Author II Title III NASA/Washington Memorandum

Keywords: SB; Memorandum; Viking; Planetary Quarantine Provisions; Approval; Reynolds
PQ-113

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications.
1 p. NASA/Washington Memorandum, from Lawrence B. Hall SB/Planetary Quarantine Officer to SL/Viking Program Manager, April, 1969

I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; SB; Viking; MAST; sterile insertion; PQO; problem

PQ-114

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications.
1 p. NASA/Washington Memorandum, from SB/Director, Orr E. Reynolds to SL/Director, June, 1969

I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; SB; Project plans; approval; sign off; procedure; Reynolds
PQ-115

National Aeronautics and Space Administration, Washington, D. C.
1 p. NASA/Washington Memorandum from Donald P. Hearth-SL/Director, Planetary Programs, to SB/Director, Bioscience Programs, July, 1969

I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; SL; Project Plans; Submittal; procedure; sign off

PQ-116

National Aeronautics and Space Administration, Washington, D. C.,
Office of Space Science and Applications.

I Author II Title III NASA/Washington Memorandum

Keywords: Viking; Memorandum; SB; Meeting; Schedule; coordination; agreement
PQ-117

1 p. NASA/Washington Letter, from Lawrence B. Hall, Planetary Quarantine Officer to Dr. W. H. Pickering, Director Jet Propulsion Lab., Pasadena, Calif., July, 1969

I Author II NASA/Washington, Letter

Keywords: Letter; SB; JPL; support; resident; request

PQ-118


I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; SL; Viking; documents; meeting; LaRC; coordination; agreement; procedures

I Author II NASA/Washington Letter

Keywords: Letter; American Institute of Biological Sciences (AIBS); Viking; Support; Viking Quarantine Evaluation Board (VQEB); request; funds; support; Hall

1 p. NASA/Washington Letter from Donald G. Fox, Sterility Control Officer to Dr. Martin S. Favero, USPHS-NCDC, Phoenix Labs., Phoenix, Arizona, July 22, 1969

I Author II NASA/Washington Letter

Keywords: Letter; Favero; Viking; assay plan; scope; arrangements; Fox
PQ-121

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.

I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; P_c; P_g; SB; P(N); Mars; Venus; Jupiter; parameter values; SSB; official; approved

PQ-122

National Aeronautics and Space Administration, Washington, D. C.

I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; SL; Viking; Sterilization; Facility; MAST; utilization; rejection
Decision concerning use of "MAST" type sterilization facility for the Viking Project.

July 18, 1969.


Keywords: Letter; Viking; Langley Research Center; MAST; utilization; facility; sterile insertion; rejection
PQ-125

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.
1 p. NASA/Washington Memorandum, Aug. 1969, from Planetary Quarantine Officer/SB Lawrence B. Hall to Viking Program Manager/SL

I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; SB; Viking; Sterilization; Facility; MAST; sterile insertion; requirement; clarification

PQ-126

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.
July 31, 1969.
1 p. NASA/Washington, Memorandum from SB/Planetary Quarantine Officer to SL/Viking Program Manager, July, 1969

I Author II NASA/Washington, Memorandum

Keywords: Memorandum; SB; Viking; Sterilization; facility; MAST; clarification; procedures; agreement; sterile insertion
PQ-127

2 p. NASA/Washington Letter from Donald G. Fox, Ph.D., Planetary Quarantine Program Officer to Mr. Sam Schalkowsky, Exotech, Inc., Washington, D. C., Nov., 1969

I Author II NASA/Washington Letter

Keywords: Letter; Fox; Viking; meeting; bioburden; model; agenda; assay; sampling; procedure

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I Author II Title III NASA/Washington Preliminary Agenda

Keywords: Agenda; Viking; bioburden; meeting; model; assay; sampling; statistics
PQ-129
Jet Propulsion Laboratory, Pasadena, California.
August 8, 1969.

I Author II JPL/Pasadena Letter

Keywords: letter; Jet Propulsion Laboratory; resident; support; Pickering; agreement

PQ-130
Exotech Inc., Washington, D. C.
Comments on draft of Mariner Mars '71 PQ plan PD 610-18. March 6, 1970.

I Author II Title III Exotech Inc., Memorandum

Keywords: Memorandum; Exotech; MM '71; PQ plan; comments; review
PQ-131

Exotech Inc., Washington, D.C.
Additional comments on draft of Mariner Mars '71 PQ plan PD 610-18.
March 12, 1970.
1 p. Exotech Inc., Washington, D.C., Memorandum from E. Bacon
to A. Neill, March 12, 1970

I Author II Title III Exotech Inc., Memorandum

Keywords: Memorandum; Exotech; MM '71; PQ Plan; comments; review; burden; arrival
Comments;

PQ-132

Sandia Laboratories, Albuquerque, New Mexico.
2 p. Sandia Laboratories, Albuquerque, New Mexico, Letter from
H. D. Sivinski, to Dr. Don Fox, NASA Headquarters, Washington, D.C.,
January, 1969

I Author II Sandia Laboratories, Letter

Keywords: Viking; Sandia; Letter; assay; fracture; sensitivity; adsorption;
vacuum probe
Exotech Incorporated, Washington, D. C.
Visit with Al Hoffman of JPL. March 10, 1970.

I Author II Title III Exotech Inc., Memorandum

Keywords: Memorandum; Exotech; MM '71; Pre-launch analysis; Hoffman; Meeting; micrometeoroid dislodgement

National Aeronautics and Space Administration, Washington, D. C.,
Planetary Quarantine Office.
Planetary quarantine office program objectives. N.D.
NASA/Washington, Planetary Quarantine Office Program Objectives

I Author II Title III NASA/Washington Program Objectives

Keywords: Atlanta; PQAC; Program Objectives
PQ-135

National Aeronautics and Space Administration, Washington, D. C.
Headquarters funded projects.

NASA Headquarters Funded Projects

I Author II Title III NASA Headquarters Funded Projects

Keywords: Atlanta; PQAC; Program Objectives; evaluation; review; tasks; contracts

PQ-136


TASK: To participate in Viking design reviews. 1969.

2 p. NASA/Washington Task Description and Planning Sheet,
Referenced from NHB 8020.12 3.2(5), 1969

I Author II Title III NASA/Washington Task Description and Planning Sheet

Keywords: Viking, Task; Task descriptions; planning; Exotech; design review

TASK: Perform surveillance microbiological assays of facilities and hardware.

NASA/Washington Task Description and Planning Sheet, Referenced from NHB 8020.12 Par 3.2(8)(1)

I Author II Title III NASA/Washington Task Description and Planning Sheet

Keywords: Viking, Task; Task descriptions; planning; assay; Exotech

PQ-138

Kereluk, K.

I-III Authors IV Title V GWUBSCP Abstract

Keywords: abstract; George Washington University-Biological Sciences Communication Project = GWUBSCP; ETO; sterilization
Kereluk, K.
I-III Authors IV Title V GWUBSCP Abstract

Keywords: abstract; George Washington University-Biological Sciences Communication Project; Ethylene Oxide = ETO

Kereluk, K.
I-III Authors IV Title V GWUBSCP Abstract

Keywords: abstract; George Washington University-Biological Sciences Communication Project; Ethylene Oxide; water activity; humidity; D value
Kereluk, K.

Keywords: GWUBSCP; abstract; ethylene oxide; sterilization; humidity; lethality; water activity

Rueter, A.

Keywords: abstract; GWUBSCP; sterilization; ethylene oxide; toxicity; compatibility; lethality
Petersen, N. J.
Microbiological evaluation of the vacuum probe surface sampler, by N. J. Petersen and W. W. Bond.
March 20, 1970.

Keywords: George Washington University-Biological Sciences Communication Project = GWUBSCP; abstract; sampling; vacuum probe; surface; Minnesota

Whitfield, W. J.
The vacuum probe sampler, by W. J. Whitfield and M. E. Morris.
March 5, 1970.

Keywords: George Washington University-Biological Sciences Communication Project = GWUBSCP; abstract; Sandia; vacuum probe; sampling; surface
PQ-145

Anon


Title II GWUBSCP Abstract

Keywords: GWUBSCP; abstract; Sandia; sterilization; radiation; thermodiation; synergism

PQ-146

1 p. George Washington University-Biological Sciences Communication Project, Department of Medical and Public Affairs, Abstract

Title III GWUBSCP Abstract

Keywords: GWUBSCP; abstract; Detrick; sterilization; chemicals; progress report


Keywords: GWUBSCP; Abstract; contamination; control; handbook; NASA; Marshall; Sandia

NASA/Langley Memo. from James S. Martin, Jr./Viking Project Manager to NASA Code SB/Dr. D. G. Fox.

Keywords: Memorandum; Viking; T; clarification; agreement; Martin (J.S.)
National Aeronautics and Space Administration, Washington, D. C.
Viking '73 period of planetary quarantine. Nov. 4, 1969
1 p. NASA/Washington Memorandum from SB/Planetary Quarantine Officer, Lawrence B. Hall to SL/Viking Program Manager, Nov., 1969

I Author II Title III NASA/Washington Memorandum

Keywords: Viking; Memorandum; SB; T; N; clarification

Cornell University, Ithaca, New York, Center for Radiophysics and Space Research, Space Science Building.
August 18, 1970.

I Author II Cornell University, Letter

Keywords: Letter; Sagan; Jovian; Planetary Quarantine Requirements; Entry heating; Radiation; RTG
PQ-151

National Aeronautics and Space Administration, Washington, D. C.

I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; SL; Viking; Planetary Quarantine Provisions; review; comments

PQ-152

The George Washington University Medical Center, Washington, D. C.
Biological Sciences Communication Project.
May 17, 1971.
2 p. Biological Sciences Communication Project, Letter, from Frank D. Bradley, Senior Staff Scientist, to Dr. Vishwanath More, Asst. Professor in Political Science and Law, Johnston College, University of Redlands, May 17, 1971

I Author II Series note

Keywords: George Washington University; Letter; More; International Law; Back Contamination
PQ-153

National Aeronautics and Space Administration, Washington, D. C.  
1 p. NASA/Washington Memorandum from SL/Viking Program Manager, Planetary Programs-Walter Jakobowski to SB/Planetary Quarantine Officer-Bioscience Programs, March 1970

I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; SL; Viking; PQ plan; submittal; deviations

PQ-154

National Aeronautics and Space Administration, Washington, D. C.  
1 p. NASA/Washington Memorandum from SD/Planetary Quarantine Officer, Lawrence B. Hall to SL/Viking Program Manager, September, 1969

I Author II Title III NASA/Washington Memorandum

Keywords: Viking; memorandum; Project plan; review; comments; PQO; clean room; assay; amendment
Exotech Incorporated, Washington, D. C.
Notes on thermal radiation sterilization meeting. April 23, 1970.
3 p. Exotech Incorporated, Washington, D. C., Memorandum, from
E. Bacon to O53 File (LS), April 23, 1970

I Author II Title III Exotech Memorandum

Keywords: memorandum; Exotech; meeting; Sandia; Sterilization;
radiation; thermoradiation; status; report; minutes

Instruments: MS/GC unit slated for 1973 Mars landing. (News of
the $27-Billion Research Industry).
IN Industrial Research: 41, May, 1970

I Title II Jn. Cit.

Keywords: Viking; Mars; Science; MSGC; news release; publication;
characteristics
PQ-157

Estimation of microbial release probabilities from a Martian lander, by Samuel Schalkowsky and Paul S. Levy.
9 p., with 6 figures

I-III Authors IV Title V Exotech Inc. Report VI NASA Contract 
NASW-2062

Keywords: Exotech; Report; P(r); Mars; COSPAR; Leningrad; Schalkowsky; Levy

PQ-158

Angelotti, R.
15 p. Review Committee Report Submitted for the Use of the Planetary Quarantine Advisory Committee (PQAC)

I-VII Authors VIII Title IX Review Committee Report

Keywords: Report; Review; bioburden; model; estimation; prediction; JPL; Angelotti
PQ-159

Exotech Systems, Inc., Washington, D. C.


I Author II Title III ESI Memorandum

Keywords: Mercury; Venus; Comments; Memorandum; PQ plan; MM '73; Requirements; waiver; review; Exotech

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PQ-160

Murray, Bruce C.

Planetary contamination II: Soviet and U. S. practices and policies, (Quarantine can be neither absolute nor unilateral; U.S. policy should acknowledge Soviet practice), by Bruce C. Murray, Merton E. Davies, and Phillip K. Eckman.


I-III Authors IV Title V Jn. Cit.

Keywords: Davies; Status; USSR; P(N); Mars; Venus; history; publication
PQ-161

Sneath, P. H. A., editor.
Sterilization techniques for instruments and materials as applied to space research. (Issued) Nov., 1968.

I Editor II Title III COSPAR Technique Manual Series

Keywords: COSPAR; sterilization; techniques; probability nomenclature

PQ-162

National Aeronautics and Space Administration, Washington, D. C.
Interface of the P.Q. program with the Viking program, project and contractors.
Oct. 9, 1969.
2 p. NASA/Washington Memorandum, from Planetary Quarantine Officer Lawrence B. Hall to Planetary Quarantine Staff and Supporting Personnel

I Author II Title III NASA/Washington Memorandum

Keywords: Viking; memorandum; interface; agreements
PQ-163

2 p. NASA/Washington, Office of Space Science and Applications, Memorandum, from SB/Planetary Quarantine Officer-Bioscience Programs Lawrence B. Hall to SL/Viking Program Manager-Planetary Programs, March 12, 1970

Author II Title III NASA/Washington Memorandum

Keywords: deviation; Viking; memorandum; approval

PQ-164

2 p. NASA/Washington, Office of Space Science and Applications, Memorandum from SB/Planetary Quarantine Program Officer Lawrence B. Hall to Planetary Quarantine Advisory Committee Chairman and Members, July 15, 1970

Author II Title III NASA/Washington Memorandum

Keywords: PQAC; memorandum; Atlanta; agenda
PQ-165


I. Author II. Title III. NASA/Washington Memorandum

Keywords: memorandum; Viking; sterilization; alternative

PQ-166


Carl-Coran Heden, Letter of March 13, 1970, to the Members of the Panel on Planetary Quarantine

I. Author II. Letter

Keywords: Letter; Heden; COSPAR; Planetary Quarantine Panel; $P_x$; $P_f$; Contamination log
National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.
Jan. 6, 1969.

I Author II NASA/Washington Letter

Keywords: SSB; letter; Pr; D-values; status; Pg

---

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.
August 20, 1969.

I Author II NASA/Washington Letter

Keywords: SSB; P(N); letter; Prague; Cospar
PQ-169

National Aeronautics and Space Administration, Washington, D. C.
December 4, 1969.
4 p. NASA/Washington Letter from Lawrence B. Hall, Planetary Quarantine Officer, to Mr. George Derbyshire, Space Sciences Board of the National Academy of Sciences, Washington, D. C., Dec. 4, 1969

Author II NASA/Washington Letter

Keywords: SSB; letter; PQ status; T_e; T-period; N

PQ-170

National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.
March 24, 1970.
2 p. NASA/Washington Letter from Lawrence B. Hall, Planetary Quarantine Officer-Bioscience Programs to Mr. George Derbyshire, Executive Secretary, Space Science Board of the National Academy of Sciences, Washington, D. C., March 24, 1970

Author II NASA/Washington Letter

Keywords: Pg; SSB; Woods Hole; letter
PQ-171

National Aeronautics and Space Administration, Washington, D. C., Office of
Space Science and Applications.
1 p. NASA/Washington Memorandum from SB/Planetary Quarantine Officer,
Lawrence B. Hall to SL/Viking Program Manager, Feb. 20, 1969

I Author II Title III NASA/Washington Memorandum

Keywords: Viking; D values; memorandum; requirements

PQ-172

Jet Propulsion Laboratory, Pasadena, California.
Microbial survival after simulated meteoroid impact, by R. L. Olson, Ph.D.,
R. H. Green, Ph.D., E. A. Gustan, and A. J. Pilgrim, Ph.D.
21 p. Paper presented at the "Society for Industrial Microbiology Meeting",
August 1966

I-V Authors VI Title VII JPL Paper

Keywords: Test; micrometeoroid; JPL; dislodgement; survival

Contents: Experimental Program; Sterilization Certification Plan; Suggested Areas Requiring Further Investigation

Keywords: AVCO; Mars; Lander; Facility; Test
PQ-175

Martin Marietta Corporation, Denver, Colorado, Denver Division.  
Martin Marietta Corporation Viewgraphs from Martin Marietta Presentation on Viking Planetary Quarantine Program to NASA Headquarters on October 22, 1969

I Author II Title III MMC Viewgraphs

Keywords: Martin Marietta; Viking; Mars; VLC; PQ Program; Meeting

PQ-176


I Author II Title III NAS-NRC/SSB Memorandum

Keywords: SSB; Woods Hole; P_g; Report; Mars; Conservatism
FQ-177

National Aeronautics and Space Administration, Washington, D. C.
Models of Mars atmosphere (1967), (NASA Space Environment).
21 p. NASA Special Publication SP-8010

Contents: State-Of-The-Art, Development of models, choice of parameters for models, surface pressure, composition and molecular mass, temperature, density, gravity; Criteria; References

Keywords: Mars; Atmosphere; Model; Density; Gravity; Composition

FQ-178

Viking Project Management.
1973 Viking voyage to Mars.
(Reprint from the November 1969 issue of Astronautics & Aeronautics: 30-59)

Keywords: Viking; Mars; Mission; objectives; Science
Jet Propulsion Laboratory, Pasadena, California.  
Viking orbiter science briefing.  
NASA Viking Orbiter Science Briefing, September 12, 1969

Author II Title III NASA/VO Briefing

Keywords: Viking; VO; Meeting; Science Package; JPL
PQ-181

NASA/Langley Research Center, Hampton, Virginia, Viking Project Office.
NASA/Langley Viking Project # M73-115-0, Sept., 1969

<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>NASA/Langley Viking Project</th>
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Contents: Preliminary Design Payload; Mission Description; Spacecraft Description; Environmental Considerations; Special Considerations; Schedule; Appendix, additional orbiter engineering constraints

Keywords: Viking Project Plan; Spacecraft design; mission description; Mars; LaRC

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California Institute of Technology, Pasadena, California, Jet Propulsion Laboratory.

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<th>Authors</th>
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<th>JPL Tech. Report</th>
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Contents: Capsule Description; Assembly and Test; Sterilization Process Determination; Microbiological Monitoring; Sterilization Test Results; Conclusions; Recommendations for Future Programs

Keywords: JPL; CSAD; Sterilization; Assay; Sterilization Tests
PQ-183

Fox, D.
PQ requirements for planetary missions.
Sections A - E Paper by D. Fox, Aug. 20, 1970

I Author II Title III Paper
Keywords: Pg; Pc; period of biological interest; (Planets)

PQ-184

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I-II Authors III Title IV NASA/OART Working Paper
Keywords: entry heating; Mars; survivability; Ames
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The Boeing Company, Seattle, Washington.
Microbial release from solids after simulated hard landings, by S. J. Fraser, R. L. Olson, and R. H. Green. N.D. 9 p. The Boeing Company, Seattle, Washington, Abstract

I-IV Authors V Title VI The Boeing Company Abstract

Keywords: Boeing; Test; impact; f; g

PQ-186


I-III Authors IV Title V The Boeing Company Final Report

Contents: Test I; Test II; Test III

Keywords: Boeing; test; impact; f; g
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I Author II Title III Beckman Instruments, Inc., Tech. Proposal

Contents: Technical Management; Technical Approach; Resumes; Selected References

Keywords: Beckman; proposal; Viking; L

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I Author II Title III Beckman Instruments, Inc., Addendum

Contents: Answers to NASA Questions; Beckman Annual Report; ATO Brochure

Keywords: Beckman; proposal; Viking; Meeting; LaRC
NASA/Manned Spacecraft Center, Houston, Texas.
Apollo interior spacecraft sampling. Dec. 11, 1970.
2 p.

NASA/Manned Spacecraft Center, Houston, Texas, Letter from
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I Author II Title III NASA/Manned Spacecraft Center, Houston, Texas,
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Mariner Mars 1971 planetary quarantine plan (Preliminary), Part I,
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PD 610-18, Part I, Feb. 11, 1970

I-III Authors IV Title V JPL Project Document

Contents: Organization and Responsibilities; Probability of Contamina-
tion, Analysis Plan; Documentation; Data Treatment; Subcon-
tractor PQ Requirements; Facilities; Schedules; New Technolo-

gy

Keywords: Planetary Quarantine Plan; MM '71; Jet Propulsion Laboratory
PQ-191

Martin Marietta Corporation, Denver, Colorado, Denver Division.
Viking '75 project planetary quarantine plan. August 20, 1970.
6 Sections, with appendices, tables, & figures Martin Marietta
Corporation, Denver Division Coordination Draft # PL-3701009, August
20, 1970

1 Author II Title III MHC Coordination Draft IV NASA Contract
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Contents: Applicable Documents; Viking Project Integration; Viking
Lander Capsule System; Viking Orbiter System

Keywords: PQ Plan; Viking '75; Martin Marietta Corporation


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y by Samuel Schalkowsky.
Exotech Systems, Inc., Washington, D. C., Paper presented by
S. Schalkowsky at the Woods Hole Meeting, July, 1970

I-II Authors III Title IV Exotech Systems, Inc., Paper

Keywords: SSB; Woods Hole; Meeting; Minutes; P_g
National Aeronautics and Space Administration, Washington, D. C., Office of Space Science and Applications.
Revision of the value of $P_g$ for Mars.
Aug. 12, 1970.
1 p.

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Keywords: Mariner '71; Mars; $P_g$; Memorandum; Woods Hole; SSB

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Keywords: COSPAR; report; D values
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Contents: Scientific Objectives; Science Requirements; Landing Sites; Lifetime; Strategy for the Use of Two Spacecraft; Mission Definition Schedule

Keywords: Viking; Project Plan; Langley Research Center; Science Package

PQ-196


I Author II Title III NASA/Washington Memorandum

Keywords: Planetary Quarantine Officer; Comments; Mariner; Mars; 1971; Pre-launch Analysis
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July 1, 1970.
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I Author II Title III MMC, Denver Division Coordination-Copy

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I Author II Title III MMC, Denver Division Coordination-Copy

Contents: Applicable Documents; Approach to Contamination Control; Major Sources of Organic Contamination and Methods of Control; Additional Sources of Organic Contamination and Methods of Control; Other Contamination Sources and Methods of Control

Keywords: Viking; Contamination Plan; DRL; Martin Marietta Corporation

Keywords: American Institute of Biological Sciences (AIBS); Seminar; Atlanta; Agenda

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Keywords: Memorandum; Draft; Exotech; Comments; Mariner; Mars; 1971; Pre-launch Analysis
PQ-201

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Martin Marietta Corporation, Denver Division, VIKING: Status of Viking Analyses

I Author II Title III MMC Viking Analyses

Contents: Potential Contamination Events; JPL Analyses (MM71 and Viking); MMC Analyses; Summary

Keywords: MMC; Viking; PQ; Analysis; Model; Ejecta; Ejecta; Recontamination; View Graphs; Planetary Quarantine Working Group

PQ-202

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I Author II NASA/Washington, Letter

Keywords: Space Science Board; P, P, Mars; Planetary Quarantine Requirements
PQ-203

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I Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; SB; Viking; Minutes; Conservatism

PQ-204

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Space Science Board
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I Author II NAS-NRS, Space Science Board Letter

Keywords: Space Science Board; P; Quarantine period; 6 missions; Mars; rate of consumption of P_c
California Institute of Technology, Pasadena, California, Jet Propulsion Laboratory.
52 p., with appendix Jet Propulsion Laboratory, Pasadena, California, Report no. 605-87, PD 141, May 22, 1968

I-II Authors III Title IV JPL Report

Contents: Mission Description; Mathematical Model; Analysis and Allocation of $P_C$; Small Population Sources

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I Author II Title III NASA Policy Directive

Keywords: Lunar; Biological; Organic; Contamination; Policy; Directive
PQ-207

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Outbound planetary biological contamination control: Policy and responsibility.
Sept. 6, 1967.
2 p. National Aeronautics and Space Administration, Washington, D. C.,
Policy Directive No. NPD 8020.10, Sept. 6, 1967

I Author II Title III NASA Policy Directive

Keywords: Biological; Contamination; Policy; Directive; NASA

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I Author II Title III AIBS, Planetary Quarantine Seminar Abstracts

Keywords: Planetary Quarantine Seminar; Abstracts; Williamsburg; American Institute of Biological Sciences
PQ-209

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I Author II Title III NASA Report

Keywords: COSPAR; Space Science Board; Post-launch; MM'64

PQ-210

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I Author II Title III NASA Report

Keywords: COSPAR; Space Science Board; Post-launch; VM'67
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Post-launch analysis report: Mars Mariner '69.

Author II Title III NASA Report

Keywords: COSPAR; Space Science Board; Post-launch; MM'69

Nikander, J.
Some problems posed by the Planet Venus, by J. Nikander.

Author II Title III GWUBSCP Abstract

Keywords: GWUBSCP; Venus; surface; atmosphere
PQ-213

Cameron, R. E.
Bacterial growth in agar subjected to freezing and thawing, by R. E. Cameron, G. B. Blank and N. H. Horowitz.

I-II Authors III Title IV GWUBSCP Abstract

Keywords: GWUBSCP; Horowitz; Bacteria; Growth; Freezing; Thawing

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PQ-214

Cornell, R. G.

I-II Authors III Title IV GWUBSCP Abstract

Keywords: GWUBSCP; contamination; models; estimation
PQ-215

Phillips, G. B.

Keywords: GWUBSCP; sampling; vacuum probe; Becton, Dickinson; NASA; Langley

PQ-216

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Keywords: Viking; Martin Marietta Corporation; Document; Status
Battelle Memorial Institute, Columbus, Ohio.
1 p. The George Washington University-Biological Sciences Communication Project Abstract, from Battelle Memorial Institute on Research conducted from 1 Sept. 1968 to 30 June 1970

Keywords: Battelle; Report; Spacecraft; materials; nutrient; fungicide; Abstract

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I Author II Title III Exotech Systems, Inc., Memorandum

Keywords: Memorandum; Comments; Exotech; Swenson; Survivability; Entry; Jovian

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I Author II Title III Exotech Systems, Inc., Memorandum

Keywords: Seattle; Memorandum; Exotech; Listing; Tasks; Semi-Annual Seminar
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Planetary Explorer/Venus mission. Section 7 - Planetary quarantine.
NASA/GSFC, Greenbelt, Maryland, Planetary Explorer/Venus Mission, Report, Section 7 - Planetary Quarantine

I Author II Title III NASA/GSFC Report

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Keywords: Planetary Explorer; Analysis; Venus; Report; Goddard Space Flight Center (GSFC)

PQ-222

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I Author II Title III Exotech Systems, Inc., Memorandum

Keywords: Memorandum; Exotech; Planetary Explorer; Venus; Comments; Analysis
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Review of section 7 planetary quarantine of a report on planetary
Planetary Quarantine Officer, to GSFC/Paul Marcotte THRU SL/Ronald
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I Author II Title III NASA/Washington, Memorandum
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March 9, 1971.
2 p. Jet Propulsion Lab., Pasadena, Calif., Letter from Dan
Schneiderman, Manager/Mariner Mars 1971 Project, to SL/Earl W. Glahn,
MM 71 Program Manager, NASA/Washington, March 9, 1971 and Enclosure
date March 4, 1971

I Author II JPL Letter and Enclosure
Keywords: Letter; JPL; MM '71; Pre-launch Analysis; Revision
Contents: Scope; Applicable Documents; Planetary Quarantine Requirements; Activities Plan; Contractor Planetary Quarantine Requirements; Documentation; Data Treatment

Keywords: Ames; Pioneer; Planetary Quarantine Plan; Jupiter

Keywords: Jet Propulsion Lab.; Outer Planet Planetary Quarantine; Seattle; COSPAR; Abstract
PQ-227

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I Author II Sandia Laboratories Letter

Keywords: Sandia; Letter; Seattle; Title; COSPAR; Papers

PQ-228


I Author II U. S. Dept. of Health, Education, and Welfare, Letter

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1 p. NASA/Washington, Letter, from Lawrence B. Hall, Planetary Quarantine Officer to Dr. Wolf Vishniac, Dept. of Biology, University of Rochester, April 14, 1971

Author II NASA/Washington Letter

Keywords: NASA; Hall; Letter; Seattle; Vishniac; COSPAR

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PQ-230

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Author II Title III NASA/Washington Memorandum

Keywords: Memorandum; NASA/SL; Mariner Mars '71; Revision A; Planetary Quarantine Plan
PQ-231

The Boeing Company, Seattle, Washington.

I-III Authors IV Title V The Boeing Co., Abstract

Keywords: JPL; COSPAR; Seattle; Abstract; D. M. Taylor; Erosion; Release

PQ-232

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1 p. Jet Propulsion Laboratory, Pasadena, California, Abstract, Feb., 1971

I-III Authors IV Title V JPL Abstract

Keywords: COSPAR; Seattle; Abstract; JPL; Mansour; Recontamination
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A re-evaluation of material effects on microbial release from solids, by D. M. Taylor, S. J. Fraser, E. A. Gustan, R. L. Olson, and R. H. Green.  
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Keywords: Pf, Jet Propulsion Laboratory; COSPAR; Seattle; Abstract; Taylor

Naugle, John E.  

Keywords: NASA; Space Science Board; Pf; Letter; Woods Hole
PQ-235

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I Author II Title III NASA/Washington Memorandum
Keywords: NASA/SL; Memorandum; Fox; Review; Viking; Planetary Quarantine Plan; Schedule

PQ-236

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I Author II U. S. Dept. of Health, Education, and Welfare, Letter
Keywords: Favero; Phoenix; Letter; Buried load; grinder
PQ-237


NASA/Washington, Letter, from Lawrence B. Hall, Planetary Quarantine Officer, to Mr. Leo Daspit, Viking Program Office, Langley Research Center, Hampton, Va., March 31, 1971

I Author II NASA/Washington, Letter

Keywords: Letter; NASA/SB; Policy; Viking; Allocation; UV

PQ-238


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I Author II Title III Martin Marietta Presentation

Keywords: Martin Marietta; Presentation; Recontamination; Viking; Bioshield Release; $P_e$; UV; Langley
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I Author II Title III NASA/Washington, Memorandum

Keywords: NASA/SL; Memorandum; PG; Mars

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I Author II Title III NASA Policy Directive

Keywords: Biological; Contamination; Policy; Directive; National Aeronautics and Space Administration
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2 p. Paper presented at the AIBS Planetary Quarantine Committee Meeting, Denver, Colo.,

I-II Authors III Title IV Citation

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I-II Authors III Title IV Citation

Denver; PQAP; Pr; Exotech; Viking; Mars
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I-II Authors III Title IV Memorandum

Memorandum; Exotech; Mariner Mars '71; post launch analysis; review

PQ-245

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Mariner Mars 1971 post-launch analysis of compliance with COSPAR recommendations,
20 p. includes figures and tables. JPL Report.

I-III Authors IV Title V Series note

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   a. Results of microbiological assay of MM71-2 (ESF Assay 1), by A. Hoffman.
   b. Results of encapsulation microbiological assay of MM71-1, by A. Hoffman.
      JPL Interoffice Memo. IOM 2945-2290, May 18, 1971.
   d. Revised spacecraft ejecta efflux estimates for Mariner 71-2, by A. Hoffman.

I-II Authors III-VI Titles VII-X Series notes

Mariner Mars '71; Jet Propulsion Lab.; analysis; memoranda; biological assay; efflux ejecta

PQ-247

Levinthal, Elliott

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I Author II Title III Series note

Quarantine period; orbit lifetime; Viking; Levinthal; letter
PQ-248

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I Author II Title

Viking; MMC; report; documentation control; PQ schedule; milestones
PQ-250

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I Author II Title III Series note IV Contract

PQ Plan; Viking; Langley; draft

Contents: I. Introduction; II. Applicable Documents; III. Viking Project Integration; IV. Viking Lander Capsule System; V. Viking Orbiter System; VI. Viking Launch Vehicle System, Appendix A. Planetary quarantine status (PQS) and directory (PQD) systems and Appendix B. Planetary quarantine plan glossary.

PQ-251

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Viking lander bioburden tabulation.

I Author II Title

Viking; Langley; burden; prediction; buried; MMC; presentation
PQ-252


I-III Authors  III Title  IV Subject-Developments of NASA PQ Program. V Series note

Space Science Board; letter; NASA/Hdqts.; PQ status; Odishaw

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I Title  II Series note

General Electric; data; management; Viking; Langley
PQ-254

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23 p. [Charts and illustrations] n.d.

I-II Authors III Title IV (Period of Quarantine: 20 years, beginning Jan. 1, 1969)

MMC; Viking; presentation; Langley; PQ requirements; constraints; vu graphs

PQ-257

National Aeronautics & Space Admin., Washington, D.C. Office of Space Sci. & Applications,
Biosci. programs. PQ program officer.
Comments on draft Viking planetary quarantine plan, by Lawrence B. Hall.

I-II Authors III Title IV Series note

NASA/Hdqts.; PQ plan; Viking; comments; memorandum
PQ-258

National Aeronautics & Space Admin., Washington, D.C. Office of space sci. and applications, Biosci. programs, PQ program officer.

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I-II Authors III Title IV Series note

NASA/Hdqts; memo; Viking; sterilization plan; comments; PQAP

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PQ-259

National Aeronautics & Space Admin., Washington, D.C. Office of Space sci. and applications.

Planetary programs, Mariner Mars '71, manager.

Letter from Earl W. Glaheh to Dan Schneiderman, May 27, 1970.

1 p. May 27, 1970

I-II Authors III Title IV JPL, Schneiderman)

NASA/Hdqts.; Mariner Mars '71; assay plan; approval; JPL; letter
Comments on preliminary microbiological assay and monitoring plan, by Arthur H. Neill.

I-II Authors III Title IV Series note

NASA/Hdqts.; Mariner Mars '71; assay plan; comments; approval; memo.

Letter from Dan Schneiderman to Earl W. Glahn, July 30, 1970.
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I-II Authors III Title IV Series note

NASA/Hdqts.; Mariner Mars '71; assay; letter

PQ-263


Planetary quarantine parameters. n.d. 1 p. PQ Parameters for Planets.

I Author II Title III Series note

PG; Pc; NASA/Hdqts.; status; Mars; Venus; Mercury; Jupiter; Saturn; parameters
PQ-264

National Aeronautics & Space Admin., Washington, D.C.  
Planetary quarantine status for approved planetary missions, n.d.  

Author  Title  Series note
NASA/Hqts.; PQ constraints; Pc; PQ plans; status; Viking; Mariner Mars; Pioneer; M-V-M

PQ-265

National Aeronautics and Space Admin., Washington, D.C. Planetary Quarantine Officer.  
Minutes of conservatism meeting, Memorandum on...  

Author  Title  Memo
NASA/Headquarters; memo; conservatism = safety margins; meeting; Viking; buried load; P_r
PQ-266

Major planetary quarantine program activities,
1 p. Agenda, [Dec. 1970]

Author Title Series note
NASA/Headquarters; agenda; PQAP; Atlanta; Seattle; program planning

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PQ-267

Fifth quarterly progress report, contract NASw-2062, Planning, evaluation and analytical studies to implement planetary quarantine requirements, by E.J. Bacon.

Author Title Series note
Exotech; quarterly report; progress
PQ-268

Proposed meeting of Space Science Board ad hoc committee on COSPAR Sterilization Standards.
1 p. Agenda, [April 1971]

Author: National Aeronautics and Space Admin,
Title: Proposed meeting of Space Science Board ad hoc committee on COSPAR Sterilization Standards.
Series note: NASA/Headquarters; program planning; SSB; agenda

PQ-269

California. Institute of Technology, Pasadena, Calif. Jet propulsion lab.

Author: California. Institute of Technology, Pasadena, Calif. Jet propulsion lab.
Series note: MVM; JPL; report; bias; Mercury; Venus; maneuver; impact; P(r); memo.
California. Institute of Technology, Pasadena, Calif., Jet propulsion lab.

I-II Authors III Title IV Series note

Letter; MVM; P(r); Mercury; Venus; impact; JPL; Green; Clarke

Microbiological contamination log for planet Venus, by E.J. Bacon.

I-II Authors III Title IV Series note

Exotech; log; Venus; contamination
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I-II Authors III Title IV Series note

Exotech; log; Mars; contamination

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I-II Authors III Title IV Series note

NASA/Headquarters; Hall; SSB; policy; parameter values; \( P_G \); Mercury; outer planets; deflection; T
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I Author II Title III Series note

Exotech; report; N; COSPAR; Mars; P_g; T; P(n)

PQ-275

Definition of probability of planetary contamination, Memorandum from E. Bacon to L.B. Hall. July 24, 1970.

I-II Authors III Title IV Series note

Exotech; memo; P_c; definitions; COSPAR
PQ-276

Hall, Lawrence B.
Recent developments in planetary quarantine, by Lawrence B. Hall.

I Author II Title III Series note
Hall; report; PQ Program; policy; history; status; London; COSPAR

PQ-277

California. Institute of Technology, Pasadena, Calif. Jet propulsion lab.
Letter from D. Schneiderman to E.W. Glahn (MM 71 Program Manager, NASA) and Memorandum 2945-2225 on Response to NASA comments regarding the preliminary draft of MM'71 Pre-Launch analysis document, by A.R. Hoffman and R.J. Reichert.

I-IV Authors V Title of Letter VI Title of Memo VII Series note
Letter; JPL Memo; JPL; MM '71; pre-launch analysis; revision; bio-burden; parameter values; spacecraft efflux ejecta
PQ-278


I-II Authors III Title

SSB; NASA/Headquarters; L.B. Hall; vu graphs; policy; Pioneer; USSR; Sagan; Mercury; presentation; parameters; values; model

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I-II Authors III Title IV Series note

Exotech; report; status; ETO; meb; specification
Planetary Quarantine Advisory Panel action items/suggestions: June 1971.
4 p. PQAP Action Items/Suggestions (Seattle, Wash.), June 1971

I Title II Series Note

PQAP; Seattle; minutes; meeting; P(r); m<sub>Pl</sub>; d-value; suggestions

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Sign off on the Mariner Mars '71 post launch analysis, Memo from L.B. Hall.

I-II Authors III Title IV Series note

Hall; memo; MM'71; post launch analysis; PQO; approval
PQ-284

Hall, Lawrence B.
Potential cost of planetary quarantine. n.d.
1 p.

I Author II Title

report; NASA; cost; Viking; Jovian; Mars

PQ-285

Hall, Lawrence B.
Status of thermoradiation, n.d.
1 p.

I Author II Title

report; NASA; thermoradiation; sterilization; Sandia; Viking; cost
PQ-286


Letter from L.B. Hall to Dr. Elliott C. Levinthal, Stanford University, Sept. 13, 1971.


I-Il Authors III Title

NASA; PQO; letter; Viking; bioshield; UV; \( P_g \)

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Questions for PQAP, 9/21/71

1 p.

I Title

PQAP; agenda; KSC; \( P(r) \); parameter values; \( m_b \)
PQ-288

Documented definitions of planetary contamination, by E.J. Bacon

I-II Authors III Title IV Series note

Exotech; Bacon; memo; definition; Pc; Woods Hole

PQ-290

Memorandum from E.J. Bacon to Job 053 File on notes — NASA presentation, August 27, 1970.

I-II Authors III Title IV Series note

Exotech; Bacon; memo; presentation; Pg; Viking
PQ-292

(see revised PQ-11)
National Aeronautics and Space Admin., Washington, D.C. Office of space sci. & applicator
Planetary programs.
Letter from L.B. Hall to E. Bacon on Viking document M75-127-1 revision.

I-II Authors III Title IV Series note

NASA/Headquarters; Hall; Viking; document; review

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PQ-293

National aeronautics and space administration, Washington, D.C. Office of space science
and applications.
Letter to Dr. Charles H. Townes, SSB, on planetary quarantine policies.

I Author II Title III Series note

Letter; Naugle; SSB; policy; request; review; P(g); Mercury; outer planets; bus deflection
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H:Hall; memo; policy; revision; authorization; SSB; official

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P:PO; Hall; PQO; SSB; Hoffman; memo; policy; review; opinion; P(g); Mars; SAG; Goody
Ad hoc Committee (Outer Planet) for Science Advisory Group.

SAG; report; outer planets; PQ requirements; Jupiter; Saturn; Uranus; Neptune; penalty; Goody

2 pp. Letter to LB Hall, PQO, Code SL
Exotech; letter; comments; review; Viking; PQ provisions; Hall; Bacon
PQ-298

Microbial growth in simulated Martian environment, by E.J. Bacon.
1 page. Memorandum to 053 file, July 20, 1970.

I-II Authors III Title IV Series note

Bacon; Mars; memo; atmosphere; survival; P(uv); P(vt); test; experiment; data

PQ-299

Documented definitions of planetary contamination, by E.J. Bacon.

I-II Authors III Title IV Series note

Bacon; Exotech; memo; Hall; definitions; Woods Hole; P_c; contamination
PQ-300

Status review—PQ support project, by E.J. Bacon.

I-II Authors III Title IV Series note

Exotech; Bacon; memo; report; meeting; status; contract; minutes

PQ-301

Microbiological contamination log for planet Mars, December 31, 1971, by E.J. Bacon.

I-II Authors III Title IV Series note

Bacon; report; log; Mars; contamination; COSPAR; Exotech
Microbiological contamination log for planet Venus, by E.J. Bacon.

I-II Authors III Title IV Series note

Bacon; Exotech; COSPAR; report; log; Venus; contamination


I-II Authors III Title IV Series note

Exotech; Bacon; Hall; letter; P(sa); Pioneer; review; comments; evaluation
Estimation of planetary contamination probabilities by non-landing vehicles, by S. Schalkowsky.

Exotech; Schalkowsky; report; $P_c$; non-landing vehicles; probability of arrival; method; analysis

Exotech review of Viking planetary quarantine plan, by E.J. Bacon.

Bacon; Exotech; memo; Viking; PQ plan; review; schedule; assignment
PQ-306


I-II Authors  III Title  IV Series note
Schalkowsky; Exotech; memo; Pioneer; prelaunch; comments; Jupiter; Swenson

PQ-307

PQAP's support of NASA's PQ program, by E.J. Bacon.
1 p. Outline by E.J. Bacon for PQAP meeting, Cape Kennedy, Jan. 1972.

I-II Authors  III Title  IV Series note
Exotech; Bacon; PQAP; Cape Kennedy; note; presentation; orientation
PQ-308

Comments on MM '71 microbiological assay and monitoring plan, by E.J. Bacon.

I-II Authors III Title IV Series note

Exotech; Bacon; Neill; NASA/SB; memo; comments; review; MM '71; assay plan

PQ-309

3 p. Memorandum from S. Schalkowsky to L. Hall, July 24, 1970....

I-II Authors III Title IV Series note

Exotech; Schalkowsky; memo; Hall; Viking; sterilization plan; review; comments; MMC
PQ-310


Viking meeting September 10 and 11, 1970 at Langley Research Center, by E. J. Bacon.

I-II Authors III Title IV Series note

Exotech; Bacon; memo; minutes; meeting; LRC; Viking; MMC; vu graphs; model; bioshield; models; requirements

PQ-311


Revised PQ requirements for Pioneer F/G, from E. J. Bacon/via S. Schalkowsky.

I-II Authors III Title IV Series note

Exotech; Bacon; Schalkowsky; memo; Hall; PQ requirements; Pioneer; Jupiter; P(N); P(G); T; recontamination; revised
PQ-312


Comments on Pioneer F/G planetary quarantine plan, undated preliminary draft PC-204, from E.J. Bacon/via S. Schalkowsky.

I-II Authors III Title IV Series note

Exotech; Bacon; Schalkowsky; memo; Hall; Pioneer; PQ plan; review; comments

PQ-313


Summary of comments compiled during review of January 14 of coordination draft PQ plan as edited by D. Fox and Exotech.

I Author II Title III Series note (Memorandum on Viking '73 PQ Plan)

PQ plan; Viking; memo; comments; review; draft; Fox; Bacon; Exotech

I-II Authors III Title IV Series note

PQO; memo; Pioneer; certification; launch; Jupiter; compliance; approval; recommendation; pre-launch analysis


I-II Authors III Title IV Series note

COSPAR; Secretariat; letter; MM '71; post-launch analysis

National aeronautics and space administration, Washington, D.C. Space science, Deputy assoc. administrator.
PQ-318

National aeronautics and space administration, Washington, D.C. Office of space science and applications. Planetary quarantine officer.
...Spacecraft sterilization technology seminar. Letter concerning information discussed at the..., by Lawrence B. Hall. Feb. 23, 1972.

I-II Authors III Title IV series note

Letter; Hall; Sagan; request; JPL; papers; seminar; reply

PQ-319

National aeronautics and space administration, Washington, D.C. Office of space science and applications. Planetary quarantine officer.
...Sterilization vs. off-loading science. Note to R.S. Kraemer, by L.B. Hall.
1 p. Note/SL.

I-II Authors III Title IV Series note

Note; Hall; off-loading; SSB; decision; heat sterilization; Viking; policy
PQ-320

National aeronautics and space administration, Washington, D.C. Office of space science and applications. Planetary quarantine officer.

...Spore longevity. Letter to M.W. Miller concerning..., by Lawrence B. Hall.
1 p. Letter/SL.

I-II Authors III Title IV Series note

letter; spores; lifetime; P(vt); Hall

PQ-321

Hall, Lawrence B.

Rough estimate of minimum P.Q. — Viking, by L.B. Hall. n.d.
2 p. PQ Policy Considerations.

I-Author II Title III Series note

Hall; estimate; PQ (minimum); M; Mars; Viking; policy
PQ-322

1 p. Draft for Assurance action.

I Title II Series note

COSPAR; SSB; USSR; request; assurance; international agreement; policy

PQ-323

National aeronautics and space administration, Washington, D.C. Office of space science and applications, Planetary quarantine officer.
Meeting of the NAS committee on space biology and medicine, Space Biology section, by Lawrence B. Hall. Jan. 31, 1972.
1 p. Memorandum to SL/H.S. Young.

I-II Authors III Title IV Series note

Memo; Hall; SSB; policy; review; P(g); Mars; value; heat sterilization; meeting
PQ-324

National aeronautics and space administration, Washington, D.C. Office of space science and applications, SL/Program engineer, MVM.


I-II Authors III Title IV Series note

Memo; MVM '73; NASA/SL; P(N); Venus; deflection; aim point; atmosphere

PQ-325


I Title II Vu graphs on PQ Parameters, Viking.

Vu graphs; Viking; parameters; P(uv); P(r); Dv; values
APPENDIX B

Thesaurus Terms
CATEGORY 1

Medium

Abstract
Agenda
Document
Draft
DRL
Guidelines
Letter
Memorandum
Minutes
News Release
Paper
Plan
Proposal
Report
Questionnaire
View Graph
CATEGORIES 2 & 3

Originator/Receipient

AIBS
Ames
AVCO
Apollo
Bacon
Battelle
Beckman
Becton, Dickinson
Boeing
Brown
COSPAR
Detrick
Exotech
Explorer
Favero
Fox
General Electric
Green
Goody
GWUBSCP
GSFC
Hall
Heden
Horowitz
JPL
LaRC
Levinthal
Little (A.D.)
Mariner

Monsour
MMC
Martin
More
NASA
NASA/SB
NASA/SL
Neill
Nelson
Odishaw
Phoenix (PHS)
Pioneer
PQAC
PQAP
PQO
PQWG
Sagan
Sandia
Schalkowsky
Sneath
SSB
Swenson
Taylor
USAMRDC
USSR
Viking
Viking Quarantine Evaluation
Board (VGER)
Vishniac
Characterization of Contents

Action
Agreement
Allocation
Alternative
Analysis
Appreciation
Approval
Assay
Assay Plan
Briefing
Comments
Constraints
Contamination Log
Contamination Plan
Control Drawing
Correspondence
Criteria
Directive
Deviation
Certification
Definition
Estimation
Evaluation
Listing
Mission Description
Mission Statement
Model
Policy
Post-Launch Analysis
PQ Plan
PQ Provisions
Pre-Launch Analysis
Presentation
Recommendation
Request
Review
Revision
Schedule
Sterilization Plan
Status
Submission
Task
Test
Verification
Workload
**CATEGORY 5**

Flight Projects and Planets

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<td>Venus</td>
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<td>Viking</td>
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<td>Neptune</td>
<td>Zond</td>
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</tbody>
</table>
CATEGORY 6

Associated Places, Organizations, etc.

Antartic
Atlanta
COSPAR
Denver
Houston
Kennedy
Leningrad
Minnesota
Palo Alto
Pasadena
Prague
Seattle
Tokyo
Williamsburg
Woods Hole
### CATEGORY 7

**Subject Matter**

CATEGORY 7

(Continued)

Relaxation
Release
Repairs
Resident
Revision
RTG
Sampling
Schedule
Science
Simulation
Small Population Sources
Solar Wind
Spacecraft
Species
Status
Sterile Repair
Sterilization
Sterilization Model
Sterilization Plan
Sterilization Tests
Submittal = Submission
Support
Surface
Survival = Survivability
T = Quarantine Period
Task
Techniques
Test
Thawing
Thermal Radiation
Thermal Vacuum
UV = Ultraviolet
Vacuum Probe

Value
Verification
View Graphs
VLC
Workload